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ORGANISED BY:

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Book of abstracts

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WELCOME MESSAGE

Dear colleagues,

On behalf of the Local Organizing Committee, I am honored to welcome you to the **26th Triennial Meeting of the International Academy of Legal Medicine (IALM)**. We have long anticipated this opportunity to meet in Athens, share knowledge and expertise, connect with old and new colleagues, inspire and get inspired, and advance our field of Legal Medicine.

I believe that our Congress moto "**Science and Justice through Research and Innovation: An Interdisciplinary Congress**" makes an important statement about the objectives and motivation for our science.

The International Scientific Committee has organized a vibrant scientific program, and we are very proud to present highly respected and internationally acknowledged speakers to lead it.

Among the strong points of this meeting, I would like to highlight the enormous participation of young specialists, as well as the global contribution by experts from more than 55 countries.

My deepest gratitude is addressed to the IALM Presidium, as well as all members of the Local and International Scientific Committees, for their incredible support and devotion in putting together this Meeting. Without them, we would not be able to complete this task.

I do hope that your participation in the Meeting and your stay in Athens will be a memorable experience.

Chara Spiliopoulou

IALM 2024 LOC President
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ORGANIZATION - COMMITTEES

INTERNATIONAL ACADEMY OF LEGAL MEDICINE (IALM)

The International Academy of Legal Medicine (IALM) – formerly known as the "International Academy of Legal Medicine and Social Medicine" – was originally founded in 1938 (in Bonn).

Its aim is the furthering of scientific progress in the field of Legal Medicine, especially by promoting collaboration and the exchange of information among specialists on an international level, by holding scientific meetings and congresses, by recommending guidelines in the different areas of Legal Medicine, and through Scientific Publications.

The IALM shall aim to collaborate with other Scientific Societies and shall endeavor to provide as required the information and expertise to answer public inquiries related to the discipline of Legal Medicine.

HELLENIC SOCIETY OF FORENSIC MEDICINE AND FORENSIC SCIENCES (HSFM&FS)

The Hellenic Society of Forensic Medicine and Forensic Sciences was founded in 2018 in Athens and was officially recognized by the Hellenic State. All the Hellenic academic Departments of Forensic Medicine are supporting the new Forensic Society which comprises the majority of the Forensic Pathologists in Greece. The purpose of the Hellenic Society of Forensic Medicine and Forensic Science is to promote the education, the practice and the official representation of Forensic Medicine in national and international level.

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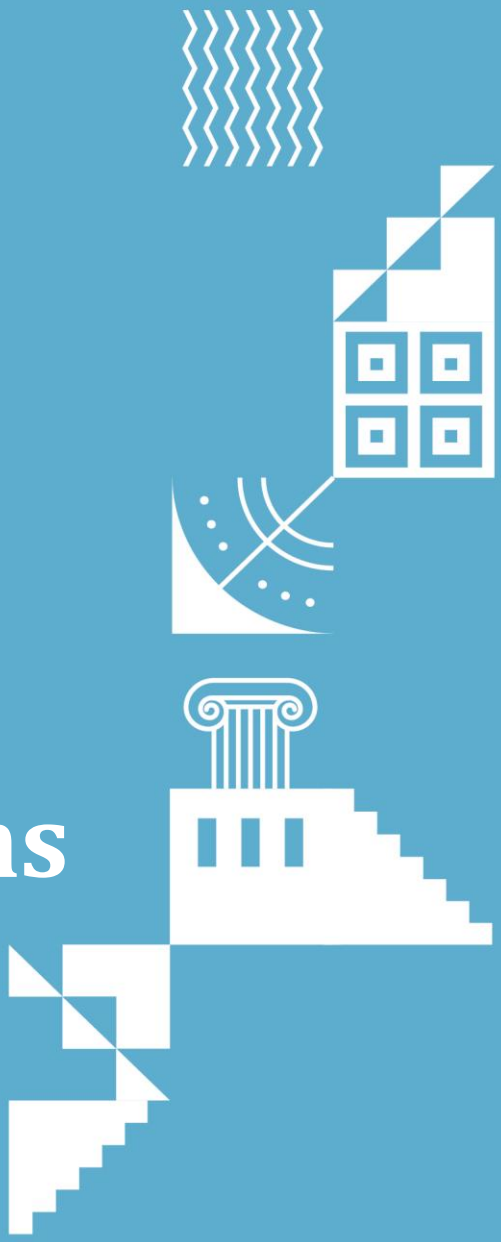
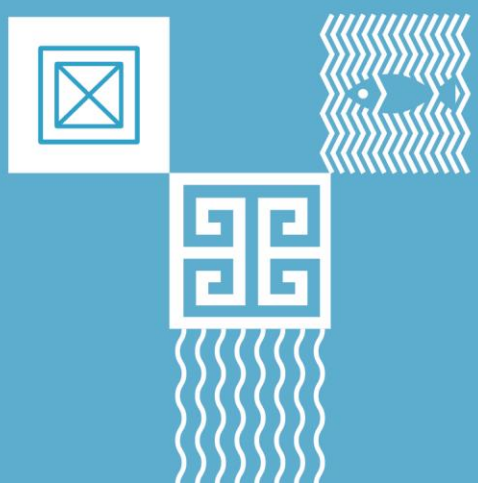
Oral Communications





Oral Communications 01: Forensic Pathology I

OC01-1

Branch in the Heart: Unusual Fatal Self-Inflicted Injury

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During post-mortem examinations, forensic pathologists encounter various kind of injuries, and their duty is to identify whether they were a direct cause of death or could contribute to death, or whether they were caused by a third party, were a result of an accident or were self-inflicted. Sometimes it is difficult, or even impossible, to identify the mechanism and circumstances of injuries, in particular, if very unusual tools were used.

The case presents a suicide committed by a 21-year-old man who dug a broken tree branch into his chest through a recent scar resulting from a similar suicide attempt he made with a knife a few weeks earlier. Owing to lower skin resistance in the site of the scar which remained from the recent wound, he was able to dig in quite a blunt branch, which pierced through and penetrated the skin and pericardial sac to the heart and caused death.

In this case, despite the unusual tool, i.e., a tree branch, which is indubitably difficult to dig into the chest on one's own, suicide was confirmed on the basis of similar attempted self-mutilation, which was committed several weeks earlier, and a history of mental disorders. In addition, medical records from the psychiatric hospital where the man was hospitalised for 1.5 months following the previous attempt, indicated that he had suffered from delusions and stabbed himself with a knife because "he thought that God wanted him to do that". What is interesting, as the patient then stated, at the age of 17 yo he diagnosed himself with ADHD and treated it on his own with amphetamines because "he heard that it helped". As a reason for his attempted suicide, he mentioned remorse for his misuse of psychoactive substances. In the interview, he admitted that he had used MDMA, codeine, benzodiazepines and NPSs. He effectively committed suicide 3 days after leaving the psychiatric ward, where he had been hospitalised for 1.5 months after being admitted immediately after his previous suicide attempt.

The case presented herein reflects the determination of a young man with mental disorders which could have resulted from the use of psychoactive substances, who effectively committed suicide by using an unusual tool after several previous attempts made with the use of more common suicide methods. In addition, it confirms data indicating that, in certain cases, despite specialised psychiatric hospital treatment and an alleged improvement following therapy, the patient's disease is that severe and advanced that shortly after having left the hospital, the patient makes another suicidal attempt, which is frequently effective and it is hard to prevent it.

OC01-2

The Death of a 6-Year-Old Child-Violent or Non-Violent?

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From a legal and medico-legal point of view, in Romania death is considered violent when it is caused by external factors - (namely, the intervention of a traumatic agent, external to the body), or non-violent, when it occurs from internal causes, pathological (namely, non-traumatic diseases). The role of the forensic pathologist, regardless of the time passed since the injury occurred, is to determine whether there is a causal relationship between the alleged injury and the death.

The authors present the case of a 6-year-old girl, who, after an alleged traumatic episode (she was punched in the abdominal area by a 5-year-old boy for not sharing her bicycle), falls on the kitchen floor and vomits blood, 12 hours after the incident. The mother calls the ambulance, the girl is transported to a hospital where investigations are carried out, then transferred to a children's hospital, where she arrives in a serious condition, with abundant, repeated hematemesis and hematochezia.

Emergency surgery is performed including: exploratory laparotomy, exploratory gastrotomy, (which finds approx. 1000 ml of fresh blood in the stomach), as well as gastro-esophageal endoscopy (which finds active bleeding, originating from the lower esophagus, from the left lateral side, arterial type, with high flow, pulsating simultaneously with the heart rhythm). A Blakemore tube is applied, which controls the bleeding, and an exploratory right thoracotomy is performed, with penetration into the mediastinum through the 4th intercostal space. The esophagus is visualized and dissected. An important fistula between the descending aorta and the esophagus, with increased flow is found. The aorta is clamped above and below the lesion, the fistula is sutured, but during this time the girl suffers two cardiac arrests, the last one being fatal.

The paper presents theoretical data regarding aorto-esophageal fistulas, on-site investigation and reconstitution data, data from the case file-witness statements, video recordings of some surveillance cameras in the area and the time interval in which the aggression allegedly took place, data from the medical documentation drawn up at the hospitals, the video recording of the gastro-oesophageal endoscopy, the necropsy findings and the post-autopsy laboratory examinations (histopathological and toxicological examinations).

Although the witness statements sustained an aggression against the girl (family members), the traumatic episode invoked could not be proven - no external or internal traumatic injuries were found either during the hospitalizations or at the autopsy and the video recordings did not surprise any traumatic episode.

It was concluded that the girl's death was non-violent and was due to upper digestive hemorrhage following the rupture of an esophago-aortic fistula for which surgical intervention was performed. The causal relationship between the alleged traumatic episode (which could not be proven) and death could not be established.

OC01-3

WITHDRAWN

OC01-4

WITHDRAWN

OC01-5

A Diamond in the Rough – Myocardial Infarction as a Complication of "Near Hanging" in an Adolescent. Exceptionally Rare Find Case Report

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"Near hanging" is a term used to refer situations in which individuals who attempted suicide by hanging, surviving at least long enough to be taken to the hospital. It is an infrequent cause of trauma, with an optimal clinical approach still to be defined and remaining controversial, due to its rather small sample size. In the cases culminating in victims' death, according to available studies, cause of death associated with near hanging would mainly concern central nervous system (anoxic encephalopathy) and lungs (pneumonia and/or pulmonary oedema).

The case we would like to present concerns a 17-year-old boy, found by his grandmother, hanged by the neck. Paramedics were called to the scene, founding the boy in cardiac arrest, having immediately initiated advanced life support algorithm, including intubation and restoring circulation after approximately ten minutes. The victim was then taken to the nearest hospital and admitted at the Paediatric Intensive Care Unit, where he presented himself with fixed mydriasis. He was submitted to a head computerized tomography, which did not detect any alterations. On the next day the exam was repeated, having, this time, revealed extensive alterations compatible with cerebral anoxia. He remained completely unresponsive, with Glasgow Coma Scale score of 3, with serial Doppler ultrasounds and electroencephalograms conducted, not reaching the criteria of brain inactivity, nonetheless, with poor prognosis. He was also submitted to daily echocardiograms. On day 5 it detected a severe global systolic disfunction of the left ventricle, associated with QT alterations in his electrocardiography. He was pronounced braindead later on that very day, having most of the organs being collected for donation.

During the post-mortem exam we would detect findings compatible with hanging, such as anterior cervical abrasion and its corresponding subcutaneous tissue congestion (the hanging mark), and cerebral oedema and softening. However, the most interesting and unusual finding was the "tigroid" appearance of the myocardium of the left ventricle. It was sampled and sent for microscopical examination diagnosing acute myocardial infarction, confirming our suspicion.

In this case the cause of death was classified as mechanical asphyxia due to fatal pressure on the neck, namely hanging, complicated by acute myocardial infarction, confirmed microscopically and timed as occurred in the last 24 hours. As per the manner of death, forensic pathologists have defined it as undetermined, not having been provided with data convincing enough to affirmatively define it as either suicide, homicide, or accidental.

We consider this presentation an important learning opportunity for the forensic pathology community, presenting a rare and previously practically undescribed complication of a "near hanging" case.

OC01-6
WITHDRAWN

Oral Communications 02: Forensic Anthropology

OC02-1
The Value of the Hyoid Bone as a Sex and Age Marker: A Pilot Study

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INTRODUCTION: The hyoid is a bone of special significance in Forensic Medicine and Anthropology. There have been various studies in the literature exploring the potential of age and sex estimation using its morphology, fusion rates and bone mineral density, using dry bone and imaging modalities. The purpose of this study was to assess the value of the hyoid bone in sex and age estimation using postmortem CT scans of forensic cases handled by the Forensic Medicine Unit of the University of Crete, Greece.

MATERIAL AND METHODS: Postmortem CT scans of 84 individuals were employed for the study with a slice thickness of 0.625 mm on a 512 x 512 matrix. The sample consisted of 42 males and 42 females with a mean age of 58 ±19.1 and 66 ±19.5 respectively. The open-source software 3D Slicer was used to conduct semi-automatic segmentation of the hyoid bones. Two variables were extracted from each case through the segment statistics module: The total volume in mm (TV) and the mean intensity value in HU (MIV). The correlation of variables with age and sex was explored. Bootstrapping was used to overcome sample size issues. SPSS 24 was used for all statistical tests.

RESULTS: MIV showed low correlation with age in the total sample and the male subgroup. Surprisingly MIV showed higher correlation with age in females but still not significant enough to be considered a useful single age marker. Both TV and MIV showed statistically significant differences between males and females. Binary logistic regression resulted in 87% correct classification for the original and 84.5% for the cross-validated data when both TV and MIV were used.

DISCUSSION: MIV was suggested as an age marker in previous studies but this hypothesis is rejected in this study. Sex estimation can be accomplished with good accuracy rates, however in real-case scenarios the posterior probability of correct classification should be taken into consideration on the decision making. Naturally, a wider sample is needed to verify these preliminary results.

OC02-2
Deep Diving into Vouliagmeni's Blue Hole: Proposing Strategies for the Effective Underwater Recovery of Skeletal Remains

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The exploration of underwater caves constitutes a distinctive yet perilous setting resulting in numerous casualties, particularly among recreational divers. Retrieving bodies from marine sinkholes is frequently carried out by individuals lacking prior expertise in body recovery and death scene processing. This issue becomes more pronounced when dealing with decomposed or skeletonized remains due to the increased risk of losing essential body elements. The recovery of complete skeletons is essential for ethical reasons and can contribute substantially to case examination and resolution. This study focuses on the investigation of the deaths of three American recreational divers serving at the U.S. Air Force base in Athens, who were missing in the complex tunnel systems of the Vouliagmeni blue hole in 1978. Numerous attempts were made over the years to recover their remains, with a cave exploration team mapping a section of the cave in 1989 and locating two out of three divers. Tragically, an attempt to recover the remains in 1990 resulted in another casualty, leading to the abandonment of recovery efforts until 2006 when some former members of the Hellenic Navy Seals successfully retrieved all three divers. Anthropological examination of the skeletal remains was conducted at the Forensic Anthropology Unit of the Medical School of the National and Kapodistrian University of Athens. The postmortem examination revealed heavily fragmented and bleached skeletal elements, as a result of their long exposure to the marine environment. Mitochondrial DNA analysis conducted at the Armed Forces Medical Examiner System confirmed the identities of the missing divers. The study highlights the unique challenges encountered during underwater cave recoveries and advocates for standardized protocols to be followed in such operations. Emphasis is placed on the importance of trained personnel and a well-coordinated recovery team. Specific guidelines are proposed to enhance the success of recovering and processing human skeletal remains from challenging marine contexts, with the aim of increasing the chances of identification of the diseased and the reconstruction of the circumstances of death.

OC02-3

Unmanned Aerial Vehicle Assisted Searching for Human Skeletal Remains

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Search and recovery of skeletal human remains can be challenging and hazardous for professionals burdened with the task. Difficult conditions are likely to lead to a lower yield of recovered bones, which impacts the identification of the deceased and forensic investigation negatively. Traditionally, investigators perform a line walk or spiral search, and the search for human remains can be aided with cadaver dogs. In both instances the context is disturbed, traces of forensic interest can be contaminated or destroyed, and the material of interest is at risk as trampling on skeletal remains can lead to fractures and fragmentation. Also, human skeletal remains can blend in with the context, making it difficult to spot with the human eye. The biophysical properties of human bone for forensic application have been studied in the past. Human bone luminesces, when it is excited with light of a specific bandwidth, light of a longer wavelength is emitted which can be observed if the excitation light is blocked by a long pass filter. The luminescent characteristic can be used to create contrast between bone and surroundings, aiding the search for skeletal remains. In order to overcome the previously mentioned disadvantages of a traditional searches, we investigated the application of unmanned aerial vehicles (UAVs) for search and recovery of human skeletal remains. The UAV was equipped with an alternate light source through a custom developed mount and the camera was equipped with a long pass filter. The UAV was tested under differing lighting conditions, in different contexts, and at different heights above the ground for effectiveness at recording luminescing skeletal material. The application proved highly effective. Lastly, a comparative experiment was carried out in which the yield of the traditional line walk was compared with the yield of the UAV. The yield of the UAV far surpassed the yield of the line walk, while demanding less man hours and without disturbing the area of interest.

OC02-4

Isotope Analysis to Assist Identification of Human Remains

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Dead victim identification is an important task in crime investigations and mass disasters, but also for the relatives. If there are no clues as to the identity of the deceased, the age, sex, and origin represent particularly important information to limit the search for possible matching persons. In tooth enamel, which has not exchanged any carbon atoms since its formation, analysis of nuclear bomb-pulse derived levels of 14C can allow an accurate birth dating of an individual. However, if the find only consists of bones, the task will be more difficult, since the carbon in bone tissue continuously turns over. The 14C levels in a bone sample can tell if a person was alive, or not, after 1955 when the 14C levels began to rise in the atmosphere, but the crude concentrations cannot be compared to the atmospheric levels at a given time point. The prediction of year of birth requires a mathematical modelling of the carbon turnover based on levels in bones from individuals born before and across the bomb-pulse curve. Hence, we have collected bones from several deceased donors and used accelerator mass spectrometry to analyse 14C levels in samples from the mineral, collagen and lipid fractions of different types of bones. In most cases we have analysed samples from the diaphysis of femur, tibia and humerus, but in five cases, 12 different types of bones were analysed. We found that the 14C levels in the collagen fraction are generally fairly similar in the different types of bones, including the temporal bone´s pars petrosa, which has been claimed to show very low turnover. Further, we discovered that the lipid fraction consistently shows more recent 14C levels than the collagen and carbonate fractions. It seems possible to predict the year of death from the lipid fraction 14C levels using simple calculation of the lag time. We have started to perform mathematical modelling of the year of birth from the 14C levels in the collagen and mineral fractions, and so far, the collagen fraction levels show less error than the mineral fraction, but more bones from subjects of different ages are and further mathematical processing are necessary to obtain more accurate year of birth estimates. Finally, we have also analysed the stable isotopes 13C, 15N and 18O, which can provide indication food and water intake and geolocation. All Scandinavian subjects showed very low 13C levels, and it will be interesting to compare these results with 13C levels in bones from subjects who lived in other countries.

OC02-5

Gunshot Trauma Pattern in Human Long Bones

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When dealing with badly preserved cadavers or skeletal human remains, the assessment of death circumstances remains challenging. When forensic evidence cannot be taken from the skin and soft tissue, the information may only be deduced from more resistant elements such as bone. Whereas cranial gunshot injuries have been well studied, reliable data on fracture patterns in ballistic long bone trauma remains scarce. The aim of this study is focused in defining the ballistic fracture characteristics in human long bones. 16 femurs and 13 humeri from body donors were dissected, embedded in ballistic gelatine and fixed upright. Fractures were produced by a 9 mm Luger full metal jacket bullet with an impact velocity of 360 m/s. At a distance of 2 m, the bullet was fired perpendicularly to the middle of the anterior aspect of the shaft. The fractures were reconstructed and examined macroscopically. All samples presented comminuted fracture with a stellate pattern at the impact side. The cortical characteristics could be divided into entrance, exit and general traits. All evaluated traits were found in both bone types. The results provide guidelines for the identification and differentiation of gunshot trauma in human long bones.

OC02-6

Revealing Bone Trauma Timing and Mechanism from Osteonal Microdamage Pattern. Insights for Trauma Assessment in Forensic Anthropology

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Forensic anthropologists need more tools at their disposal to better enable trauma assessment and reconstruction of death circumstances. The macroscopic characteristics of bone fractures are commonly used to identify the timing of trauma and the mechanism of trauma, due to

different trauma biomechanics. However, this approach can be challenging, particularly in cases of highly comminuted or incompletely recovered fractures. Histological analysis of bone fractures may thus help gain more insight on fracture biomechanics. It has been suggested that microdamage represents a form of defence against crack formation and bone failure through a phenomenon known as microcrack toughening. Nevertheless, the mechanics surrounding microcrack propagation following trauma are still yet to be fully understood. Based on this premise, our research aimed to explore the microdamage pattern in long bones with different trauma mechanism (BFT and GST) and timing (peri and pot-mortem). We analysed cortical histological sections from traumatic death cases and post-mortem experimental fractures. Our results shows that osteonal microdamage formation is a characteristic of vital perimortem fractures, whereas in postmortem fractures more microdamage is concentrated in the interstitial tissue. Moreover, we identified different types of osteonal damage (OD). OD compromising the Haversian canal was found to be a feature of BFT, while OD affecting the cement line and interstitial lamellae is more common in GST samples. These findings support our hypothesis that there are distinct microdamage patterns in human long bones with different trauma biomechanics, which are of relevant value for trauma analysis in forensic anthropology.

Oral Communications 03: Biology in Forensic Medicine I

OC03-1

Post-Mortem Sperm Retrieval in India: An Original Research Study

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BACKGROUND: In the wake of a young male's untimely demise, particularly one crucial for carrying on the family lineage, the prospect of posthumous sperm retrieval (PMSR) is raised, akin to organ donation. Limited studies have explored this area, indicating the potential feasibility.

AIMS AND OBJECTIVES: This study, conducted at AIIMS Bhopal with support from the Indian Council of Medical Research, aims to assess the viability and practicality of PMSR. The primary objective was to retrieve viable spermatozoa and ascertain the optimal retrieval site, along with determining the window of viability after death.

MATERIAL AND METHODS: Following thorough explanation and obtaining informed consent from the deceased's first-degree relatives or next of kin, the procedure was executed, and sperm were collected. They were subsequently preserved under varying temperature conditions and analysed.

RESULTS AND OBSERVATIONS: In approximately 100 cases, retrieval was successfully carried out, and the collected sperm were stored at temperatures of -186°C and -80°C. The retrieved sperm samples were analyzed for Morphology, Motility, Viability and acrosomal integrity etc. using the Sperm Quality Analyzer (SQA Vision).

CONCLUSION: This study provides an analysis of the retrieval process in approximately 100 cases, demonstrating a prevailing positive outcome in favor of post-mortem sperm retrieval. The next crucial step involves establishing and enforcing appropriate guidelines for this procedure.

ACKNOWLEDGMENT: The authors acknowledge the Indian Council of Medical Research (ICMR) New Delhi for providing funding to this research Project

KEYWORDS: Postmortem sperm retrieval, Viability, motility, cryopreservation

OC03-2

Postmortem Dance of Diatoms – Experimental Research of Comparison Diatom Test and Pathohistological Findings in Lungs

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INTRODUCTION: Diatom detection is an important method for identifying drowning and distinguishing between drowning as the immediate cause of death and bringing the corpse into the water medium after death. the goals of our study were to evaluate the macroscopic and microscopic findings in different groups with the same mechanism of death, but different cause of death, to compare the diatom test with the results of the pathohistological lesions that developed in relation to the group of animals and the causes of death.

METHODS: Twenty-nine adult albino Wistar rats of the recommended body weight (200-300mg) were divided into four groups, as follows: L1 (n=5; mechanism of death - asphyxia; cause of death - suffocation, submerged 1 hour after death); L2 (n=8: mechanism of death-asphyxia; cause of death-suffocation, immersed 72 hours after death); L3 (n=8: mechanism of death-asphyxia; cause of death-drowning, autopsy immediately after death) and L4 (n=8: mechanism of death-asphyxia; cause of death-drowning, post mortem 48 hours after death). The diatom test protocol was carried out in accordance with the available guidelines for the analysis of diatoms for the assessment of the ecological state of waters from the Bosna River.

RESULTS: Microscopic analysis revealed the presence of diatoms in the lungs of rats. Within group D, in samples 3, 4 and 5, diatoms were found, namely: Navicula sp. (U3 and U6) and Ulnaria ulna (U4). The pathohistological findings were graded changes, along with consolidation, inflammatory cell infiltration was also found (presence of peribronchial and perivascular inflammatory infiltrate - it was dominated by lymphocytes and macrophages, and in some samples also eosinophilic leukocytes

CONCLUSION: Our results indicate that the diatom test should be combined with pathohistological analysis as support for the diagnosis of drowning. Therefore, a detailed analysis of multiple organs would be more useful.

KEYWORDS: drowning, diatoms, forensic, lungs, pathology, autopsy

OC03-3

WITHDRAWN

OC03-4

When ATR-FTIR Spectroscopy Meets Forensic Pathology

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BACKGROUND AND AIM: The determination of the post-mortem interval (PMI) is crucial in forensics. Traditional methods can easily estimate early-PMI cases (< 24hours) but as time passes, imprecision becomes more significant.
FTIR spectroscopy is a reliable and valid analytical technique providing -with a single analysis- the complete characterization of macromolecular

composition of biological samples. ATR is a specific accessory useful for a quick analysis of liquid samples.
Present study aims to investigate the potential of Attenuated Total Reflectance - Fourier Transform InfraRed (ATR-FTIR) spectroscopy for predicting PMI based on the spectroscopic analysis of vitreous humor (VH).

METHODS: Vitreous humor samples were collected from 70 humans in the range of 2-114 hours postmortem and immediately stored at -80°C, until the analysis; the age was in the range 65-79 years; 40 male and 30 female.
ATR-FTIR spectra were acquired by an Invenio R interferometer with a Platinum ATR accessory equipped with a diamond crystal and a DTGS detector (Bruker Optics, Ettlingen, Germany). The experiment was performed in triplicate. ATR-FTIR spectra were interpolated in the range 1800-900 cm-1, vector were normalized and two-point baseline corrected (OPUS 7.5 software, Bruker Optics, Ettlingen, Germany). Specific band area ratios were calculated and statistically analyzed by Multivariate and Univariate analyses.

RESULTS: The representative IR spectrum of human humor vitreous was in the spectral range 1800-900 cm-1. The position of the most relevant peaks are: 1655 cm-1, 1631 cm-1, 1583 cm-1, and 1455 cm-1 (peptide bond and amino acids); 1416 cm-1, 1361 cm-1, and 1313 cm-1 (protein collagene); 1220 cm-1, 1198 cm-1, 1083 cm-1, (phosphates), 1120 cm-1, 1042 cm-1, 984 cm-1, 853 cm-1, 835 cm-1 (glycosylated compounds).
The analysis was first performed on two groups with a PMI of 12 hours corresponding to young (Y, 18-40 years old, including 10 subjects) and old (O, over 60 years old, including 30 subjects) donors. As expected, the preliminary analysis of the spectral data displays significative differences in the spectral profile of Y and O groups.
Then, all samples were divided in early PMI (three groups with < 24 hours), medium/long PMI (> 25 hours). The statistical and multivariate analysis of the IR spectra of the two PMI groups a good segregation between the early and medium/long PMI group, both in absorbance (PC2, variance 86.3%) and in derivative second (PC1, variance 49.2%).

CONCLUSIONS: Herein, for the first time, we demonstrated the potential of FTIR spectroscopy in humans post-mortem samples for evaluating early and medium/long PMI group based on the VH samples. The observed spectral pattern reflected multiple chemical components in the VH that varies as time passes.

OC03-5

Asbestos-Related Diseases: How to Determine the Causal Relationship with Previous Asbestos Exposures in Forensic Contexts?

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The term asbestos refers to six naturally occurring fibrous minerals well known to cause asbestos related diseases (ARDs), including malignant mesothelioma, lung cancer and asbestosis, the lung fibrosis due to asbestos inhalation. Such diseases are characterized by a long latency (30-50 years) between the start of asbestos exposure and the onset of the clinical manifestations. Therefore, especially in forensic context, it is essential but difficult to determine, with a high grade of certainty, if a disease is associated with a previous asbestos exposure and to identify the source of exposure. From a legal point of view, it is crucial to relate ARDs with a previous occupational exposure, given the potential liability of the employer, often involved as accused person in penal trials for manslaughter due to transgression of workplace safety regulations.

The gold standard to evaluate previous exposures is the asbestos concentration in lungs measured by analytical electron microscopy. However, asbestos is widely diffused in the urban environments, and it is, therefore, possible to find asbestos in lungs of general population. The background asbestos exposure, defined as the level of asbestos exposure that anyone can be subjected to without experiencing a significant increased risk to develop mesothelioma or other ARDs, is not well defined.

Often, previous asbestos exposures are retrospectively evaluated based on the history of exposure, but this method presents important limitations. Moreover, pleural plaques (PP), lung fibrosis and histological evidence of ferruginous bodies (FB) are important markers of asbestos exposure, but they have never been associated with a threshold value of inhaled asbestos. With this study we compared asbestos concentration in lungs of 95 deceased mesothelioma patients with 50 individuals from general population, finding that a concentration of asbestos below 100 000 ff/gdw can be considered due to background exposure. Secondly, we attempted to shed light on the dose-response relationship of PP, lung fibrosis and FBs, investigating if their prevalence in exposed individuals who died from mesothelioma is related to the concentration of asbestos in lungs, assessed using scanning electron microscopy equipped with energy dispersive spectroscopy.

Lung fibrosis showed a significant positive relationship with asbestos lung content, whereas PP and FB did not. We identified, for the first time, critical lung concentrations of asbestos related to the presence of PP, lung fibrosis and FB at histology (respectively, 19 800, 26 400 and 27 400 fibers per gram of dry weight), that were all well-below the background levels of asbestos identified in our laboratory. The obtained data suggest that PP, lung fibrosis and FB at histology should be used with caution in the causal attribution of MM to past asbestos exposures, while evaluation of asbestos lung content using analytical electron microscopy should be preferred in legal contexts.

OC03-6

Advancing Forensic Semen Stain Analysis on Various Surfaces: A Non-Destructive Method for Accurate Identification and Temporal Classification Using ATR-FTIR Spectroscopy and Chemometric Analysis

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Semen stain analysis is pivotal in the forensic investigation of sexual offenses. Not only does it reveal the identity of the offender, but it also provides crucial information about the timing of the incident. Despite various attempts to determine the age of semen stains through different methods in previous studies, these approaches have not yet been widely adopted in forensic medicine due to practical, methodological, and cost-related challenges. Most existing methods damage the collected material from crime scenes, limiting subsequent analyses. This study aims to address these challenges by developing a practical, cost-effective, and non-destructive method that facilitates further analysis.

Semen stains obtained from healthy volunteers were intentionally created on seven different solid surfaces commonly found in indoor crime scenes, including wood, glass, leather, tile, cardboard, metal, and plastic. Measurements were conducted using Attenuated Total Reflectance Fourier Transform Infrared (ATR-FTIR) spectroscopy and chemometric analysis (Partial Least Squares Discriminant Analysis - PLS-DA) at various intervals over a two-month period. The time intervals were categorized into three groups: 0-24 hours, 2-6 days, and 1-8 weeks. At the time of analysis, a part of each semen stain was removed the surface and analyzed without any pre-processing or extraction procedure under the ATR probe FTIR device. FTIR spectra gathered for each sample recorded.

Evaluation of the method's success relied on the "EFR" ratio derived from chemometric analysis of the acquired spectral data through PLS-DA. Validation data demonstrated the method's accuracy in categorizing data into the correct time intervals. Notably, the success rate was 100% for all time intervals on wood, glass, cardboard, metal, and plastic surfaces. For leather and tile, the success rates were marginally lower at 99.94% and 99.95%, respectively.

In conclusion, this study establishes ATR-FTIR spectroscopy as a viable method for semen stain identification discovered on various surfaces. The integration of chemometric methods facilitates precise determination of the stain's age for studied time periods. Further studies will be conducted to refine the method for more accurate and shorter time intervals: in order to add value to ongoing efforts to enhance its applicability in forensic settings.

KEYWORDS: Forensic Science, Semen Identification, Determination of Semen Stain Age, ATR-FTIR, Chemometrics

Oral Communications 04: Artificial Intelligence in Forensic Sciences

OC04-1

"Imminent Forensic Medical Problems due to Imaging in Medicine?": Processing of Ophthalmological Images for DICOM

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BACKGROUND: With DICOM (Digital Imaging and Communications in Medicine), the images in ophthalmological examinations must be processed before they can be shared and/or compared, as many instruments using the same technology have unique imaging techniques. The problems of different proportions or properties of the images for the same examination should be solved.

METHODS: DICOM is the international standard for medical images and related information. It defines the formats for medical images that can be exchanged with the data and quality required for clinical use. Unique imaging in each instrument from different brands using the same technology is a problem as it can alter and/or distort the image. The need for image processing and its possible negative effects are discussed.

RESULTS: There are technically very fine measurements in ophthalmology such as OCT, OCTA, corneal topography, aberrometer, fundus fluorescein angiography, B-scan ultrasound. The images made with it are mostly 2D and in pixels, some of them can be 3D and in voxels, which makes it difficult to compare different devices. In order to compare the changes in images, they must have the same backlight, the same size of the image and the same size of the background and/or neighboring structures. Therefore, changes in contrast, illuminance and size (pixelization!) may be required, which can change the information contained therein.

CONCLUSIONS: Similarly, to maintain DICOM standards in ophthalmic images, they must be created in instruments using the same technique. Subsequent editing of the images can lead to errors. These problems can (soon or even now) have legal medical consequences.

OC04-2

Forensic Bone Age Estimation of Adolescent Pelvis X Rays Based on Two Stage Convolutional Neural Network

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In the forensic estimation of bone age, the pelvis is important for identifying the bone age of teenagers. However, studies on this topic remain insufficient as a result of lower accuracy due to the overlapping of pelvic organs in X-ray images. Segmentation networks have been used to automate the location of key pelvic areas and minimize restrictions like doubling images of pelvic organs to increase the accuracy of estimation. This study conducted a retrospective analysis of 2164 pelvis X-ray images of Chinese Han teenagers ranging from 11 to 21 years old. Key areas of the pelvis were detected with a U-Net segmentation network, and the findings were combined with the original X-ray image for regional augmentation. Bone age estimation was conducted with the enhanced and not enhanced pelvis X-ray images by separately using three convolutional neural networks (CNNs). The root mean square errors (RMSE) of the Inception-V3, Inception-ResNet-V2, and VGG19 convolutional neural networks were 0.93 years, 1.12 years, and 1.14 years, respectively, and the mean absolute errors (MAE) of these networks were 0.67 years, 0.77 years, and 0.88 years, respectively. For comparison, a network without segmentation was employed to conduct the estimation, and it was found that the RMSE of the three CNNs above became 1.22 years, 1.25 years. and 1.63 years, respectively, and the MAE became 0.93 years, 0.96 years, and 1.23 years. Bland-Altman plots and attention maps were also generated to provide a visual comparison. The proposed segmentation network can be used to reduce the influence of restrictions like image overlapping of organs and can thus increase the accuracy of pelvic bone age estimation.

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KEYWORDS: Bone age estimation, Pelvis, Image recognition, Deep learning, Convolutional neural networks, Adolescent

OC04-3

Effectiveness of App Based Learning in Forensic Medicine – Perceptions of Students

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BACKGROUND: Mobile Learning or m-learning, a part of Electronic Learning, which includes use of smart phones, Tablets, E-readers, etc. for the purpose of education. The aim of this study is to evaluate the perceptions of students regarding App based learning and its effectiveness in Forensic Medicine among 2nd MBBS students of AIIMS, Hyderabad.

MATERIALS AND METHODS: 2nd year MBBS students of AIIMS, Hyderabad, were included in the study after obtaining ethical approval from Institutional Ethical Committee and informed consent. WhatsApp group was created for app-based learning purpose which included faculties of Forensic Medicine and 2nd MBBS students. Recent forensic news, question papers of other universities, important notes, power points, images, videos, discussion on common doubts, etc. were shared and discussed on the group for study purpose throughout the course. Topic of Forensic Psychiatry was covered in two theory classes and before every class, necessary teaching materials was shared in WhatsApp group. An online examination was conducted on the topic after a week in the form of pre-tested and validated MCQs (10 in number, Single best response type) before the revision exercise on the same, after obtaining consent of the participants. Feedback was taken from the students on this method of app-based learning via pretested and validated Likert Scale Type (1 to 5, 1 – Not at all true, 5 – Very true) perceptions (10 in number). Perceptions of students towards app-based learning were assessed via weighted mean.

RESULTS: Total 57 participants were included in the study group. 20 female and 37 male students participated in this study and their ages ranged from 19 to 22 years. The median score of the test was 9 out of 10 and mean score was 8.28. Total 28% of the participants secured full

marks and 94.7% of the students secured more than 50% of the score. Students gave positive feedback for App based learning.

CONCLUSION: Mobile learning or education through social media applications provides a motivating environment leading to improved quality of teaching as well as learning. Timely feedback from both the students and faculty and their analysis will improve the effectiveness of online teaching and learning. App based learning can be a good tool for revision.

KEYWORDS: Medical Education, M-learning, E-learning, Forensic Medicine, social media, App based learning

OC04-4

Fall from a Height Deaths: Application of Artificial Intelligence Techniques for Estimating Fall Height

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INTRODUCTION: Common characteristics of fall from a height trauma are the multiplicity of injuries involving multiple body sites. The type and extent of injury is related to multiple factors including the kinetic energy as well as the nature and conformation of the impacted surface, the anatomical site of impact and the intrinsic characteristics of the body tissues. However, the height of the fall is the factor that most influences the kinetic energy of the body and appears to be one of the factors that most affects the extent of injury.

AIM: The purpose of this work is to evaluate, through machine learning algorithms, whether the autopsy injury pattern observed in subjects who died from fall from a height can be useful in estimating fall height.

METHODS: 405 victims of falls from a height which underwent a complete autopsy at the Institute of Forensic Medicine of Milan-Italy were retrospectively and anonymously analyzed. The inclusion criteria were: death by fall from a height with no further injurious methods; death at the scene with absence of performed resuscitative maneuvers; impact on concrete; known point of the fall, without intermediate impacts; corpse not corrupted by decomposition; availability of complete circumstantial information and the entire autopsy report. The cases were enlisted by dividing them into 7 groups according to the height of the fall: 6 or less meters; 9 m, 12 m, 15 m, 18 m, 21 m, 24 m. Autoptic data were registered through the use of a previously published visceral and skeletal table. A total of 25 descriptors were used. Reduction of values in the range, standard and robust scaling were used as preprocessing methods. Principal Component Analysis, Single Value Decomposition and Independent Component Analysis were applied for dimensionality reduction. Cross validation was performed with 5 internal folds to ensure the validity of the results.

RESULTS AND CONCLUSIONS: The learning algorithms that generated the best models were Linear Regression, Support Vector Regressor, Kernel Ridge, Decision trees and Random forests. The best mean absolute error was 4.58+1.28m when dimensionality reduction was applied. Without any dimensionality reduction, the best result was 4.37+1.27m, suggesting a good performance of the proposed algorithms, with better performance when dimensionality is not automatically reduced. The observed errors obtained from the models remains noteworthy, but they confine the height of the falls to three floors and, if confirmed in other studies, could in any case help direct initial police investigations in similar urban contexts. However, over-reliance and automation biases must be avoided, as such evaluations must be developed based on multiple sources of evidence, as they cannot be based solely on autopsy findings, given the multiple variables involved and the well-known major limitations in the use of artificial intelligence in courtrooms.

OC04-5

Discussion on the Ethics of Chatbots Based on AI-Assisted Technologies in the Writing of Forensic Science Papers

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Chatbots based on artificial intelligence (AI)-assisted technology have been increasingly used in the field of forensic science, whether in scientific research or scientific paper writing, can effectively help researchers. In this study, we did an interesting experiment, three kinds of chatbots commonly used in China (ERNIE Bot, Zhipu Qingyan, IFLYTEK SPARK) were typed "Please write a 600-word paper on the ethics of using chatbots based on AI technology to write papers in the field of forensic science". Compared the generated content text. The results showed that: (1) From the perspective of content, ERNIE Bot mentioned three ethical issues: privacy protection (the research participants), impartiality and responsibility; Zhipu Qingyan deviated from the theme, and the output text ignored the key content of "paper writing"; IFLYTEK SPARK mentioned three ethical issues: academic integrity and intellectual property rights, over-reliance, and privacy protection (for researchers). (2) From the perspective of structure, the structure of the output text was similar, all of them were "General-Narration-Summary" structure. (3) When instructed to increase word count, the output text will be filled with fictional references. Therefore, as the ICMJE Recommendations (2023 edition) suggests, AI may output incorrect, incomplete or biased but authoritative-sounding content. The content analyses are often not sufficiently in-depth and can bias the understanding of instructions, outputting off-topic content text, and the AI cannot be held responsible for the accuracy, integrity or originality of the work. When using AI-assisted chatbots to assist in writing forensic science papers, it is important to be aware of ethical issues and to carefully review and edit the output content text.

OC04-6

Bridging Forensic Science and Radiomics: Post-Mortem Interval Estimation

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Accurately determining the post-mortem interval (PMI) is essential in forensic investigations, aiding in the reconstruction of events surrounding a death. Traditional methods such as algor, livor, and rigor mortis often provide only approximate estimates due to inherent limitations; consequently, there is a pressing need for more accurate and reliable techniques, and recent advancements in medical imaging, particularly radiomics, offer promising avenues. Radiomics was initially designed for tumor analysis but has proven applicable in a broader context. Its goal is to develop automated, reproducible analysis methodologies, extracting previously inaccessible quantitative information from medical images. By analyzing subtle changes in tissue properties over time, radiomics holds the potential to discern temporal patterns associated with post-mortem changes, which may serve as valuable markers for PMI estimation. This study investigates the potential of radiomic features extracted from postmortem CT (PMCT) brain scans to provide information on the time since death (or PMI). The primary objective was to assess the feasibility of using PMCT-based radiomics to differentiate between early (<t) and late (>t) PMIs. A retrospective analysis was conducted on PMCT scans obtained at various time points from a cohort of cadavers. Radiomic features were extracted from brain CT images. Four classifiers (Logistic Regression, Linear Support Vector Machine, Support Vector Machine with Radial Kernel,

and Random Forest) were trained to distinguish between early and late PMIs. Three time thresholds (t=12-, 24-, and 36-hours postmortem) were considered and classifier performance was evaluated using Receiver Operating Characteristics (ROC) curves and Areas Under the Curves (AUC). Results demonstrated strong performance for the classification using t=36 hours postmortem across all models, with Logistic Regression, Linear Support Vector Machine, and Support Vector Machine with Radial Kernel showing similar high performance. However, no significant results were found for t=12- and 24 hours postmortem. This study highlights the potential of PMCT-based radiomics of the brain in differentiating between early and late PMI given a threshold t. The findings support the application of quantitative imaging in forensic investigations, specifically at later PMIs when traditional techniques may be less reliable. Despite challenges, the synergy between forensic science and radiomics holds immense promise for advancing PMI estimation.

OC04-7

Deep Learning as a Forensic Diagnostic Method for Blow and Fall Brain Injury Mechanisms Identification: A Feasibility Study

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In forensic practice, the mechanism of traumatic craniocerebral injury involving a blow or a fall, particularly in the absence of witnesses and surveillance, is difficult to identify. In China, the authors encounter cases frequently in which the head injury is caused by a blow or fall, especially the blow followed by the fall. It is urgent to exclude the effect from consideration factors and the objectivity of forensic pathologists to identify the injury mechanism. Based on the extensive application of CNN in image recognition, we proposed a new forensic diagnosis method with the Vgg16 model for blow and fall brain injury mechanism identification. CT scans of 320 cases were selected between 2007 and 2018 from the Academy of Forensic Science in China, of which 109 cases showed blow injury, 81 cases showed fall injury and 130 cases showed no head injuries. Through the random stratified sampling procedure, 80% of the CT datasets was divided into training dataset, and the rest was divided into testing dataset. In order to simulate the routine reading approach of radiologists, we introduced RGB theory which synthesized the upper and lower slices and defined the diagnosis method. In addition, Gradient-weighted Class Activation Mapping (Grad-CAM) was applied to determine the specific regions of head CT images that contributed to injury mechanism. The research results suggest that in the testing sets, the diagnostic accuracy of blow injury, fall injury and the control is 94%, 75% and 90%, respectively, and an area under the curve (AUC) of 0.98, 0.88 and 0.90, separately. Results from this study provided evidence that deep learning techniques are feasible for blow injury and fall injury identification based on head CT images. The use of deep learning to read CT images can be used as an auxiliary diagnostic or screening tool to help forensic radiologists and pathologists identify blow and fall injuries.

OC04-8

Bone Radiomics as Potential Age Markers: The Example of the Femur

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INTRODUCTION: Age at death is one of the four parameters of biological profiling, and as such it is of vital importance in forensic investigations. Multiple skeletal elements have been used towards that direction, while at the same time imaging modalities are being employed more and more often. Radiomics and artificial intelligence, a rising field in modern Radiology, are presenting with a new avenue to be explored and utilized in Forensic Medicine and Anthropology. Clavicle radiomics have been explored as potential age markers with promising results. In this work the femur is tested with the same objectives.

MATERIALS AND METHOD: A total of 99 postmortem CT scans were employed for this study with a slice thickness of 0.625 on a 512 x 512 matrix. The sample consisted of 64 males and 35 females with a mean age of 54.2 ±19 and 65.6 +/- 22.3 respectively. Femora were segmented in the open-source software 3D Slicer using the automated tool Total Segmentator and Radiomics features were extracted using PyRadiomics. The right femur was selected for analysis to avoid overfitting of the model. Two models were created using the complete femoral bone (M1) and the proximal portion of the femoral bone alone (M2). Data were divided in training (70%) and validation (30%) groups for each dataset. Significant features were selected with the Boruta algorithm and were used to train an XGBoost regression model. Model performance was evaluated in the validation set with root mean square error (RMSE), R2, mean absolute error (MAE), and mean squared error (MSE).

RESULTS: Boruta extracted a number of significant features, which were used for further model development. XGBoost regression achieved a performance with RMSE 15.098, R2 0.433, MAE 13.052, MSE 227.954 and RMSE 13.924, R2 0.493, MAE 11.143, MSE 193.888 for M1 and M2 respectively. Both models exhibited moderate performance, however it was noted that the proximal portion of the femur performed slightly better. In both cases the femoral datasets performed worse than the previous pilot study on the clavicle.

CONCLUSIONS: Radiomics features constitute a new set of variables of diagnostic value in the field of Clinical Radiology, and as such their potential application in forensic questions is explored here. More specifically, Radiomics of the femur are tested as age markers in two datasets. The moderate performance of the complete femur compared to the clavicle can be attributed to the effect of the axial mechanical loading of the femoral diaphysis. The performance of the proximal portion of the femur may appear slightly improved due to the inclusion of age-associated degenerative changes, while at the same time excluding information related to biomechanical diaphyseal stress. Naturally, this approach requires further sampling to produce definite conclusions on the initial hypothesis.

Oral Communications 05: Biology in Forensic Medicine II

OC05-1

Fluorescence of Various Buried Fresh and Fresh-Frozen Tissue Types up until the Point of Active Decay: A Human Taphonomy Study

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Forensic taphonomy is the study of postmortem changes of human remains for the purpose of answering legal investigative questions. There are a myriad of variables affecting the pattern and rate of decomposition of remains, which complicate taphonomic studies and estimation of the postmortem interval. Although a large number of taphonomic studies have been conducted over the years, to our knowledge, only one published article addressed the taphonomy of frozen and subsequently buried non-human tissue. Investigating the effect of a freeze-thaw cycle followed by burial on remains is crucial for future taphonomic research, as it is unknown whether frozen material is suitable in extrapolating conclusions to fresh material. The present study explored the effects of a freeze-thaw cycle and subsequent burial on

human tissue under controlled field conditions, whereby fresh and fresh-frozen hands were interred at the Amsterdam Research Initiative for Sub-surface Taphonomy and Anthropology (ARISTA) for a period of 31.7 to 340.4 accumulated degree days. Decomposition was visually assessed via two decomposition indices, fluorescence measurements of protein and fluorescent oxidation products, as well as excitation-emission matrix measurements in skin, adipose, and muscle tissue. Fresh and fresh-frozen tissue could not be differentiated based on decomposition scoring nor monitoring of fluorophore peaks in excitation-emission matrices. However, trends in fluorophore peak occurrences and decomposition, as established by protein and fluorescent oxidation product measurements, differed in fresh and fresh-frozen samples, thereby demonstrating that taphonomic processes vary based on sample state. For the most part, fresh samples followed the expectation that protein levels would decrease over time, while those of fluorescent oxidation products increased. Conversely, trends in fresh-frozen samples significantly deviated from this expectation and were far more unpredictable. Adipose was found to be best suited for distinguishing fresh from fresh-frozen tissue following burial. This work is somewhat limited by challenges inherent to pilot and human taphonomy studies, whereby validated methods and procedures have yet to be developed, and samples are difficult to source. Despite these, this study clearly demonstrates that differences exist in the decomposition of fresh and fresh-frozen tissue, and furthermore that these trends vary slightly by tissue type. We therefore conclude that frozen material can no longer be assumed to be analogous to fresh tissue regarding taphonomic processes.

OC05-2

A Novel Field in Body Fluid Identification: MicroRNA Studies

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INTRODUCTION: Samples studied in forensic science are generally in small quantities, degraded and exposed to various environmental conditions. MicroRNAs are biomarkers that have potential especially in the identification of body fluids. miRNAs have advantageous features such as tissue specificity and resistant nature to environmental changes. These biomarkers may be important in mixture samples especially in sexual assault and homicide cases.

AIM: Our aim in this study is to emphasize the importance of miRNAs in the identification of body fluids within the scope of forensic science. For this purpose, in addition to the literature review, we will also talk about the work we have completed and plan to complete in the future. In our first study, the aim was determining degraded blood stains (exposed to different environmental conditions) by hsa-miR-451a and hsa-miR-203a-3p miRNA biomarkers. In our second study, the aim was differentiating blood and saliva by using miRNA biomarkers (miR-203A-3p for saliva & miR-451A for blood) in the mixture samples. In our third study (in progress), our aim is evaluating the durability of miR-891a and miR-10a markers in semen samples (different conditions).

METHOD: In first study, blood samples on denim fabric pieces were exposed to different environmental conditions. In second study, blood and saliva samples were collected from both female and male volunteers. Different mixtures in different ratios were prepared. In both studies RNA isolation and cDNA synthesis were done after sample collection. miRNA expression quantification was performed by using the Delta Ct method (ΔCt). In third study, semen samples will be collected from volunteers. Then, they will be dropped on cotton fabric and kept under various conditions (mock crime scene conditions). Then RNA isolation and cDNA synthesis will be performed. miRNA expression quantification will be performed by using the ΔCt method.

RESULTS: First work results; Hsa-miR-203a-3p expression was not observed in any sample group. Therefore, it cannot be used for blood determination in tested conditions. The expression of hsa-miR-451a was observed in the sample group kept at -20°C and +4°C and in a sealed bag. Therefore, it may be useful for determining the blood in certain conditions. Second work results; The presence of saliva samples by miR-203A-3p was not observed in any mixtures. Therefore, it cannot be used for saliva determination. The presence of blood samples in the mixtures was determined at all dilutions by miR-451A. Therefore, miR-451A may be used for determining the presence of blood.

CONCLUSION: MicroRNAs are biomarkers with high efficiency potential for identification of body fluids. However, for this purpose, more miRNAs should be analyzed and different mixture samples should be prepared and different environmental conditions should be evaluated.

KEYWORDS: miRNA, body fluid identification, mixture studies, blood, semen, environmental conditions

OC05-3

Analysis of the Effects of Emotional and Violence-Related Genes on Athletes from the Perspective of Forensic Sciences

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The investigation of the human genome encompasses the examination of various factors, such as gene function, structural features of the genome, chromatin arrangement, recombination rate, and mutation. This is imperative for a precise understanding of its intricate relationship with physiology and diseases. With the sequencing of the human genome, the volume of studies on the influence of genes during the development of behavior and personality traits has surged. Research indicates that complex behavior and traits are orchestrated by multiple genes. In this context, genes influencing the dopamine pathway are entwined with neuroscience research. Studies in sports genetics encompass the identification of genes impacting athletic performance, clarification of the mechanisms of action of these genes, and determination of predispositions in terms of athletic performance based on genetic structures. Considering the determinants of success in sports, the development of training and nutrition programs tailored to genetic structure is pivotal. This study presents the outcomes of an experiment scrutinizing the literature on genes recognized as candidates affecting the personality and behavioral characteristics of athletes, namely TPH1, TH, and 5HT1A.The study involves 20 kickboxers approved by the Turkish Kickboxing Federation, and data are collected through surveys on sportsmanship, sports emotions, and anger control. Oral swab samples are collected, and DNA extraction is performed for genetic analysis using standard laboratory procedures. The analysis was conducted based on the scales; in the Anger-Control Scale, parameters such as SL-ANGER (continuous anger), ANGER-INTERNAL, ANGER-EXTERNAL, and ANGER-CONTROL were examined. In the Sports Emotion Scale, parameters such as TENSION, DISSATISFACTION, EXCITEMENT, ANGER, and HAPPINESS were analyzed. Additionally, the Sportsmanship Behavior Scale was also examined. When the 5-HT1A gene is examined; no significance has been found in all other data, except for the C allele, where significance has been detected in terms of the SL-Anger and Happiness parameters. However, since no significance has been found in other variants or in any pairwise evaluations, it has not been considered in parallel assessments. For the TH gene; for the Anger-External parameter conforming to normal distribution, significance has been found in individuals carrying GG and AA alleles, and in those not conforming to normal distribution, significant data has been obtained for GG and AA alleles, i.e., homozygous individuals, in terms of the SL-Anger parameter. When the TPH gene is evaluated; significance has been detected in terms of the SL-Anger and Happiness parameters for the A allele. Studies clearly indicate the following truth regarding aggressive attitudes: Patterns of aggressive behavior vary among individuals in conjunction with genotypic features and their interactions with the personal environment. Individuals who intentionally and consciously

exhibit aggressive behaviors show a tendency with a more pronounced genotypic effect compared to those displaying reactive aggressive behaviors.

OC05-4

Forensic Genetics at the Service of Disaster Victim Identification: The Preliminary Results of the "Experimental Mass Grave Project"

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The need to identify victims of mass disasters (Disaster Victim Identification - DVI) represents a challenge for forensic investigations. Developing and validating strategies for DVI is critical for humanitarian, ethical and legal reasons. Every disaster has its scenario, and every scenario defines its own methods for identifying corpses. The use of genetic profiling as the main means of identification has been suggested more than twenty years ago and reinforced following the terrorist attack on the World Trade Center, as it is not only able to provide a precise identification, but also to associate the remains. To date, DNA extraction from human remains in an advanced state of decomposition or skeletonization is made using mostly sampling "hard" tissues such as bones and teeth.

The study originates from the "Experimental Mass Grave Project" (MGP) conducted at the Forensic Anthropology Center of Texas State University (FACTS), research aimed at studying at a macroscope, microscopic and biomolecular level the entire process of decomposition of human bodies within mass graves and individual tombs.

In particular, the forensic geneticists involved in the study carried out sampling to assess the completeness of the genetic information obtained from skin, oral and rectal swabs made upon arrival of the donors to the FACT and after their freezing lasted from 11 to 455 days. Subsequently, the possibility of typing genetic profiles useful for a comparison starting from soft tissues/ biological fluids sampled after 18 months of burial was evaluated, also checking if there was a correlation between the goodness of the genetic profiles obtained and the degree decomposing, the characteristics of the burial and the location of the donor in the mass grave.

The results of the study show a progressive loss of information with the freezing of the bodies and their burial. In addition, the results obtained from exhumation samples do not seem to be affected by the degree of decomposition of the body and its position inside the mass grave. In the mass grave, higher levels of preservation of bodies than in individual graves, cross-contamination of biological material and less DNA degradation were observed.

In conclusion, the study made it possible to understand how freezing and burial can influence the personal identification of corpses in particular contexts such as mass disasters and at the same time stresses the importance, in these circumstances, of sampling how many as many tissues as possible in order to successfully identify an unknown corpse.

OC05-5

Analysis of Placenta and Blood to Evaluate the Maternal-Fetal Transmission of Per and Polyfluoroalkyl Substances (PFAS)

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Per- and polyfluoroalkyl substances (PFAS) are anthropogenic contaminants considered multi-system toxicants affecting thyroid functions, immune system, kidney, and reproductive system in adults. Recent studies showed that exposition during pregnancy is related to pathologies, such as preclampsia, diabetes and reduced weight at birth (IUGR). The aim of the present research was to study the maternal-fetal transmission of PFAS through the analysis of blood and placenta samples. We collected blood samples from mothers and newborns and both decidua and villi samples after delivery. An original liquid chromatography coupled to high resolution accurate mass spectrometry (LC-HRAMS) method was developed and applied for the determination of 20 PFAS, including legacy, emerging and fluorotelomers compounds. Samples were purified by solid-phase extraction (SPE) by using weak anion exchange cartridges. For quantification the isotopic dilution method was applied. A total of 64 samples were collected from 16 subjects living in one region of Italy. Few data on lifestyles were also requested to the mothers, such as water and fish consumption, in order to correlate with PFAS presence. Results demonstrated PFAS presence in all the analysed samples, confirming the ubiquitarian nature of their diffusion. The most frequently detected compounds in maternal blood were PFBS/PFHxA/PFHxS/PFOA/PFOS/PFNA/PFUnA and PFPeA, while in cord blood PFBS/PFHxA/PFHxS/PFOA/PFOS were mostly detected. Decidua and villi showed a different accumulation pattern for PFOA/PFOS/PFBS, PFHxS and PFHXA. Moreover, our data indicated a different accumulation pattern between PFOS/PFOA and PFHxS/PFHxA/PFBS between mothers and newborns blood, with the former more concentrated in the maternal blood and the latter in the newborn blood. As conclusion, placenta confirmed its permeability to PFAS, but the observed different partitioning suggests that placental tissues may mediate PFAS transfer not equally. Our studies contribute to understand PFAS burden in biological human samples in not highly exposed population. This data may help in the definition of safety limits for human health.

OC05-6

The Value of Pericardial NT-proBNP in the Diagnosis of the Cardiac Origin of Sudden Death

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INTRODUCTION: Sudden Cardiac Death persists as a global health problem and stands as the leading cause of death. In the field of forensic medicine, determining the cardiac cause of death may be challenging, especially in the absence of morphological or anatomopathological findings. Ancillary diagnostic approaches including biochemical markers gain importance in such cases and several studies have investigated postmortem biochemical methods for various markers. In recent years the amino-terminal part of the pro-brain natriuretic peptide (NT-proBNP), has been gaining attention in the forensic field as being more useful than other studied hormones in detecting the cardiac origin of death.

AIM OF THE STUDY: To evaluate the value of the NT-proBNP measurement in pericardial fluid samples in determining the cardiac origin of sudden death.

METHODS: This is a cross-sectional study dealing with cadavers who underwent a forensic autopsy at the Department of Forensic Medicine Teaching Hospital Taher Sfar of Mahdia. we divided cases into two diagnostic groups, according to the cause of death: cardiac deaths and non-cardiac deaths with postmortem interval<24h.
NT-proBNP levels were measured in pericardial fluid in all cases. Comparisons were made between cardiac and control levels, as well as between cases with and without cardiopulmonary resuscitation. Additionally, levels of this marker were compared in cases with various postmortem intervals.

RESULTS: 42 cases were included in this study with a mean age of 46.55± 20.919 years. Pericardial fluid NT-proBNP was significantly higher in the

cardiac death group than in control cases (p=0.001). Cut-off values for diagnosing the cardiac origin of death was 2336.5 pg/ml (sensitivity, 77.3%; specificity, 75%), with an area under the ROC curve of 0.8.
The NT-proBNP levels were significantly higher in individuals who had suffered from chronic cardiac ischemia than in either control cases or those who had suffered from acute cardiac ischemia. Our results reveal no significant postmortem influence on pericardial NT-proBNP levels within 24 h after death, suggesting the stability of this molecule in postmortem pericardial fluid. According to the role of cardiopulmonary resuscitation, our results showed that there was no statistically significant variation in pericardial NT-proBNP levels between cases without cardiopulmonary resuscitation and those with cardiopulmonary resuscitation.

CONCLUSION: The study suggests that pericardial NT-proBNP measurement is a reliable diagnostic biomarker for sudden cardiac death in postmortem. However, it is important to note that postmortem biochemistry is a complementary discipline that should be combined with macroscopic and histological examination to increase diagnostic accuracy in forensic practice.

Oral Communications 06: SARS CoV2

OC06-1

Forensic and Pathological Death Investigation of Excess Covid-19 Related Deaths in 2020-2022 in Kildare, Ireland and the Role and Lessons of Forensic Clinical Medicine

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All Covid-19 deaths, nursing home and residential home deaths and deaths must by law in Ireland be reported to the Coroner, the independent Judicial Officer of the State, in the District in which they occur. In this study beginning 11th March 2020, when the first Covid-19 death occurred in Ireland, to 28th February 2021 there were 4,443 Covid-19 deaths nationally of which 230 (5%) were reported in Kildare, population 230,000, with 163 (71%) deaths occurring in nursing and residential homes. The clinical epidemiology and documented excess mortality of the reported deaths are analysed in this study for three distinct periods from March to February 2021 corresponding with three national "lockdown" periods, and for the consolidated "Covid-19 year" period from March 2020 to February 2021 with update to May 2022.

METHODS AND RESULTS: The calculated excess number of deaths notified for March 2020 to February 2021 compared with 2015-2020 (5-yearly average of 567) was 300 (53%) of the 867 total deaths reported with a 169 (54%) excess in the 480 deaths in nursing and residential homes (5-yearly average of 311). Covid-19 deaths accounted for 77% of the total excess deaths and for 96% of the nursing and residential home excess deaths. Underlying medical conditions were recorded in all but two of those deaths related to Covid-19. The average age of the deceased was 82.2 years, median age of 83 year, 58% female (134) and 42% male (126). The excess total death percentages were 117%, 16%, 46% and 53% in the three periods and year respectively. In the nursing and residential home setting the corresponding excess death percentages were 142%, 4%, 35% and 54%. To 6th March 2022, 300 Covid-19 deaths had been reported in Kildare of 6,570 nationally (5%), 194 in nursing and residential homes (65%). Only 10 of these Covid-19 related deaths were the subject of forensic post mortem examination.

DISCUSSION: Information analysed for this study informed Covid-19 public health policy and strategy in the continuing challenges of the infection. The report is set in the wider context of the Forensic Coroner Service and Forensic and Pathological death investigation processes and their medical role during the pandemic. Comments and observations are made on clinical epidemiology, co-morbidities, post mortem practices, bereavement, vaccination and the public health imperative for centralized mortality databases, reformed death notification and certification systems for infectious disease surveillance. The tragic Covid-19 related deaths in County Kildare of 320 individuals to 31st May 2022 from Covid-19 inform the learning process to diminish the worst outcomes of any future similar infectious pandemic and Covid-19 now continuing as an endemic infection. Recommendations of both national and international application will be presented on foot of the findings and questions raised.

OC06-2

Gender Violence During the Three Ages of Life and the Impact of the Covid-19 Pandemic: A Review

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Women, children, and older people suffered different types of violence during centuries, and this appears to have been exacerbated during the period of the COVID-19 pandemic and the relative lockdown. Aim of the study is to analyze the literature about gender violence and abuse in the different ages of life and during the Covid-19 lockdown, to reach a deeper understanding of the evolution of the scientific community's approach to this topic throughout the years and to find out if there are any substantial differences in the amount of research in different types of abuse. Moreover, the impact of the Covid-19 pandemic was specifically highlighted. Data were obtained from an electronic literature search using various online sources such as PubMed, Google Scholar, Science Direct and Web of Science. The quantitative and qualitative aspects of the different literature findings were commented. Key findings were that in all the scientific sources, the terms "child abuse" were certainly the most frequently treated of all, compared to "gender violence" which appear to be second placed in quantitative terms; then generally follows "femicide" and, lastly, "elderly abuse", with few results.

From a qualitative point of view, the different approach to the issue were of great interest, the first studies typically considered gender - based violence as a purely physical problem, then, progressively, the analysis focused more and more on the psychological point of view of the issue, both for victims and abusers.

There was a general greater number of studies in 2020 about violence in comparison with previous years: this is due to the attention for the COVID-19 pandemic and lockdowns.

In conclusion, the social and scientific attention to gender-based violence appeared to be very poor, especially in the case of older people abuse, while child abuse seems to be the form of violence with the greatest number of studies. It is necessary to increase general attention to the topic to correctly identify each form of abuse and to be able to take care of the subjects most at risk.

OC06-3

Necroptic Aspects in Sars-CoV-2 Infections – Retrospective Study

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INTRODUCTION: The global spread of the SARS-CoV-2 pandemic has led to a serious global crisis in the health, social and economic spheres. The COVID-19 pandemic was and still remain the most important health emergency worldwide, for whose management all professionals have

been called to provide support in the diagnosis and treatment of patients affected by this disease. Despite early concerns about safety, forensic medicine has contributed to a better understanding of the pathological mechanisms of the disease.

OBJECTIVE: The purpose of this paper is to establish the importance of forensic autopsy in SARS-CoV-2 infection, and to accurately identify morpho-pathological lesions and consequences of this infection on the human body.

MATERIAL AND METHOD: The authors conducted a retrospective study between 2020-2022, the pandemic period, within the casuistry of the Institute of Forensic Medicine Iasi.

RESULTS AND DISCUSSION: Following the descriptive analysis of the cases included in the study, as well as the analysis of the specialized literature, the major impact of the COVID-19 pandemic was highlighted in terms of the death mechanisms involved, the occurring consequences and the induced changes.

CONCLUSIONS: The forensic autopsy is an essential tool in investigations aimed at pathogenesis and clinical implications of Sars-Cov-2 infection. To this end, it is also important to have an extensive medical history as well as to perform multiple complementary investigations (imaging, immunohistochemical, etc.).

OC06-4

COVID-19-Related Substance Use and Abuse: Consequences on Young Adults' Mental Health

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The COVID-19 pandemic has undoubtedly struck elderly people hardest, in terms of severity and mortality; it is just as apparent, however, that children and adolescents have suffered major upsets and disruptions in their lives. The psychological, mental and developmental repercussions have been major, and have led to a reshaping of drug abuse dynamics and substance addiction. The authors have outlined a narrative review on the major issues affecting adolescents and their mental well-being, by clarifying the lingering effects and pandemic aftermath, especially on drug abuse, developmental aspects and behavioral addiction. The unique traits of adolescent risk factors need to be outlined, in order to identify areas to be prioritized for future strategies. Possible repercussions on juvenile crime linked to social estrangedness and disrupted interactions have been briefly explored as well. At the same time, novel avenues of drug trafficking have shaped up: digital and web-based technologies and applications have dramatically and profoundly changed the way human beings function and interact, and such a revolution has been thoroughly explored and researched from the legal, ethical, moral and anthropological perspectives. The pandemic itself, while on the one hand restricting social contact, has greatly encouraged (and at times mandated) on-line interactions. From the standpoint of adolescent mental health, such an evolution is liable to engender or compound manifestations of dysfunctional behaviors, e.g. body dysmorphic disorder (BDD, characterized by negative thoughts about appearance and body misperceptions), eating and addictions disorders. People with body dysmorphic disorder are at increased risk of developing substance use disorders, and such a destructive association has only been made more severe by pandemic-related restrictions, emotional distress and anxiety, as well as longer exposure to social media and online interactions. This is a major cause for concern, because substance use worsens symptoms of BDD and contributes to unfavorable treatment outcomes. Such dynamics and correlations can relatively easily spiral out of control, given how our daily activities and interactions in which we routinely engage rely heavily on softwares, devices and applications for an ever more extensive range of tasks. The Fourth Industrial Revolution is poised to change healthcare at its very core, but the impact that abnormal exposure to the cybersphere and developing forms of cybercrime can generate on public health is daunting, and represents an existential threat for the very fabric of our societies and the lives of millions. As the enemies and threats to our social peace and well-being now lurk in the ether, almost invisible and untraceable, an extraordinary effort needs to be undertaken to adapt, integrate our skills and take global cooperation and exchange to a whole new level, if we are to prevail. All such aspects are highly meaningful and relevant from a medicolegal perspective as well.

OC06-5

Violence Against Women and Domestic Violence: Differences Revealed under COVID-19 Social Circumstances and the Distinct Features of the Homicides Committed within Both Type of Violences

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Violence against women (VAW) has different features regarding to the rest of violence. It is a "moral violence" (not "instrumental") used by men against women, especially in the context of an intimate partner relationship, with its motivations rooted on cultural references, and with the main goal to control women within the relationship. "Domestic violence" (DV) is a violence defined by the contextual elements of the family relationships or among people living together in the same home. In DV perpetrators and victims can be different persons with distinct positions within the family (men, women, fathers, mothers, sons, daughters, grandfathers, grandmothers…) and the motivations and goals are multiplex (economical, drugs, robbery, personal conflicts…) WAW and DV are different, and these differences must be observed in their social circumstances, in their injuries' pattern and homicide´s elements. Motivation and objectives of VAW are different to DV ones and these differences have consequences on the aggressions and homicides under one and another violence. COVID-19 pandemic and lockdown created a general circumstance under many social behaviours were affected, showing their nature and differences depending on how the new context impacted on the behaviour's elaboration. In our case, we analysed how VAW and DV behaved to see if their elements and features are the same or if they are different kind of violences, as we hypothesize. We studied VAW and DV national statistics during the COVID-19 pandemic (2020) and five years before (2015-2019) to see how evolved, and the homicides Judicial Sentences from Spanish Courts regarding to VAW and DV from crimes committed since 1997 to 2020, and analysed the differences between both types of violence around these indicators:

- Statistics changes in the incidence of VAW and DV during COVID-19 pandemic
- VAW and DV homicides' elements:
  - Mechanism and instrument used
  - Use a simple mechanism and instrument or more than one (simple or mixed)
  - Direct use of the hands to kill
  - Degree of violence used
  - Specific modus operandi in VAW and DV homicides

We compared these indicators in VAW and DV cases and homicides, and we found some relevant differences between them regarding to the following elements:

- Different behaviour of VAW and DV cases complains during COVID-19 pandemic
- Different incidence of VAW and DV homicides rate during COVID-19 pandemic
- In VAW homicides regarding to DV homicides we see:
  - Higher degree of violence ("overkill")
  - Higher direct use of the hands to kill.
  - Higher proportion of mixed mechanisms (more the one instrument used to kill)

These features are very useful to focus the investigation and to identify the different elements related to each kind of violence and developing the specific instruments and laws for each one.

Oral Communications 07: Forensic Pathology II

OC07-1

"Anatomie d' une Chute": Jumper or Faller? A Comparative Retrospective Study in Italy

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Recently, the movie "Anatomy of a Fall" ("Anatomie d' une chute") was awarded with the Palme d'Or at the 76th Cannes Film Festival. It emphasizes the crucial role of forensic pathologists in analyzing all available evidence in order to determine the dynamics of a fall from a height.

Inspired by this movie, our work aims to identify patterns potentially useful for forensic pathologists in establishing the dynamics of a fall from a height, investigating the differences between jumpers and fallers in Italy and comparing them to the relevant existing literature.

A retrospective study was conducted using autopsy data from falls from a height referred to the Institutes of Legal Medicine of Padua and Bologna between 2000 and 2023.

The included cases (n. 54) were categorized into accidental (n. 29) and suicide (n. 25) falls. Data on epidemiological (e.g., victim's sex and age, presence of psychiatric disorders, height, season, and time of the fall) and forensic data (e.g., contusions, abrasions, and lacerations of the skin in various districts, fractures at the cranial vault, skull base, splanchnocranium, spine, sternum, ribs, upper and lower limbs, hemorrhages, lacerations of internal organs and major vessels, cause and time of death, and primary site of impact) were recorded for each group.

The main results show that jumpers consisted of 60% men and 40% women, while fallers were almost all men (93.1%). Psychiatric disorders were reported in 56% of suicide cases, compared to 3.4% of accidental cases. Fall heights of ≥10 meters occurred in 68% of jumpers, compared to 34.5% of fallers. Fractures involving the vault and skull base were present in 32% and 36% in jumpers, and 37,9% and 51.7% in fallers, respectively. Subarachnoid and subdural hemorrhages were present in 40% and 16% in jumpers, versus 55.2% and 41.4% in fallers, respectively. Rib fractures occurred in 88% of jumpers and 62.1% of fallers. Upper and lower limbs were affected by fractures in 68% and 58.3% of suicides, compared to 34.5% and 31% in accidents. Death was immediate in 88% of jumpers versus 51.7% of fallers. The most common mechanism of death was hemorrhagic shock (64%) in suicides and neurogenic shock (51.7%) in accidents. Both jumpers and fallers most commonly experienced primary thoraco-abdominal impacts (40% and 31%, respectively).

Our findings confirm that fallers and jumpers exhibit different injury patterns, aligning with those reported in the scientific literature. Consequently, forensic pathologists can use these patterns to establish the dynamics of the fall, not only during the autopsy, but also during the death scene investigation.

OC07-2

Cartilage Macromolecules as a New Parameter for PMI Determination?

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The determination of the time of death or the postmortem interval (PMI) is one of the most important and frequently asked questions in forensic medicine. The methods used for PMI determination are based largely on early and late postmortem changes. The determination of PMI during the late postmortem changes is based primarily on a subjective assessment and is less precise due to the lack of objective methods. Cartilage could be a new parameter for PMI determination due to the structure and anatomical location that enable chondrocytes to survive for several weeks after the individual's death, and macromolecules in the cartilage degrade slower than in other tissues. Recent studies of chondrocyte viability and degradation of macromolecules in cartilage samples of knee joint as a function of time and ambient temperature have been performed under laboratory conditions that simulated the late postmortem changes in the decedent. Methods for determining the viability of chondrocytes from in vitro samples confirmed that the viability of chondrocytes could be used for PMI determination. Also, the degree of degradation of cartilage macromolecules, collagen and glycosaminoglycan in extracellular matrix, and chondrocytes nuclear DNA from in vitro samples confirmed similarly, that even macromolecules in cartilage change gradually and evenly over time, but the rates are different at different temperatures. Therefore, macromolecules in cartilage may be another model for an objective prediction of PMI in forensic medicine. However, the findings obtained in vitro should be verified by an extensive in corpore study.

OC07-3

Post-Therapeutic Changes. When the Treatment Creates Confusion

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When performing medico-legal autopsies we are used to find mostly pathologies or nonspecific signs with which the person lived or had at most a minor contribution to death. Often, after an injury or a suspected injury, the patient receives medical care, which, in addition to the intended benefit, creates a multitude of therapeutic changes.

Those signs can be more acknowledged such as injections marks, wound sutures, rib fractures after resuscitations, pressure sores etc. or less acknowledged such as "spontaneous" and extended hemorrhages, contention and manipulation marks, undiagnosed internal ulcerations and fistulae, dependent edema etc. All these signs must be explained for the authorities and their contribution to death established. These changes, especially if are described by a less experienced practitioner, and also interpreted with less caution, can mislead the investigation to wrong accusation or can hide signs of an assault.

This presentation has the purpose of clarifying this topic. We made an exemplified classification of these signs that we encountered in current practice and are a source for important debates. We did not include in the presentation those signs for which the historical/medical data created confusions that were not elucidated until the completion of this work. All the examples are accompanied by pictures and a short explanation.

Given the great variability of those signs, prudence is always recommended.

OC07-4

Decomposition in Terrestrial Settings: Exploring Differences Between Indoor and Outdoor Environments in Greece

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The study of human decomposition in various forensic contexts is integral to understanding the dynamics of postmortem changes and improving the methods of estimating time since death. In this study, a comprehensive examination of the differences between indoor and outdoor decomposition processes is presented. The sample included 330

cases examined by forensic practitioners at the National and Kapodistrian University of Athens and at the Forensic Service of Thessaloniki, Ministry of Justice, between 1999 and 2022. The selected cases included bodies in various stages of decomposition with known PMI recovered from indoor or outdoor terrestrial environments. Data collection involved examining photographic material and formal documents. Studied variables included stage of decomposition, soft tissue breakdown, skeletal degradation, disarticulation, mummification, adipocere formation, insect and scavenging activity, all of which were scored independently for each anatomical region. Demographic information and clothing were also recorded. The stage of decomposition was evaluated according to the Megyesi et al. (2005) protocol, adapted to Greek decomposition patterns. PMI was calculated from the date of last communication to the date of recovery. Accumulated Degree Days (ADD) were calculated using daily temperature data from the closest weather station for outdoor cases. For indoor cases, averaged monthly temperature data collected during scene investigation were used instead. The study revealed context-specific differences in the age but not the sex distribution. A higher percentage of young adults were recovered outdoors, suggesting potential demographic variations in the circumstances leading to death within indoor and outdoor environments. Indoor cases demonstrated significantly lower PMIs and ADDs compared to outdoor cases, resulting in smaller decomposition scores. Outdoor cases exhibited a stronger correlation between decomposition score and ADD, emphasizing the direct impact of environmental conditions on decomposition. Decomposition rate was higher outdoors, even after adjusting for ADD differences. Seasonal patterns emerged with winter displaying the smallest decomposition rate indoors and the highest rate outdoors. Mummification patterns and rates differed between environments, with season-related patterns evident indoors, but not outdoors due to the small sample size. Mummification was better correlated with ADD in indoor settings potentially due to the absence of scavenging activity. Adipocere formation was recorded in 13 cases outdoors but only in one case indoors. Soft tissue decomposition had a higher rate outdoors and was better correlated with ADD. The sequence of soft tissue decomposition and disarticulation differed between environments, and skeletal degradation was exclusively noted in outdoor cases. Scavenging activity was frequently observed in outdoor settings. Insect presence, though similarly correlated with ADD, occurred at lower ADDs outdoors compared to indoors.

In conclusion, the present study significantly contributes to understanding indoor and outdoor decomposition disparities. The findings have practical forensic implications, emphasizing the need for separate models in estimating time since death across diverse environments.

OC07-5

Proteomic Analysis for the Study of Vitality on Human Rib Fractures: A Pilot Study

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INTRODUCTION: Blunt force chest injuries with rib fractures are frequent in forensic caseworks. However, the possibility to set chronologically the traumatic mechanism on human bone is currently very limited. This study aims to a) identify the proteomic expression on bone marrow of human ribs that were damaged with fracture (vitality); b) evaluate the proteomic changes over different known survival times; c) assess proteomic differences among resuscitation fractures and other types of rib traumas (e.g., vehicle and train crashes, falling from heights).

MATERIAL AND METHODS: 15 cases with rib fractures and different survival times, and 7 controls with different causes of deaths but no traumatic injuries. Specifically, the survival times of cases included (4) < 1 hour, (3) = 1 hour, (3) = 2 hours, (3) = 5-10 hours, and (2) = 24-72 hours; ratio men-to-women was 1,14:1 and the mean age 54,06. The selection of the case samples was based on the highest hemorrhagic infiltration which could be detected macroscopically; for controls, sampling was conventionally taken on the 4th right rib. Then, soft tissues around each sample were mechanically removed and frozen at -80°C. Each sample was further processed and dissected with a scalpel to collect the bone marrow (in the fracture foci for cases). Proteomic analyses were performed on bone marrows and results were expressed over logarithmic2 fold changes. Statistical tests included ANOVA applying the false discovery rate ($q<0.05$).

RESULTS AND DISCUSSION: The trauma group showed high expressions of acute-phase and inflammatory proteins ($q<0.001$) such as alfa-crystallin B chain, plasminogen, complement component C3, complement factor B and alfa-1 acid glycoprotein 1. Moreover, there was an increasing expression in the cases of both myosins (heavy and light chains) and different extracellular matrix proteins including the bone-specific collagen alfa-1 (XII) chain. Finally, carbonic anhydrase 2 (CA2) was detected as highly expressed and significative ($q<0.001$) in the trauma group. In the trauma group, inflammatory proteins showed a common increasing trend over the time whereas both myosins and alfa-crystallin B chain decreased progressively. Notably, the expression of CA2 increased linearly with high statistical significance ($q<0.05$) for all the survival subgroups of trauma. No statistical differences were noted among resuscitation fractures and the other types of rib traumas. These results provide that the bone marrow reacts to the trauma similarly to other tissues by recruiting cells in the fracture foci (evidence of myosins) to start the early inflammatory phase (evidence of inflammatory proteins). However, bone marrow also shows a particular response to trauma by increasing the expression of CA2 which is a very specific enzyme and fundamental for the process of bone remodeling. Therefore, this study provides specific forensic markers of vitality which could help to set chronologically the traumatic mechanism on human bone.

OC07-6

Deaths in the Elderly: Pilot Study

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INTRODUCTION: Longer life expectancy is one of the most important advances in medicine. The growing proportion of the elderly implies that healthcare resources will have to be transferred to this part of the population in the future. It also implies that natural and unnatural deaths of the elderly will be increasingly confronted.

OBJECTIVE: The aim of this pilot study was to determine the causes and epidemiological aspects of deaths in the elderly, defined as individuals at least 65 years of age at the time of death.

METHODS: A retrospective pilot study was undertaken of autopsy cases performed at the Institute of Forensic Medicine of Health Care Surveillance Authority in Bratislava in the first and last year of the planned period of years 2018-2022. Cases were evaluated according to the occurrence of cases in particular years, sex, age, cause of death and external cause of death. The external cause of death was registered as natural, accidental, suicidal and assault.

RESULTS: A total number of 1380 autopsies were performed in the mentioned years. Of them, 378 (27.4%) cases belonged to the 65+ population age group, with the mean age of 73.9. Males comprised 240 (63.5%) of all cases, with the mean age of 73.2, and females 138 (36.5%), with the mean age of 75.2. Natural causes were responsible for 150 deaths (39.7%), and violent causes for 228 deaths (60.3%). The group of natural deaths, mean age 73.3, was dominated by diseases of the cardiovascular system in 113 cases (75.3%), especially coronary artery disease in 41 cases (36.3%), followed by 37 cases (32.7%) of universal atherosclerosis; complications of high blood pressure were present in 16 cases (14.2%) and embolism of a. pulmonalis in 10 cases (8.8%). The

overwhelming majority of violent deaths, mean age 74.4, 153 cases (67%) were accidents, 72 cases (31.6%) were suicides, and the remaining 3 cases (1.3%) were assaults. Falls – 45 cases (29.4%) were the leading cause of all accidental deaths, followed by 26 cases (17%) of road traffic accidents. Hangings – 34 cases (47.2%) prevailed among violent suicide methods.

CONCLUSION: Our pilot study shows that elderly people are exposed, due to physiological, behavioural, environmental, and contextual factors, to unnatural deaths, particularly accidental deaths. An autopsy is an appropriate procedure to determine the cause of death in the elderly as in all deaths out of hospital and deaths of untreated patients. Autopsies provide important statistical data on the causes and manners of death that can be used for preventive strategies. Preventive measures should help the elderly to avoid, for example, accidental falls or traffic accidents. The specialization of care for the elderly on the somatic or psychiatric level, given the specific needs, should also be considered.

Oral Communications 08: Forensic Pathology III

OC08-1

Mood Disorders and Suicide: Preliminary Toxicologic Findings on Psychiatric Therapeutic Compliance

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INTRODUCTION: Suicide is one of the leading causes of death today, and among all psychiatric disorders, mood disorders are one of the main risk factors. It is well-known and proven that suicides are very common among people undergoing treatment and prescribed psychiatric medication. So far, however, there have only been a few studies dealing with this phenomenon. For this reason, a study was carried out to investigate the extent to which patients with mood disorders who were undergoing pharmacological treatment were complying with the therapy at the time of their suicide.

MATERIAL AND METHODS: All individuals who died by suicide and were autopsied at the Institute of Forensic Medicine of Milan in the last 10 years and simultaneously suffered from Major Depressive Disorder (MDD) or Bipolar Disorder (BD) were retrospectively extrapolated. After that, only those patients for whom it was possible to obtain health records on the last and ongoing drug therapy prescribed were selected. This information was retrieved from hospitals, territorial mental health centers or private psychiatrists. Finally, blood and urine samples that had been taken at autopsies were subjected to toxicological analysis and the results compared with the prescribed therapy.

RESULTS: A total of 22 people (11 men and 11 women) aged between 28 and 83 years, were selected, 12 with MDD and 10 with BD. Fourteen cases (63.5%) were treated as hospital outpatients or inpatients, 5 (23%) were treated in territorial mental health centers and finally 3 (13.5%) by private psychiatrists. The toxicological analysis revealed that only 6 cases (27%) showed a qualitative match with the prescribed medication. In 5 cases (22.7 %) the medication was only partially complied with and in 11 cases (50 %) it was not complied with at all. And even when medication was present, the value was often below the therapeutic range. Overall, more than 70 % of the test subjects adhered to their medication only partially or not at all. This applied to all drug classes, especially benzodiazepines, antidepressants, anxiolytics, antipsychotics and neuroleptics. The post-mortem toxicological analyses also revealed in some cases ethyl alcohol in their blood or traces of illicit drugs or unprescribed medications.

CONCLUSIONS: It is clear that a toxicologic examination is essential in all psychiatric deceased in general and even more so in suicide cases, as it may demonstrate a lack of compliance. As treatment adherence is considered as a key factor in reducing the risk of suicide, the observed findings inevitably raises relevant clinical questions. Against this background, prospective monitoring of post-mortem medication levels in suicidal individuals and synergistic collaboration between clinicians and forensic pathologists could help to evaluate the effectiveness of specific medical interventions, highlight existing critical problems and develop new approaches to suicide prevention.

OC08-2

Preliminary Microscopic Study on the Effect of Basic Corrosive Substances on Human Bone: Observations for Forensic Purposes

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INTRODUCTION: Attempting to dissolve a body in corrosive substances is a well-known method of destruction and concealment, but the literature on this forensic aspect is very limited. In this context, our previous study investigated the effect of different acidic caustic substances on human bone tissue. To fill the current gap regarding the effect of basic corrosive substances, a new experimental study was conducted with a threefold aim: i) to investigate the temporal evolution of bone dissolution; ii) to evaluate the destructive effect at different concentrations; iii) to histologically evaluate the recognizability of bone nature and its human origin.

MATERIAL AND METHODS: Compact human bone fragments (cranial bone and femur) and spongy bone fragments (rib and vertebra) measuring approximately 4cm x 4cm x 1cm were obtained from 10 autopsied bodies. These fragments were divided into 4 equal parts and sent for controlled destruction in the laboratory using basic corrosive substances. Different concentrations of ammonia -NH3- (2.5%, 5%, 10% and 28%), caustic soda -NaOH- and caustic potash -KOH- (2.5%, 10%, 28% and 35%, respectively) were used. Macroscopic and microscopic observations were performed at predetermined immersion intervals, with an interruption after 360 hours (forced endpoint) if the sample did not dissolve completely.

RESULTS: Ammonia proved to be ineffective on compact bones even at the highest concentration of 28%, as the bone fragments remained intact even after 360h of immersion; spongy bones, on the other hand, were completely dissolved after 240h (at 10% and 28% concentration) and 336h (at 2.5% and 5% concentration).
Caustic soda was effective on both types of bone and resulted in the following dissolution times: for compact bone 168h at 2.5%, 96h at 10%, 48h at 28% and 24h at 35%; for spongy bone 96h at 2.5%, 48h at 10%, 20h at 28% and 1h at 35%.
Caustic potash was also effective and resulted in in the following dissolution times: for compact bone 216h at 2.5%, 132h at 10%, 72h at 28% and 48h at 35%; for spongy bone 120h at 2.5%, 65h at 10%, 21h at 28% and 4h at 35%.
In almost all cases, the possibility of recognizing the material as human bone was gradually lost.

CONCLUSIONS: Caustic soda and potash proved to be effective substances for human bone tissue, with dissolution times decreasing with increasing concentration, with faster timescales in the case of spongy bone. However, a comparison of the basic corrosive substances examined with the results of the study on acidic substances shows that the former have an effect over a longer period of time. Nevertheless, it has been shown that basic substances have a high destructive power. These results can be of practical use in challenging forensic investigations for which there is no scientific evidence.

OC08-3

Homicide by Sharp Force Injuries to the Neck: Microradiology of Cervical Vertebrae and Weapon Identification through 3D-Printed Models

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While injuries to the cervical carotid arteries are well-recognized in cases of sharp trauma, the protected anatomic location of the vertebral artery within the bony canal makes such injuries relatively less common. Consequently, there is a scarcity of published cases on this topic.

These injuries can manifest with a wide range of severity, from hemodynamic instability to severe exsanguination. Associated injuries may include spinal cord transection or contusion, brachial plexus injury, laryngo-esophageal section, and vertebral fractures.

Stab wounds to the neck resulting in injury of the vertebral artery and cervical vertebral incisions are more frequently associated with homicide, as they require a significant amount of force to be produced.

We present a fatal case of homicidal stab wounds affecting the left side of the neck. The autopsy revealed the severance of the left vertebral artery. Subsequent radiological studies, performed through postmortem computed tomography (PMCT), identified a fracture of the left lateral mass of the epistrophe, further characterized using micro-CT. Additionally, high-resolution micro-radiological scans were used to 3D print the first three cervical vertebrae, allowing for a fit matching analysis with an exact model of the weapon declared by the assailant.

This case represents the first example of a forensic sharp force trauma case involving the cervical vertebral district in which all the aforementioned techniques were applied and compared. During the presentation, we will discuss their potential advantages and limitations.

Given the promising results obtained, this contribution suggests that micro-radiological investigations and 3D printing, when validated, will provide forensic pathologists with a valuable asset for identifying the weapon used through a comprehensive study of bone structures.

OC08-4

Positional Asphyxia: Incidental Death or Filicide?

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INTRODUCTION: We report a case of a 17-years-old male, found dead during an Emergency Services (ES) operation, after parents' call. The minor was under benzodiazepine treatment for bipolar disorder; also, he started a drug rehabilitation program, due to alcohol and cannabis abuse, in the previous months. An increasing aggressiveness was reported.
According to reports from parents, the mother was threatened by the minor with a knife tens of minutes before the call to ES, and the father had defended her by grabbing the son's wrists, forcing him onto the bed, and then sitting astride him while the mother had immobilized his legs. The parents left the son's room after 15 minutes, when the minor had apparently calmed down. Upon their subsequent return to son's room, the minor was found in an unconscious state.

MATERIALS AND METHODS: Forensic autopsy, histopathological and toxicological exams were performed.

RESULTS: At the external cadaveric examination a small stabbing wound, located at the distal phalanx of the right fifth finger's palm was observed. Together to classical and nonspecific signs of asphyxia (subpleural petechiae, subungual cyanosis) a fracture of the upper horn of the thyroid cartilage was detected at the autopsy.
Acute pulmonary emphysema and endo-alveolar haemorrhage were confirmed at histopathological examination; a moderate hepatic steatosis was also observed.
Toxicological analysis, carried out on blood sample, provided positive results for alcohol, delta-9-tetrahydrocannabinol (THC) and benzodiazepines, namely alprazolam. The blood alcohol concentration (BAC) was 2.49, THC concentration was 10.1 ng/mL while alprazolam was measured at a high level, consistent with a supratherapeutic range (108 ng/mL). In addition, hair analysis tested positive for cannabinoids.

CONCLUSIONS: The cause of the death was attributed to an acute asphyxia, due to airways constriction, caused by the parents while they desperately attempted to restrain the minor's aggressive behaviour. The presence of alcohol and alprazolam in blood, at a high concentration level, may be interpreted as contributory factor. Learning object: after attending this presentation, attendees will be aware of a peculiar death by accidental positional asphyxia.
Impact statement: This presentation will impact the forensic science community by reporting a multidisciplinary approach identifying the accidental positional asphyxia as the cause of death, by evaluating the intoxication only as a contributory factor.

OC08-5

Development and Application of a Novel Medical Device Designed to Emulate Ex Vivo Hepatic Circulation – Post-Mortem Applications

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INTRODUCTION: The study focuses on the development and application of a novel medical device designed to emulate ex vivo hepatic circulation, aiming to elucidate and highlight intricate hepatic micro vascularization. Hepatic microcirculation plays a crucial role in liver function, pathology, and surgical interventions. Accurate visualization of hepatic microvascular structures is essential for comprehensive understanding and improved clinical outcomes.

METHODS: Our team engineered a sophisticated ex vivo hepatic circulation mimicking device, incorporating cutting-edge technology to replicate the physiological conditions of the liver microcirculation. The system integrates perfusion mechanisms, biomimetic materials, and advanced imaging modalities to closely emulate the in vivo hepatic environment. A series of experiments setups were conducted to validate the device's ability to reproduce hepatic hemodynamics and facilitate high-resolution imaging.

RESULTS: Preliminary results demonstrate the successful emulation of hepatic circulation, with the device showing remarkable fidelity in reproducing physiological flow patterns and pressures. Furthermore, the system enables real-time imaging of hepatic micro vascularization, allowing for detailed analysis of vascular networks, perfusion dynamics, and potential pathological alterations.

CONCLUSION: Our innovative ex vivo hepatic circulation mimicking device represents a significant advancement in the field, providing a unique platform for studying hepatic micro vascularization with unprecedented precision. This technology holds great promise for enhancing our understanding of liver physiology, pathology, therapeutic interventions and in forensic medicine practice. The device's potential applications span from basic research to clinical settings, offering a valuable tool for both diagnostic and interventional purposes. Also, with this device we will try to perform some post-mortem angiography studies for other organs. This work invites further discussion and collaboration within the medical community to explore the full range of possibilities afforded by this groundbreaking technology.

OC08-6

Differential Muller-Matrix Analysis of the Vitreous Body of the Human Eye as a Useful Tool in the Study of the Postmortem Interval

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INTRODUCTION: Determining the time since death is one of the key components of forensic medical practice because it plays an important role in judicial investigations, establishing the causes and circumstances of death. This task requires a high level of accuracy and objectivity, since the duration of the post-mortem interval can determine whether the criminal investigation will be successful, the establishment of guilt and a fair trial.
Now, in the world, there has been a significant increase in interest in the development and improvement of methods for determining the postmortem interval due to the use of the latest technologies and scientific approaches. Increasing the objectivity and accuracy of determining the time of death contributes to the improvement of the quality of the investigation of criminal events and increases the efficiency of judicial processes.
Therefore, our main goal is to create an algorithm to accurately determine the postmortem interval by using differential Mueller matrix analysis of the vitreous body of the human eye.

METHODS: The samples of the human vitreous body (n=90) who died from cardiovascular pathology with a previously known postmortem interval of up to 48 hours were studied. The research was carried out using a laser polarimeter of a standard scheme. Further statistical calculations of the obtained data were carried out using Statistica and Excel software.

RESULTS: Differential Mueller-matrix analysis made it possible to establish clear time-dependent changes in the structure of the human vitreous body. The transformation of the polarization parameters of postmortem changes in the polycrystalline structure of the layers of the human vitreous body was determined. Namely: as the postmortem interval increases, the level of optical anisotropy decreases. These processes occur due to the destruction of the collagen network and a decrease in the concentration of protein complexes.
According to the research results, it was possible to determine the duration of the postmortem interval in the range of 1-36 hours with high accuracy - up to 25 minutes.

CONCLUSIONS: Modern science and technology make it possible to ensure a faster and objective establishment of the time since death, which can be a decisive factor in saving lives and ensuring justice in justice. The obtained results will provide an important contribution to improving the quality of forensic medical examinations and scientific research in the field of determining the time since death, contributing to the development of modern methods and practices that will help determine the postmortem interval with the highest accuracy and objectivity.

KEYWORDS: forensic medicine, postmortem interval, time since death, vitreous body, laser polarimetry.

Oral Communications 09: Forensic Pathology IV

OC09-1

Isaac's Revenge: A Case of Patricide by Stabbing Followed by Incineration

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INTRODUCTION: We present a case involving a 61-year-old man killed by his 23-year-old son and subsequently incinerated on a pyre. The man was last seen at home with his son; upon the wife's return home, she found her husband missing, whereas their son was tending to a burning pyre in the garden, in which the woman saw 'a carcass' and some various traces of biological matter on nearby ground. Due to her son's unconvincing explanations about his father's disappearance and his increasingly alarming behavior in the following hours, the woman alerted the police.
A longstanding conflictual relationship between father and son was reported; furthermore, over the past two weeks, the son, after returning home from a rave party, had begun displaying bizarre behaviors, religious obsessions, and wandering around the house with a knife.

MATERIALS AND METHODS: Investigations included: scene inspection, autopsy, histopathology, toxicological exams.

RESULTS: Scene inspection revealed bone fragments, charred soft tissues, and chunks of "cooked" blood in the pyre remnants; beyond the nearby fence, a severely charred torso with part of the head still attached through cervical vertebrae, was found. Both the autopsy and histopathology examinations showed extensive heat-induced organ alterations and signs of acute suffering, along with intense blood inhalation in lower airways and lungs, with minimal soot traces. No stab wounds were found. Neck examination proved impossible due to the complete soft-tissue destruction. Toxicology exams on blood samples showed a carboxyhemoglobin of 18.8%.

CONCLUSION: Extensive tissue destruction due to heat and the impossibility to inspect the neck region prevented detection of stab wounds, likely to be present on the basis of his declarations to the Police. Lungs and airways findings, coupled with carboxyhemoglobin blood levels, suggest that the man was at the "limine vitae" while burning, emphasizing that the man survived briefly after the stabbing and when the pyre was lit. Scene inspection suggested also that the son attempted to scatter some of the corpse remains.
Confronted by the police, the son confessed to having stabbed his father in the neck with a utility knife at the peak of an altercation; he also admitted having built the pyre to incinerate the body, describing the act as a ritual to "set his father's soul free".
The role of drug consumption (probably during the rave party) in the onset of the young man's psychotic conditions must also be highlighted; it is noteworthy that the murder occurred during the initial stages of the Covid pandemic and quarantine restrictions, which played an additional role in exacerbating familial conflicts and triggering the violent outburst.

OC09-2

Comparison of "Traditional" Forensic Medical and the DVI Protocol Based Identification of Unknown Bodies

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INTRODUCTION: Identification of the unknown bodies is a core element of the forensic medicine as well as of the police investigation. Depending on the legislation many countries use the medico-legal autopsy to clarify the circumstances, while others use only external examination. The Interpol Disaster Victim Identification (DVI) protocol is used in natural disasters, mass accidents, etc., focusing the identification without the autopsy. Our aim was to compare the two systems, finding pros and cons.

MATERIALS AND METHODS: In the Department of Forensic Medicine, University of Szeged we performed forensic medical examination of a 14-dead traffic accident. The victims were non-Hungarian citizens, unidentified at the beginning. The forensic medical identification was performed with the autopsy. We put the autopsy report data into the DVI Post-Mortem Form and analyzed the differences between the two methods.

RESULTS: The autopsies found four diagnoses, and three treated teeth which were identifying points. Histopathology helped in diagnosing the diseases and specify the survival time. The reports based the reconstruction of the mechanism of the accident. Autopsy was cheaper, mainly because of the need of less human resource. The use of the form made the data uniformed, easier to compare with other data. The

description of the denture was week in the autopsy reports, while the dentists of the DVI team give detailed state. In the Form there is a stronger accent on the individual appearance, and the personal items.

DISCUSSION: The dead persons came from the same village and were second cousins of each other. Even though they had the ID-cards with them, the injuries and their physical similarities made it impossible to recognize them only by the appearance. The identification was successful in three days. Without the autopsy we could lose numerous personal data, which was known by relatives, and mentioned by them, when the identification started. The post-mortem imaging couldn't be enough, while the post-mortem x-ray or CT is not an adequate tool to receive all the non-traumatic diagnoses. On the other hand, the forensic medical expert (pathologist) is week in dentistry and focuses the pathological state and the injuries of the body, less attention is paid to the non-medical characteristics, while the DVI Form requires a detailed description of them.

CONCLUSION: The DVI Form is standardized, good for comparison even in international conditions. It is minimally invasive, respecting the differences of the autopsy regulations. The participation of the dentists would be inevitable in all identification cases. In the cases, where not only the identification, but the clarification of the circumstances or the responsibility is needed, the autopsy may remain the golden method. In our opinion the DVI method and the autopsy must be performed in one action when both needed.

OC09-3

The Enigma of ALCAPA Syndrome: Unravelling Sudden Cardiac Death in a Young Athlete

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Sudden cardiac death (SCD) is a complex phenomenon, especially when it occurs in apparently healthy individuals. Therefore, a comprehensive investigation of cardiac conditions is necessary.

This case report describes the sudden death of a 15-year-old competitive athlete, highlighting the complexity of diagnosing cardiac abnormalities in apparently healthy individuals.

Despite the athlete's rigorous monitoring for active engagement in sports, the absence of previous indicators of underlying health concerns contrasts with a family history of unspecified cardiac issues.

The young athlete collapsed in the locker room before training, prompting swift defibrillation attempts. Despite prompt intervention and hospitalization, the young athlete died within minutes. In order to understand the cause of death, an autopsy was requested.

The gross cardiac examination documented a weight of 500 grams, anteroposterior diameter of 4,5 cm; longitudinal diameter of 15,5 cm and transverse diameter of 12,5 cm. Transverse and longitudinal dissections of the coronary artery system revealed an ALCAPA. The left coronary artery originated from the pulmonary artery, instead of the aortic sinus, and it was divided into two branches: the anterior interventricular branch and the circumflex branch. A single coronary ostium, associated with two rudimentary ostia, was described in the aortic root. The right coronary artery, presenting tortuous and dilated, was divided into three branches at 2,5 cm from its origin: the infundibular artery, the acute marginal branch and the posterior descending artery. Left ventricle lateral wall was 1.8 cm in thickness while the right ventricle was 0.5 cm. All cardiac chambers were of normal configuration. Histological examination revealed patchy areas of fibrosis, associated with hypertrophic cardiomyocytes, in the anterolateral free wall of the left ventricle, suggesting remote hypoxic/ ischemic myocardial injury. In addition, it was observed the presence of myointimal fibromuscular hyperplasia of terminal intramyocardial coronary branches.

This case reveals the complex interplay between ALCAPA syndrome, chronic hypoxic/ischemic cardiopathy, and exercise-induced cardiomyocyte hypertrophy, contributing to SCD. The autopsy findings highlight the uncommon coronary anomalies associated with ALCAPA syndrome and stress the importance of including congenital factors in the assessment of young individuals. The presence of chronic hypoxic/ischemic cardiopathy suggests a prolonged compromise of coronary perfusion, adding complexity to the underlying pathology. Exercise-induced cardiomyocyte hypertrophy appears to be a compensatory response to chronic ischaemia, raising questions about the impact of intense physical activity on cardiac health. Furthermore, it is important to acknowledge that coronary anomalies such as ALCAPA often evade conventional assessments used to evaluate athletic performance in competitive athletes. These anatomical anomalies, although clinically suspected, require careful evaluation using imaging techniques such as angiography or MDCT. The complex relationship between congenital anomalies and adaptive responses underlines the need for thorough investigations and genetic considerations to formulate targeted preventive measures.

OC09-4

WITHDRAWN

OC09-5

Fatal One-Year Outcome of a Gunshot Wound Teenager Survivor with a Retained Bullet in the Head

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Traumatic brain injuries (TBIs) are divided into i) localized brain injuries (caused by concussion) that lead to congestion and intracranial haemorrhage; and ii) diffuse brain injuries (caused by sudden acceleration/deceleration) which led to diffuse axonal damage and cerebral edema. TBIs can be also primary injuries, caused directly by mechanical impact; and secondary injuries resulting from tissue and cellular damages caused by the primary injury. Although the neurological effects of TBIs are well described in the literature, the systemic effects of TBIs even late and prolonged over time should be better understood.

The authors reported a case of 15-year-old boy who shot himself to his head. He was transported to the hospital in comatose state. The gunshot entrance wound was located on the right temporal bone. According to the imaging, the shot had a transversal trajectory with the bullet lodging in the left nucleo-capsular, with the detection of gunshot residues indicating a contact shot. His initial Glasgow Coma Scale was 3, and he was urgently stabilized with intracranial pressure monitoring and external ventricular drainage. Toxicological examination was negative. The retained bullet was not removed. At 3 months post-injury, he began rehabilitation of the severe brain injury with global aphasia, severe oral apraxia, disorder in hypothalamic-pituitary-adrenal axis, and enteral nutrition. After 7 months, he needed full assistance in personal hygiene, motility, deambulation, communication, cognitive capacity, and sphincter control. At 20 months post-injury, he suddenly died at home due to acute respiratory failure.

At autopsy, scar of entry wound and temporal muscles on the right temporal region of the head and ossification of the entry hole in the temporal bone were found with severe brain atrophy. One 6mm ME Flobert bullet was still lodged in the wall of the left ventricle. Histological analysis showed gunshot residues in the brainstem and the left lateral ventricle with chronic glial response, neuronal loss and severe edema. Histologic findings of chronic inflammation in the lungs, systemic congestion, and recent myocardial necrosis were also found. The death was related to severe encephalopathy with brainstem swelling, and

alteration in autonomic functions such as myocardial disfunction resulting from a low-velocity gunshot-induced wound.

This unique case shows that the effects of TBI are not limited to the nervous system but include non-neurological dysfunctions in the cardiovascular system, lungs, liver, gastrointestinal tract, kidneys and endocrine system. The activation of secondary biochemical, cellular and physiological events can lead to delayed and long-term secondary injury, which can last from hours to years.

OC09-06

Fatal Dog Attack of an Infant with Unusual Cause of Death – A Case Report

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Fatal dog bite injuries are quite uncommon and mainly affect children and the elderly. In the vast majority of the cases, the site of the lethal injury is located in the head or neck region, especially in young children. Older children (age >6 years) and adults are usually dragged down by the lower limbs before attacking the head-neck area. Cause of death is usually exsanguination, skull compression, brain and spinal cord damage or asphyxia caused by laryngeal compression.

We present a case of a 1-year-old child found dead by his mother in their backyard, in the vicinity of their two restrained dogs. Crime scene investigation primarily ruled out the possibility of a dog attack and suggested the infant's injuries were caused accidentally by the dog's chain, leading to difficulties in further investigation process.

Autopsy revealed dog-bite injuries of the torso resulting in asphyxia due to thoracic compression. This is an unusual cause of death regarding dog attacks of humans, not yet reported in forensic medicine to our knowledge. However, veterinary forensic reports of lethal dog attacks on cats show a similar injury pattern. Through the evaluation of this case, we suggest a new approach in the alignment of lethal dog-bite injuries, provide a possible explanation of the attack and highlight the importance of proper crime scene investigation.

Oral Communications 10: Clinical Forensic Medicine I

OC10-1

Children Exposure to Drugs of Abuse: A Retrospective Study

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INTRODUCTION: Children exposure to drugs of abuse is an emergent and non-negligible issue, with both acute and long-term health and social implications. This exposure may occur via different routes, whose likelihood changes depending on children age, and includes in utero, breastfeeding, passive inhalation, intentional administration, and accidental intake. The suspicion of exposure may arise from a maternal history of substances use during pregnancy or lactation, from the presence of withdrawal symptoms at birth, or signs of acute intoxication, or it may also arise when assessing a case of abuse or neglect. In addition to blood and urine analysis, hair analysis is an increasingly used tool to investigate such exposure, but its interpretation in children is still difficult and does not allow the specific mode of exposure to be traced.

AIM AND METHODS: In order to characterize the role of hair analysis in our clinical setting and to pick up any suggestions to guide the clinical practice, the reports of children hair analysis performed during the last years at the Legal Medicine and Toxicology Unit of the University Hospital of Padova (Italy) were collected and analyzed.

RESULTS: The study of hair analysis of 101 children within the first year of age identified cocaine as the most commonly substance of exposure, to which should therefore be implemented information and prevention strategies. The study also showed that with regard to neonates within 7 days of age, maternal history rather than symptoms plays a key role in raising suspicion of drug exposure being the majority of those positive at birth for drugs of abuse investigated because of a maternal history of substance use. In this light, attention should be paid to the interview and the relationship of trust with the pregnant woman. Finally, an important element proved to be the study of mother and infant together to better delineate the type of exposure.

CONCLUSIONS: Notwithstanding the difficulties inherent in the subject, all these elements could be used to build shared prevention and management protocols for this increasingly widespread phenomenon.

OC10-2

Moroccan Medicolegal Institute Experience in Gender-Based Violence Assessment

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Gender-based violence (GBV) refers to any harm perpetrated against a person's will on the basis of gender. Around the world GBV and environmental degradation and instability are among society's most pressing challenges – each with complex drivers and widespread impact.

Given pervasive gender inequalities that almost universally affect women's unequal access to resources and rights, a majority of GBV victims are women. It is widely cited that one in three women will experience GBV at some point in their lives, but these estimates are conservative due to widespread underreporting, and in many countries the proportion of women experiencing violence is much higher.

GBV encompasses many different expressions of violence, including physical, sexual and emotional abuse sexual harassment; stalking; rape, including "corrective" rape and rape as a tactic of conflict; domestic violence and intimate partner violence (IPV); child marriage; human trafficking; and female genital mutilation.

Here, we report the Moroccan Medicolegal Institute experience in fighting against GBV and bodily damages assessment.

OC10-3

Is There a Lesser Value Type of Violence? Older People Abuse: "The Silence of the Lambs"

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The World Health Organization (WHO) describes gender violence as a real global health problem with a major impact not only on the victims' physical and mental health, but also on the economics of the National Health System. Gender-based violence has been also extended to all types of subjects defined as fragile: children, older people, women, men, and disabled people. Old people abuse, still more frequent in women, is a far less socially debated issue, with many possible forms: physical, sexual, psychological, abandonment, neglect, economic-financial, pharmaceutical, discriminatory, institutional.

Today, the most common types of violence are neglect and psychological or emotional abuse, which creates a picture that is clearly different from the past, dominated by physical and sexual violence.

An electronic literature research was carried out search using the keywords "elderly abuse" on various online sources such as PubMed,

Google Scholar, Web of Science and Science Direct. The keywords "elderly abuse" has led to a low number of results: PubMed: 78; Google Scholar: 5750; Web of Science: 85; Science Direct: 197.

The research showed low number of results and little attention to this topic in the scientific literature. The research highlights how the theme of older people abuse is unfortunately still little reported and not adequately addressed in scientific literature as well as in real life discussion or politics, being a form of violence certainly underestimated by the public.

Studies often fail to understand the data regarding the most susceptible elderly population, i.e. subjects with dementia or living in nursing homes, thus showing an incomplete evaluation of the phenomenon.

We are certain that it is necessary to broaden the theme by also considering other aspects, such as inadequate care and the safeguarding of the elderly.

Moreover, the lengthening of life prospects cause the need of a special attention to this category and a better protection for the relative vulnerability.

OC10-4

Postmortem Skeletal Muscle Reaction for the Estimation of the Postmortem Interval: A Study into the Effect of Possible Influencing Variables

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BACKGROUND: Estimating the post-mortem interval (PMI) is a challenging task for the forensic physician in daily casework. Post-mortem, supravital muscle reaction (SMR) of skeletal muscle by mechanical stimulation is an additional method to estimate the PMI, which is dependent on the post-mortem energy supply in skeletal muscle cells.

OBJECTIVES: We performed a field study to investigate the influence of the following determinants on the outcome of SMR: PMI, age, sex, the interaction between age and sex, the period of suffering prior to death and manipulation of the body before mechanical stimulation of skeletal muscle.

METHODS: In the period of January 2017 to August 2023, four forensic physicians performed mechanical stimulation of the forearms of dead bodies with a known PMI by using a reflex hammer to trigger SMR. The study population consisted of in-hospital-deaths, out-of-hospital deaths that were transferred to hospital for further investigation, and out-of-hospital deaths that were examined at the place where the body was found. The variables PMI, age, sex, the interaction between age and sex, the period of suffering prior to death and manipulation of the body before mechanical stimulation of skeletal muscle were registered in the Dutch national register of forensic medicine (Formatus). Independent Student-t test and binary logistic regression of the data were performed by using SPSS 27.0. The Wald test was used to determine which of the variables PMI, age, sex, the interaction between age and sex, the period of suffering prior to death and manipulation of the body before mechanical stimulation of skeletal muscle, was the strongest influencing variable with regard to the outcome of SMR for the whole study group, and the subgroups males and females. Significance was accepted at $P<0.05$.

RESULTS: In total 379 cases were included with a known PMI less than 24 hours. The PMI was significantly lower in cases with a positive SMR compared to cases with absence of SMR. PMI appears to be the strongest influencing variable on the outcome of SMR for the whole study group and for the subgroup of females. In the subgroup of males, the period of suffering before death was the strongest influencing variable for the outcome of SMR. The outcome of SMR seems not to be influenced by manipulating the body before examination.

CONCLUSION: In 66% of cases SMR could be provoked following mechanical stimulation with a reflex hammer with a mean PMI of 2.52 hours ± 1.56 hours. PMI has shown to be the strongest influencing variable concerning the outcome of SMR for the whole study group. The data in this study may indicate a distinction between males and females concerning the range of PMI in which SMR can be observed.

OC10-5

Death Certificates in a Hospital Setting: What Can Go Wrong?

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As in most countries, when a person dies, the attending physician fills out the appropriate forms if the attending physician is convinced of a natural death. In the Netherlands those forms are comprised of the death certificate in which the attending physician declares to be convinced of a natural cause of death (a so-called A-form) and of the medical certificate of cause of death in which the attending physician reports the cause of death to the appropriate authority (a so-called B-form). As about a quarter of the 170.000 deceased in the Netherlands die in the hospital, hospital physicians have to perform external postmortem examinations regularly. Consequently, these hospital physicians have to fill out the appropriate forms regularly.

In this paper, the filled-out forms were examined and were compared to the medical files of the deceased. The aim of this study was to see whether attending physicians, in this case hospital physicians, filled out the forms correctly and accurately. In this context, with the term 'correctly' is meant that for example where a name should be given, only a name should be given and not also the initials or title. With the term 'accurately' is meant that for example the filled-out cause of death is the actual cause of death according to the review of the medical file. Furthermore, it was analysed whether there is a difference in performance between medical specialists and residents/fellows in this matter.

This research was a multicentered retrospective study in three hospitals in the Netherlands. The death certificates of all the deceased in the hospitals, during a period of about five months were collected.

Results show that many forms are incorrectly filled out. Furthermore, a certain amount of cases have been filed out as natural death where they should have been an unnatural death and a number of cases have been put down as a phenomenon instead of an actual cause of death. All in all improvement is needed. Given that more countries in, and outside, of Europe struggle with an effective system of postmortem investigation and the associated certificates and forms, it stands to reason to bundle the efforts for a quality improvement and strive towards an single European standard.

OC10-6

A Comparative Study on Missing Persons and Unidentified Bodies in Milan and Paris: Towards a Common European Project

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The process of identifying deceased individuals serves crucial functions within a broad range of domains including criminal justice, civil law, administrative practices, and ethical considerations.

While advancements have indeed been made in the field of unidentified bodies identification, political strategies remain an area fraught with difficulties and misconceptions. One prevalent assumption is that national databases, particularly those hosting DNA profiles, in conjunction with international data-sharing agencies, will effectively

resolve most, if not all, challenges pertaining to the identification of unknown bodies. Unfortunately, the reality of the situation diverges significantly from expectations. From a practical point of view for those who deal with unidentified bodies in their daily work, it is clear the incapacity of national and regional systems to adequately deal with this issue, due to mismanagement of several variables, ranging from scientific to administrative and legal ones.

The issue of unidentified bodies discovered in large cities, such as Milan and Paris, poses numerous challenges, from reporting disappearances to conducting autopsies and managing legislative requirements. To achieve this, we created a survey, analyzed cases from both Milan and Paris, and utilized publicly available legal sources and information regarding the procedures for identification of unknown bodies. The number of disappearances, reporting mechanisms, and access to databases were evaluated. The legislation governing these activities was also examined, highlighting positive and negative aspects, and identifying differences. We analyzed the number of autopsies, identification methods used, and how data was entered into databases. We also reviewed how the necessary analyses for identification were handled and who bore the costs.

Every year more than 25,000 people are reported missing in Italy and 40,000 people in France, of which one tenth only in the cities of Milan and Paris. The number of unidentified bodies with no identity or requesting verification of identity amounts to 3% circa of all autopsies performed at the Institute of Milan, while in Paris the number is about 15%.

In Milan, most of individuals were successfully identified (mainly through visual recognition and non-genetic techniques), while 3 cases every year remain unidentified. In Paris, the identification procedures were realized through fingerprints and genetic analyses, while 20 cases every year remain with unknown identity. Forensic practitioners face the same challenges since identification procedures fall under the responsibility of police and prosecutors and daily practice, contribution of forensic team to identification is underrated.

Comparison of obtained data and the different casuistry between the Forensic Institute of Milan and Paris shed light on several pivotal aspects, also from a legislative point of view. From the present study, we can start to devise shared practices on a supranational level that could help us find areas of commonality in this often-underestimated activity that holds fundamental implications.

Oral Communications 11: Forensic Pathology V

OC11-1
WITHDRAWN

OC11-2
Psychological and Physical Long-Term Effects of Torture by Inserting Foreign Body and Associated Medico Legal Issues

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BACKGROUND: The presence of a foreign body in the rectum has always been a challenge due to associated medico legal issues with it. We encounter drug smugglers referred by the customs department to airports. Cases are reported as torture by other persons, and the victim approaches for medico legal help. A concerned legal matter with this problem carries complex issues, like whether it is a self-insertion or it has been inserted by another person with or without consent. In case it is without consent, then it is considered a case of assault or torture. In such cases, issues arise as how to report the nature and manner of injury. If foreign body removal needs laparotomy, then the penal code will be different, and if the removal is transanal and the hospital stay is less than 20 days, then the penal code will be different.
We report a case study of a foreign body in the rectum inserted with the purpose of torture and its related medico legal issues for public awareness.

CASE REPORT: A 60-year-old male presented as a victim of assault with a history of foreign body insertion in the rectum. He presented the history of assault by few persons by introducing a glass bottle into his rectum as a punishment or torture. He approached the doctor for treatment and also requested for medico legal guidance and help.
Rectal examination revealed per anal bruise and impacted foreign body 8cm above the anal verge. On further investigation, the Plane X-ray abdomen revealed a glass bottle in the pelvic region. Patient was admitted in the surgical ward; after excluding the perforation of the gut the bottle was retrieved trans-anal and patient was discharged after 24 hours of observation.

CONCLUSIONS: A foreign body in rectum can be a big medicolegal problem. In our society, foreign body insertion in rectum is not only a great stigma for the victim, in spite of reason being anything, but it is also a double-edged sword for physicians to decide the case of torture as a simple or grievous injury and the laws of respective country for punishment are being followed. Solutions to issues need to be addressed, and international policies are to be made.

OC11-3
Fatal Accidents at Work in Milan, Italy: Data from the Analysis of Forensic Autopsies over the Last 20 Years

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INTRODUCTION: Accidents at work are a phenomenon that affects the entire Italian territory, but Lombardy, being a region with a strong presence of productive activities, is particularly exposed to this risk. In fact, over the last 20 years, the region has recorded a significant number of fatal accidents, especially in the manufacturing, construction, and transport sectors. The manufacturing sector accounts for approximately one-third of recorded fatal accidents. The main causes of these accidents are related to the use of machinery and equipment. The construction sector, however, is particularly at risk with regards to falls from heights, while fatal road accidents are often recorded in transport. In addition to these sectors, others also present significant risks, such as agriculture, fishing, and catering.

GOALS: The objective of our study is to analyse the incidence of fatal accidents at work in the provinces of Milan and Monza Brianza from 2000 to 2023, identifying the production sectors most at risk and the main causes of fatal accidents at work.

METHODS: The autopsy database of the Institute of Forensic Medicine of Milan was used for the study, taking into account autopsies carried out at the Institute from 2000 to the first months of 2023. All deaths categorized as accidents at work were included, including commuting accidents, while deaths considered natural deaths or suicides, even if they occurred during work, were excluded. The cases were divided by year, sex, age, nationality, work activity, and type of accident. Statistical analysis was performed using the SPSS program, version 28.

RESULTS AND CONCLUSIONS: During the period between 2000 and 2023, 310 fatal workplace accidents occurred in the provinces of Milan and Monza Brianza, with an average of 13.4 cases per year. Most of the workers involved were male (95.2%) and of Italian nationality. The most represented age group was between 45 and 54 years (24.5%). The occupation with the highest number of fatal accidents was that of the specialized workman (40.3%), followed by the bricklayer (21%), and the maintenance worker/technician (10.5%). Most deaths were caused by mechanical trauma, with 36.5% of deaths due to precipitation, 13.2% due to traffic accidents, and 12.3% due to serious falls. Among specialized workmen and bricklayers, precipitation was the most

frequent cause of fatal injuries, followed by serious falls and death due to entrapment in machinery.
Despite the situation, there has been a decrease in the number of fatal accidents in recent years, also thanks to the implementation of new workplace safety regulations. In particular, greater involvement of companies in accident prevention and greater worker training were promoted. However, there are still many challenges to address in ensuring a safe and healthy working environment for all workers.

OC11-4

Aortic Dissection and Medical Malpractice: An Autopsy Case Series and a Proposed Medico-Legal Flow-Chart

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INTRODUCTION: Aortic dissection (AD) is a rare condition characterized by the disruption of the layers of aortic wall due to intramural bleeding originating from a tear in the intima layer. The complexity of clinical presentations often results in delayed or missed diagnoses, with exclusive post-mortem diagnosis accounting for more than 20 % of all cases. Given this scenario, forensic pathologists frequently encounter AD cases, tasked to ascertaining the cause of death and identifying any potential related negligence and/or medical error. Despite extensively discussed in medical literature, there is currently no standard of practice for the forensic evaluation of medical liability in aortic deaths. Therefore, the objective of this study is to analyze a case series within this context, aiming to develop a comprehensive medico-legal flow-chart for the assessment of such cases.

MATERIAL AND METHODS: Autopsy cases of suspected medical liability related to AD were selected among forensic casework of the Institutes of Legal Medicine of the Universities of Padova and Ancona (Italy). For each case, the following data were collected: (1) epidemiological and circumstantial data (i.e., age, sex, circumstances), (2) clinical data (i.e., risk score, type and onset of symptoms, comorbidities, time interval between the onset of symptoms and death, ECG and radiological findings, type of diagnosis, type of treatment), (3) post-mortem data (i.e., AD etiology, Stanford and DeBakey classification, histopathological dating, aortic branch involvement, cause of death).

RESULTS: The majority of cases presented with atypical symptoms. In almost all cases (29/30) an initial medical consultation resulted in an uncorrected or delayed diagnosis. The time interval between the onset of symptoms and death ranged from 2 hours to 10 days. The frequency of medical consultations ranged from 1 to 4. The retrospective evaluation of the risk score (following AHA guidelines) performed by the authors allowed to categorize 21 cases as “low” risk, and 9 cases as “moderate” or “high” risk. Despite this, ECG and chest x-ray were performed in most of the cases, whereas CT scans were conducted in only two cases. A prevalence of Stanford type A dissection with aortic branch involvement, was noted. The primary cause of death was cardiac tamponade, followed by hemothorax.

CONCLUSIONS: The occurrence of atypical symptoms in patients who died from AD justifies omitted or delayed diagnoses, ultimately contributing to the fatal outcome. The main medico-legal issues revolve around reconstructing the physiopathological process of the disease and assessing whether the medical conduct aligns with established guidelines of good practice or protocols. Moreover, the classification of dissection, the extent of aortic dissection and the timing of the process is crucial in forensic evaluation, as they impact the prognosis and, consequently, the assessment of the causal link between any potential error and death.

OC11-5

Challenges of Forensic Pathology in Differentiating Elder Abuse and the Physiopathology of Aging: Medico-Legal Analysis of Three Cases

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Elder abuse represents a significant violation of human rights and an escalating concern within public health domain, though it frequently goes undiagnosed. The task of forensic medicine includes the recognition of definitive indicators of elder abuse, ranging from physical assault to neglect. These markers are instrumental within an interdisciplinary framework. The aim is to analyze the challenges posed by the differential diagnosis between age-related pathologies and instances of elder abuse, with a particular focus on the medico-legal aspects of such cases.

Herein, the authors present three illustrative cases: two of them were of physical abuse and one of neglect. They all share the same characteristics as the victims: fragile individuals and incapable of self-sustenance. In the initial two cases the victims were an 82-year-old woman with cognitive impairment who died while being cared for by a privately hired caregiver and a 101-year-old woman beaten by her daughter suffering from a psychiatric illness. In both cases, the autopsy highlighted the presence of subdural hemorrhage, and its origin, whether natural or traumatic, had to be further investigated. The third case concerns a 77-year-old man found dead in his apartment during the winter season due to hypothermia, in which an accusation of negligence was made against his son. In all three cases, the autopsy highlighted findings of abuse (both physical violence and neglect indicators), alongside signs of chronic conditions and frailty typical of senescence.

Did the criminal acts lead to death or were these findings incidental, with an age-related natural cause of death? The differential diagnosis proved particularly complex, necessitating a careful assessment of signs of nutritional deficits, hydration status, skin lesions, and other potential indicators of abuse and neglect. Simultaneously, it was essential to rule out the hypothesis of a role played by pre-existing medical conditions. A comprehensive evaluation of the autopsy findings, including anatomical, histological, and toxicological evaluations, in conjunction with the examination of the circumstantial data and health records, is essential to ascertain the sufficiency of evidence supporting allegations of maltreatment. Thus, the applications of forensic pathology are vital to guarantee the identification of elder abuses cases, underpinned primarily by scientific substantiation. Given the burgeoning elderly demographic within our population, this empowers the implementation of preventive strategies for a phenomenon anticipated to grow with the progressive aging of the population. Accurate interpretation of medico-legal physical and laboratory-based findings is critical for proper classification of these cases, ascertaining the cause and manner of death, and implementing preventive measures to avoid future occurrences.

OC11-6

"When Euphoria Turns into Mania" – A Case Report

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INTRODUCTION: Substance abuse refers to the harmful or hazardous use of psychoactive substances, including alcohol and illicit drugs. One of the key impacts of illicit drug use in society is the negative health consequences experienced by its members.

CASE HISTORY: As per history and police inquest papers, a drug-abuser known to the family members attempted to murder a 14-year-old boy by chopping his neck with a moderately heavy, sharp-edged weapon. He succumbed to his injuries and died at the hospital. His body was then brought for autopsy at NEIGRIHMS.

EXAMINATION AND FINDINGS: Externally, we found multiple chop and incised wounds on the back of the neck, including an incised wound with an underlying fracture of the right angle of mandible. Internally, we found cut fractures with underlying spinal cord contusion at the level of the 2nd and 3rd cervical vertebrae. There was diffuse subarachnoid haemorrhage over both cerebral hemispheres.

DISCUSSION: Drug misuse and addiction are more about the consequences of drug use than they are on the kind or quantity of substances taken or how often they are taken. These habits frequently result in problems for the user as well as potentially dangerous for others. According to studies, children who are surrounded by drug abusers are more than twice as likely as their peers to have an alcohol and/or drug use disorder by the time they are young adults.

CONCLUSION: Most parents, caregivers, or relatives who use drugs or alcohol in moderation may not pose a risk to the children in their immediate vicinity, but if the habit escalates into substance misuse, it might prevent them from giving the kids the safe care they need. Thus, appropriate guidance and assistance services are required, particularly for parents or caregivers who are concerned about the impact of their behaviour on their offspring. People may occasionally be reluctant to share information out of concern for privacy. Still, the need to protect children must come first, and agencies that have knowledge about the abuser will be able to help greatly.

KEYWORDS: Substance abuse, Child, Murder, Autopsy, Education

Oral Communications 12: Forensic Toxicology

OC12-1

Alcohol and Drugs in Driving in Ireland in 2023 and the Further Development of the Alcohol Ignition Interlock Program and Medical Rehabilitation for Drivers with Alcohol Use Disorder in an International Context

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INTRODUCTION: Ireland has a population of 5.1 million and in 2023 had 188 deaths resulting from 177 fatal road traffic collisions with 1,342 serious injuries. This study reviews road traffic collision data; toxicology results in fatal collisions and in drivers arrested for driving under the influence of an intoxicant (DUI); police and coroners' investigation of crash causation; the development of the alcohol ignition interlock devices; and the establishment of a medical rehabilitation programme for drivers with alcohol use disorder.

METHODS: Data from the Road Safety Authority of Ireland, an Garda Síochána (Irish Police), Coroners' death investigation (Magistrates) service and the Medical Bureau of Road Safety (National DUI Toxicology Service) were examined to inform the Road Safety Partnership Board and Ministerial Committee on Road Safety on trends in fatal and serious injury road crashes and on strategies to reduce deaths and serious injuries within the Road Safety Strategy to 2030.

RESULTS: Fatalities on Irish roads in 2023 were the highest since 2014. In 57% of fatalities occurred in single-vehicle collisions. Driver fatalities consisted 38%; pedestrians 23%; 26% being 16-25 years; and 78% male. 70% occurred on non-urban roads. A review of contributory factors found dangerous behaviours of speeding, dangerous driving and alcohol and drugs driving to be the commonest factors with seatbelt and driver distraction also contributing. The Police arrested 4,972 drivers on suspicion of drink driving and 2,779 for suspected drugs driving. Of 5,674 blood and urine specimens analysed by the MBRS (in addition to 3,800 breath alcohol tests in Police stations), the blood alcohol average was 0.16g/dl with the highest value found of 0.44g/dl with high values distributed across age groups and genders. The legal limits are 0.05 and 0.02 g/dl. Blood positivity for drugs in 3,669 samples tested were positive in 75% of samples with cannabis and cocaine the drugs most frequently found. The blood THC average was 6 ng/ml (legal per se limit 1ng/ml) and for cocaine was 34 ng/ml (limit 10 ng/ml).

DISCUSSION: Causative factors in road traffic collisions remain similar to previous decades despite stricter DUI laws and increased Police enforcement. Broader integrated strategies are needed across Ministerial Departments of Transport, Justice and Health. Increased use of alcohol interlock devices on a voluntary basis for transport services and in administrative and criminal courts for repeat DUI offenders and those with high levels of intoxicants is possible with advances in technology and science. This transformative development to reduce DUI significantly must be coupled with expanded rehabilitation programmes for drivers having a medically defined alcohol use disorder. Updated analysis and proposals applicable internationally as part of clinical forensic medicine, forensic investigation, police enforcement, health policies review and science will be presented as part of this study.

OC12-2

Fatal Carbon Monoxide Poisonings in a Greek Region: A Retrospective Case Study

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Carbon monoxide (CO) poisoning may lead to morbidity being a common cause of death, presenting high rate of mortality worldwide although it is not always diagnosed. The aim of this retrospective study is to collect and analyze information about incidents of acute carbon monoxide poisoning that led to death between 2013 and 2023 (January 2013 - June 2023). The present study was based on toxicological analyses conducted at Forensic Medical Service of Thessaloniki and it includes data concerning Greek regions of Northern Greece and Thessaly. One hundred (100) forensic autopsy case reports that included abnormally elevated carboxyhaemoglobin (COHb) levels were identified as carbon monoxide poisoning. Information about the date of occurrence, demographic characteristics (gender, age, region), detection or non-detection of substances and the cause of death of all cases was collected and statistically estimated. Most of the victims were over 60 years old, the mean age was 61.7±22.8 years with mode value 88.0 years. Mortality was found to be double in male sex. Detection of drugs was positive for only 22% of the cases and shows two apparent peaks between 21-45 years and over 60 years. The majority of fatal poisonings happened during the winter season (66%). The geographical distribution analysis indicated that 66% of the incidents occurred at Central Macedonia (EL52) which is the most populated region of those assessed.

OC12-3

Invisible Strands: The Subtle Power of Hair in Forensic Investigations

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INTRODUCTION: In forensics, analyzing body fluids and tissues is crucial for constructing a detailed narrative of an individual's manner of death. Forensic toxicology, in particular, relies heavily on blood and urine

samples for drug analysis, providing essential insights into whether drug use contributed to the death. Nevertheless, forensic investigation of drug-related deaths may focus on different questions requiring information on long-term drug use in which segmental hair analysis can give useful insights.

MATERIAL AND METHODS: This is the case of a 35-year-old woman who was hospitalized following a cardiac arrest due to suspected drug abuse. Toxicological analysis of blood samples showed recent use of heroin, cocaine and benzodiazepines. The patient exhibited extensive brain hypoxia and died 34 days post-admission. Next of kin stated to the Police that the deceased was not using heroin the past years and that she had visual impairment, thus she could not have administrated herself with heroin. To investigate this statement hair samples were sent to the Forensic Toxicology Laboratory of the University Crete for detailed examination. The total length hair (40 cm) was washed with water and methanol and dried at 50 ◦ C. The hair was cut into segments (1-5 cm) and 100 mg of each segment was extracted with methanol in an ultrasonic bath for a total of 4 hours. The extracts were evaporated to dryness, dissolved in 100 µl of methanol and 10 µl was used for the analysis. Analysis was performed on a liquid chromatography-mass spectrometry system using atmospheric pressure chemical ionization (APCI) in positive mode. The separation of the compounds was performed on a C18 column.

RESULTS: Segmental hair analysis confirmed systematic use of cocaine, benzodiazepines, and buprenorphine but NOT heroin for the past 40 months. This is in line with the statements of next of kin. More specific, cocaine was detectable in all hair segments in concentration from 0.34 ng/mg (proximal) to 5.11 ng/mg (distal). 7-amino flunitrazepam and alprazolam were also detected almost in all hair segments while nordiazepam and diazepam were detected in the segments corresponding to the period 0 to 25 months before death.

DISCUSSION: Segmental hair analysis enabled the construction of a comprehensive timeline, providing insights into the deceased's systematic drug use patterns. This is crucial information for the Police investigation as to the determination of the manner of death.

KEYWORDS: forensic toxicology, segmental hair analysis, drug use, systematic

OC12-4

The Role of Intracardiac Gaseous Carbon Dioxide in Scuba Diving Fatalities

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INTRODUCTION: Scuba diving fatalities postmortem diagnosis presents a higher level of forensic complexity because of their occurrence in a non-natural human life environment. Throughout the dive, the inhaled diving gas is dissolved in the diver's tissues during the descent and if the decompression steps are not respected during the ascent, the balance between the dissolved gas and the tissues (including blood) is disrupted, leading to a gaseous release in the organism. Venous or arterial gas embolism can occur as a consequence of decompression sickness and ultimately, barotraumatism. It can also induce drowsiness that consequently leads to drowning. Consequently, the occurrence of gas in dead scuba divers is very complex to interpret, as is the difficulty to distinguish it from resuscitation maneuver artifacts or body decomposition. Thanks to our approach, it becomes possible to enlighten more precisely the cause and circumstances of death.

MATERIAL AND METHODS: This study was performed on the basis of a collaboration with several forensic centers located in nearby countries (Spain, Switzerland, Italy and France) to obtain a more important and varied amount of scuba diving fatality cases. The intracadaveric gas sampling was performed according to the classical underwater heart dissection or the methodology developed by the University Centre of Legal Medicine (CURML) i.e., by multi-detector computed tomography (MDCT) with laser guided CT scan sampling. The analysis of intracardiac gas samples was performed by portable micro gas chromatography coupled with a thermal conductivity detector (GC-µTCD).

RESULTS AND DISCUSSION: A correct fatal scuba diving diagnosis must rely on a "loop of evidences" constituted by autopsy and imaging findings, investigation reports and intracardiac gaseous composition. One lacking variable can be guessed based on the three others. Thanks to a gaseous CO_2 intracardiac concentration of 12 µmol/ml, it has been possible to strengthen the witness audition in a case of "false" barotraumatism, or to guess the shortness of diving profile from autopsy, imaging and police reports and gaseous CO_2 intracardiac concentration of 7.4 µmol/ml. A direct link between the diving profile and the intracardiac gaseous CO_2 concentration is confirmed. A short, shallow dive will lead to less desaturation than a longer, deeper dive. This additional data can be used to enrich the forensic results of the autopsy and to support the findings of the police investigation. A testimony or a diagnosis of the cause of death can be supported by the intracardiac gaseous CO_2 concentration. Intracardiac gaseous CO_2 analysis must be consider as mandatory for the forensic expertise. Judicial and forensic implications include the confirmation of witnesses' auditions and diving data useful for the police investigation, the confirmation of radiological and medical findings deriving from CT-scans and autopsy and now, the new indicator constituted by the intracardiac gaseous CO_2 concentration.

OC12-5

Mushroom Poisoning: A Case Series with a Literature Review of Cases in the Indian Subcontinent

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Mushroom is a fungus widely used as an edible in various parts of the world, especially in hilly regions with damp climates. Nevertheless, when picked from the wild to use as a vegetable, it has proved fatal for people ingesting it due to a lack of knowledge by the people of the local community for distinguishing between poisonous and non-poisonous mushrooms. Three cases presented as emergencies from a single household comprising a 13-year-old girl and both her grandparents following the ingestion of mushrooms picked from a nearby forest area. Luckily, the girl's parents were out for work, so they survived and helped identify the mushroom. Most cases are not reported or documented, and data are present mainly in the form of case reports. A mushroom is a fleshy fruiting body of fungus usually present above ground on soil or its food source. Due to its hallucinogenic properties, it is used as an edible in the form of vegetables, for medicinal purposes, and for intoxication. Nowadays, their increased consumption as a source of food has led to increased incidences of poisoning, which may be possibly hypothesized as difficulty in distinguishing between poisonous and non-poisonous mushrooms by the naked eye, ingestion of nearby toxic species along with edible species, incomplete or improper cooking, and contamination with other microorganisms such as bacteria or viruses.

OC12-6

Investigating the Influence of Psychoactive Substances and Attention Deficit Disorder on Driving Performance

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OBJECTIVE: The connection between attention disorders and substance-related disorders may contribute to driving impairment. Given this relationship, the current study aims to examine the prevalence of attention disorders in a group of drivers found driving under the influence (DUI) of psychoactive substances. This analysis holds potential implications from both clinical and medico-legal perspectives.

MATERIALS AND METHODS: This case-control study compared subjects with a previous DUI episode involved in a road accident (cases, Group 1) to DUI subjects without road crash involvement (controls, Group 2).

Individuals undergoing examination for driver's license reinstatement after being caught driving under the influence of alcohol and/or drugs were enrolled. Personal, sociodemographic, and DUI-related data were collected, including blood alcohol concentration, substances detected during the DUI episode, road accident involvement, and recidivism. Data from medico-legal and toxicological assessments, specifically hair analysis results, were also gathered. Participants completed the Continuous Performance Test–third edition (CPT-3), a neuropsychological assessment evaluating attention-related aspects including inattentiveness, impulsivity, sustained attention, and vigilance. The CPT-3 software provides results indicating the probability of an attention disorder as very high, high, moderate, minimal, or no indication.
The two groups were statistically compared in relation to the collected variables with a specific focus on CPT-3 parameters.

RESULTS: The research involved 167 participants. To explore variables associated with road crash involvement, the distribution of personal and sociodemographic data, DUI-related information, hair analysis, and CPT-3 variables were analyzed. BAC (p = 0.032) and recidivism (p = 0.038) exhibited significant differences between the two groups, while other variables showed no significant differences.
The variables differing between groups were included in a multivariate binary logistic regression model with significance set at 0.05 to explore possible predictors of previous road crash involvement. Despite not showing a significant difference (p = 0.064), inattentiveness was also included in the model due to its potential significance regarding road accident involvement. Inattentiveness (p = 0.042, OR = 2.702, CI [1.036–7.048]) and BAC (p = 0.006, OR = 2.403, CI [1.279-4.517]) were identified as independent risk factors for membership in the group with previous road accident involvement.

CONCLUSIONS: This study confirms previous findings by the authors and the existence of alterations in some attention dimensions among subjects who drove under the influence of alcohol or psychoactive substances and were involved in road crashes. Experimental confirmation of these results could motivate the assessment of attention disorder-related aspects in individuals evaluated for driving suitability.

Oral Communications 13: Criminalistics

OC13-1

Lactic Acid and Urea in Vitreous Humor, Potential Markers of Long Agonal Death

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BACKGROUND/AIM: Agony time has been classified in short and long agony in relation to various criteria: clinical and circumstantial data, phone records, witness statements, cause of death (precipitation, traumatic brain injury and myocardial infarction cathegorized as short agony deaths). Authors use agonal time in order to register different markers alteration in relation to agony time.
Serum lactate levels are used as marker of hypoxia, being correlated with bad prognosis patients. In forensics, lactic acid has been associated to postmortem intervals, to detect diabetes mellitus complications or in asphyxial deaths in children. Urea is used in case of myocardial and hypothermic/hyperthermic deaths.
To date, a few studies deal with lactic acid and urea and agony.
The aim of the study was to evaluate lactic acid & urea as potential markers of long agony (death occurring within hours).

METHODS: Samples of right eye vitreous humour, maintained in the archive of Forensic Unit Department of Marche Hospital, were collected during 49 autopsies (January - December 2023). These belonged to 25 males and 24 females (mean age = 70,51 years; range 25-92). The range of PMI was 4-188 hours. Samples were divided into two groups: short agony, defined as death within a few seconds, and long agony, defined as death within hours. Samples were stored at -80°C, until the analysis. Vitreous humor was studied using enzymatic autoanalyzer test.
Two different statistical comparisons using the independent-samples Mann-Whitney U test were performed: (lactic acid vs agonal time; urea vs agonal time).

RESULTS: In vitreous humor, long agonal death was characterized by lactic acid concentration in the range of 97,8 – 225,1 mg/dl (Median 179,55 mg/dl - IQR 161,5000 - 204,2000). In short agonal death, lactic acid concentration was in the range 65,3 – 247, 1 mg/dl (median 140,1 - IQR 100,9750 - 151,0500). The difference between the medians of the two group was significant (p=0,003). In long agonal death the median BUN level was 94,6 mg/dl (range 32,5-308,8; IQR 57,3 - 144). In the short agonal death the median BUN level was 53,5 mg/dl (range 5-125,6; IQR 41,8-84,9). The difference between the medians of the two group was significant (p=0,0062). In relation to the entire population, the area under the ROC curve (AUC) was 0,8, with a 95% confidence interval between 0.663-0.902 and a p<0.0001. The best cut-off to discriminate the two groups was 151.2 mg/dl with sensitivity of 86% and a specificity of 78% performance to discriminate among the two groups of agony.

CONCLUSIONS: Lactic acid & urea can be interesting tools for forensic pathologist regarding the detection of long agony category of specimen, especially when circumstantial data are scarce. This is a pilot study that deserves to be implemented.

OC13-2

Authentication Analysis of Digitally Captured Low and High Complexity Forged Signatures

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The most common types of cases in document examination are examining documents and determining the identity of the signatures that have caused legal disputes. With the developing technology, documents are recently being prepared in digital environments and signed digitally in many sectors to diminish the use of paper, increase the reliability of documents, and accelerate transaction processes. In the meantime, the crime types committed on documents have changed, and documents digitally signed have begun to cause legal disputes. In this situation, which judicial authorities have just encountered within the scope of document forgery, the lack of laboratories that examine digital signatures and document examination experts with the appropriate background to examine digitally received documents or signatures poses a problem. In this study, the data of digitally captured simple and original signatures which have two different complexities: low and high, and the imitations of these original signatures were compared to contribute to the literature and inform document experts on inspecting forged digitally captured signatures.

Forged signature samples were taken from ten forgers (male and women) by two different methods: free-hand simulation and practiced simulation. Original and forged signatures were analyzed and the signature data was compared with the original. Samsung Galaxy Tab S6 Lite and its stylus S pens were used to digitally capture signatures. Software to capture, decrypt, and analyze the signature was provided by AnaSoft, Slovakia. Statistical analyses were made with SPSS26.0

When biometric data of low-complexity forged signatures were compared to the data of originals, it was found that the Number of Points, Average Speed, Average Speed in Contact, Total Time of Writing in Contact, Total Time of Writing out of Contact, Line Length in Contact, Height to Weight Ratio, Acceleration, and Jerk, were significantly different (p<0.05). When high-complexity original signatures were compared to the forged ones, the Number of Points, Average Speed, Average Speed in Contact, Total Time of Writing out of Contact, Line

Length in Contact, Acceleration, and Jerk values were significantly different ($p<0.05$).

According to our findings, the Number of Points, Average Speed, Average Speed in Contact, Total Time of Writing out of Contact, Line Length in Contact, Acceleration and Jerk data can be used to discriminate forged and original signatures. We also observed that pressure, among the biometric data, was not found to be distinctive and the reason for this may stem from the equipment used in the study. When we compared the forgers in terms of gender, we observed that the jerk value and the Total Time of Writing were significantly different. This study shows that the biometric (dynamic data) of digitally captured signatures (DCS) provides a valuable contribution to the static data examination of the traditional signature.

OC13-3

Delinquency in Turkey: A Forensic Medical Perspective

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BACKGROUND: Serious and violent crimes involving children are a consistent concern for researchers, practitioners, and policymakers. However, due to the limited availability of relevant data, small sample sizes, and the lack of longitudinal data sets, the development of violent crimes remains poorly understood. This study aims to assess, from a forensic medical perspective, the demographic characteristics, reasons for involvement, and incidents of involvement in which children applying to security units in Turkey were involved, utilizing data from the Turkish Statistical Institute between 2015 and 2022.

METHODS: The dataset included information on children (<12 years, 12–14 years, and 15–17 years) regarding gender, reasons for application and types of offenses attributed to them, in detail.

RESULTS: A total of 1,196,972 children were found to have applied to security units. It was observed that 83.6% of these children were male, and 68.6% were in the age range of 15–17 years. There is a statistically significant increase in the number of children involved in the justice system due to delinquency over the years. The most frequently committed crimes were assault (33.9%), theft (27.8%) and using, selling, and purchasing of drugs (5.3%).

CONCLUSION: The numerical increase in delinquency among young people, particularly in the age group of 15–17 years, is concerning. This study will provide information for government institutions responsible for preventing children's involvement in crime, as well as practitioners and communities working with young people and their families.

OC13-4

INTERPOL Accredited "Forensic Science and Crime Scene Protection" Course for First Responder Police Officers by a Medicolegal and Forensic Approach

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The initial handling of a crime scene plays a crucial role in shaping the outcome of an investigation. The primary responsibility for effective management from crime scene to conviction rests with the first response officer. This demanding role necessitates a broad knowledge base, ranging from personal safety and well-being to proficient evidence collection. Despite the potential chaos of the crime scene, the first response officer must diligently record as much pertinent information as possible, which is indispensable for the investigation's efficient progress.

To address these challenges, we have developed a comprehensive course aimed at providing training on recent advancements in forensic science, including DNA technologies and analysis of drugs of abuse, as well as essential legal medicine topics such as sex-related offenses, child abuse and neglect, and traumatology. This training equips first response officers with the necessary skills to effectively protect and preserve the crime scene. Additionally, it fosters competency and facilitates collaboration with various agencies possessing diverse expertise, thereby maximizing the investigative outcome.

The course has undergone accreditation by INTERPOL, ensuring its quality and relevance. Taught by academic experts specialized in fields such as legal medicine, forensic genetics, toxicology, crime scene investigation, forensic psychiatry, and forensic nursing, it was delivered to 427 high-ranking police officers in Istanbul. A post-test evaluation was conducted to assess the trainees' readiness to apply their newfound knowledge and their ability to impart it to others, indicative of Kirkpatrick's Level 3 evaluation. This translation of learning into performance is pivotal for operational effectiveness.

In discussing the significance of this course, we refer to a publication in Nature from 1936 titled "Forensic Medicine," which emphasized the necessity for expertise in medico-legal practice among medical practitioners, police, and related disciplines. Despite the longstanding recognition of this need, the integration of medico-legal practice with policing activities remains insufficient. We believe our initiative represents a step towards addressing this gap and anticipate its importance for future endeavours in this domain.

To conclude, the crime scene serves as the pivotal starting point for criminal investigations, and it is imperative that first responders possess fundamental knowledge of legal medicine to safeguard its integrity. We anticipate that this course will set a commendable precedent for the development of similar programs in the future.

OC13-5

Determination of Solvents in Pen Inks by Gas Chromatography Mass Spectrometry (GC-MS): Detection of Document Forgery

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The field of forensic sciences plays a critical role in the investigation of various crimes, including forgery and fraud. Within this realm questioned document analysis focuses on the examination and authentication of written or printed materials, such as documents, receipts and banknotes. One crucial aspect of this analysis lies in the determination of the solvents present in pen and printer inks. The composition of these solvents varies for different brands and types of inks, enabling document examiners to potentially identify any instances of forgery. The application of Gas Chromatography Mass Spectrometry (GC-MS) has proven to be a highly effective technique in this regard.

The study presents a comprehensive investigation into the determination of solvents in ballpoint pen and gel pen inks using Gas Chromatography Mass Spectrometry (GC-MS). The aim is to develop a unified method capable of analyzing a diverse range of solvents, including Phenoxyethanol (PE), Phenoxyethoxyethanol (PEE), Ethylene Glycol (EG), Glycerol (GLY), 1,5-Pentanediol (PD), 2-Pyrrolidone (PYR), Diethylene Glycol Monobutyl Ether (DGME), and 1,6-Hexanediol (HD). The study further extends its scope to encompass different writing instruments, specifically ballpoint pens (in blue, black, green, and red) and gel pens (in blue, black, green, and red). Method parameters play a pivotal role in the study, as they are systematically explored to ensure the reliability and efficiency of the developed analytical method. This encompasses various facets such as sample preparation, chromatographic conditions, mass spectrometry conditions, calibration standards, limit of detection and quantification, precision. The comprehensive evaluation of these parameters allows for the establishment of a robust analytical method capable of discerning and quantifying the selected solvents across different ink types.

Furthermore, the study extends its focus beyond mere solvent identification by introducing the concept of an ink aging curve. This innovative approach involves monitoring changes in solvent concentrations over a span of 6 months. The aging curve is drawn based on systematic sampling at regular intervals, with GC-MS analyses. The data obtained is then utilized to create a graphical representation illustrating the evolution of solvent concentrations over time. This aging curve not only adds a temporal dimension to the analysis but also holds significant implications for forensic document examination. The inclusion of ballpoint and gel pens in the study enhances its practical relevance. The diversity of writing instruments mirrors real-world scenarios, where documents may be created using various tools. By drawing an ink aging curve for solvents in these different inks, the study contributes valuable information for detecting document forgery and estimating the age of documents based on ink composition. The results presented in this study pave the way for advancements in ink analysis methodologies with potential implications for forensic science and document examination.

Oral Communications 14: Forensic Pathology VI

OC14-1

Death During Hyperbaric Oxygen Therapy: A Case Presentation

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INTRODUCTION-OBJECTIVE: Hyperbaric oxygen therapy (HBOT) involves administering 100% oxygen intermittently within a pressurized chamber at levels higher than sea level. This treatment is applied to various conditions, such as carbon monoxide poisoning, decompression sickness, gas embolism, retinal artery occlusion, sudden idiopathic hearing loss, chronic wounds, acute traumatic ischemia, and avascular bone necrosis. Despite its efficacy, complications like oxygen toxicity, transient visual changes, and barotrauma are rare. This presentation discusses autopsy findings in a case where cardiopulmonary arrest occurred during the exit phase of HBOT.

CASE: A 52-year-old woman with unresponsive sudden hearing loss underwent HBOT. After the first session, she experienced respiratory arrest, progressing to cardiac arrest. Despite successful CPR, she was admitted to the intensive care unit with mechanical ventilation. An hour later, cardiac arrest recurred, and despite CPR, the patient succumbed. Autopsy revealed massive pneumothorax, air bubbles in brain arteries, epicardial fat veins, right atrium, beneath visceral pleura, in both lungs, beneath intestinal serosa, and in the abdominal aorta. A 3 cm segment in the left anterior coronary artery followed a path within the myocardium, preceded by a 25% luminal narrowing atheromatous plaque. In the left lung's lower lobe, a 6x5x4 cm encapsulated mass with coagulated blood content was found. Histopathological examination revealed grade 2-3 fat embolism in pulmonary vessels and bone marrow embolism.

DISCUSSION: Autopsy findings suggest pulmonary barotrauma (PB) due to pneumothorax and arterial air emboli. Although air in the right atrium and epicardial veins does not align with PB, postmortem CT scans of CPR cases indicate potential free air due to CPR. The retrograde path of CPR-generated air reaching the epicardial veins is debatable. Slow pressure reduction during HBOT makes PB unlikely. None of the other nine individuals in the same HBOT chamber with the patient experienced symptoms.
Therefore, evaluating other potential causes of arrest is necessary. Hyperoxia increases coronary artery resistance and decreases flow. Atherosclerotic myocardial bridging in the proximal left anterior descending artery might have caused a fatal arrhythmia due to hyperoxia. Mechanical ventilation is a common cause of PB. Although brief mechanical ventilation was administered, PB findings may have developed due to intensive CPR and mechanical ventilation.

OC14-2

Lethal Entrapment in Elevator

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BACKGROUND AND AIMS: The transportation of people and materials with elevators is considered one of the safest modes of transportation. Nevertheless, they can be associated with injuries, even deaths, when they operate under sub-optimal conditions. According to the Panhellenic Elevator and Escalator Technology Association (P.E.T.A.K.), this is frequently the case in Greece and during 15-year period (2000-2014) 39 accidents, of which 20 were fatal, were recorded.

METHODS: This is a case report. We present the findings of the forensic investigation and the autopsy and discuss the relevant literature.

RESULTS: Our case is about a 78-year-old man who entered the elevator in his wheelchair. For reasons that remain unknown, he tilted back the wheelchair and as a result, his head and thorax protruded through the door opening onto a glass surface while the elevator was still moving, obviously due to a lack of a protection mechanism. As a result, his body was entrapped and compressed, and the man suffered fatal thoracic injuries. Exterior examination revealed injuries in the head, the thorax, and the extremities. During the autopsy, fractures of the thoracic cage and the vertebrae were recorded, as well as severe injuries to thoracic organs.

DISCUSSION-CONCLUSIONS: We currently present an unusual case of accidental death associated with an elevator while on a wheelchair. The correct operation of the components of an elevator depends on the installation of the original equipment, on maintenance and upgrading. The technical support and maintenance of the lifts is mandatory by law. Furthermore, it is of medico-legal importance if such transportation means are appropriate/safe for use with special equipment such as wheelchairs or strollers. Our primary role is to raise awareness regarding the dangers of violating the terms of use or even using unregulated transportation means common to the public.

KEYWORDS: Forensic Pathology, Elevator Accident, Wheelchair

OC14-3

Suicidal Inhalation of Carbon Monoxide – Report of a Case with 95% Carboxyhemoglobin Saturation

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BACKGROUND AND AIMS: According to CDC reports, each year, more than 400 people in the USA die from unintentional CO poisoning (not linked to fires), more than 100,000 visit the emergency room, and more than 14,000 are hospitalized. We currently present a case of suicidal inhalation of carbon monoxide, that underwent medico-legal examination at the Laboratory of Forensic Medicine and Toxicology of Aristotle University of Thessaloniki.

METHODS: This is a case report. We present the findings of the forensic investigation and the autopsy and discuss the relevant literature.

RESULTS: An 18-year-old male was found lying in the floor of his house, in a carefully sealed room, next to a barrier. During the inspection, a handwritten suicidal note was found.
The forensic investigation included a range of findings that confirmed suicide by inhalation of carbon monoxide. A square-shaped barrier, full of recently burned charcoals, was found less than a meter away from the

body. In the scene, there was lack of evidence of criminal activity whatsoever.
The findings of the autopsy are of special interest. Diffuse cherry-pink livor mortis was present in all the surfaces of the body, as well as the internal organs. Cerebral and mild pulmonary edema and myocardial ischemia were found. An interesting fact is that during the dissection of the trachea, no macroscopically visible signs of inhalation of soot were found.
Of particular importance are the results of the toxicological investigation, which revealed that in peripheral arterial blood carboxyhemoglobin saturation was very high, namely 95%.

DISCUSSION AND CONCLUSIONS: This is a case with unusually high carboxyhemoglobin saturation levels. Acute coronary syndrome was the cause of death and was attributed to CO poisoning. All the available data from the forensic investigation are reviewed, presented, and discussed.

KEYWORDS: Carbon Monoxide Poisoning, Suicide, Forensic Pathology

OC14-4

Utilization of Computational Pathology in Diagnosing Pulmonary Fat Embolism

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Pulmonary Fat Embolism (PFE) is a prevalent concern in trauma-related forensic investigations, particularly in cases involving fractures and soft tissue contusions. Traditional diagnostic approaches predominantly rely on subjective assessments based on specialized staining methods, such as Oil Red O. This presentation aims to elucidate the application of computational pathology, an innovative approach that integrates deep learning algorithms with digital pathology. This method facilitates the automatic and precise quantification of fat emboli in whole slide images, applicable to both stained and unstained slides. Our findings reveal the capability of artificial intelligence (AI) techniques in accurately identifying the morphology of fat droplets within lung microvessels, across a variety of slide preparations. The AI-quantified fat globules demonstrate a high concordance with the determinations made through specialized staining by human evaluators. Furthermore, this study involves the calculation of the ratio of fat emboli to lung area across multiple case studies, enabling the establishment of a diagnostic threshold for fatal PFE. The results underscore the substantial promise of computational pathology as a cost-effective, rapid, and precise methodology for the diagnosis of fatal PFE in forensic settings.

OC14-5

Applications of Postmortem Computed Tomography Angiography in Settling Medical Disputes in Cardiovascular Surgery

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Medical malpractice is relatively common in cardiovascular surgeries. Abnormal surgical operations and irregular operation of surgeons are the most direct causes of medical disputes, which often lead to doctor-patient conflicts before entering the judicial evaluation process. A key goal of forensic pathology examinations in these instances is to determine if a surgical factor contributed to the subject's death, potentially clarifying if any negligence occurred during the operation.

Postmortem computed tomography (PMCT) and PMCT angiography are increasingly used in forensic practice. So it might be a new forensic pathological method in solving medical disputes that involve the cardiovascular surgery. We present several cases of death after cardiovascular surgery by using the PMCTA. The subjects died soon after surgical operation of inhibitory pacemaker installing, or aortic arch replacement. Due to fibrinous exudate in the mediastinum, tight attachment of the pericardium to the heart; as well as clots and inflammatory exudate in the chest cavity, Separating the organs in the chest cavity was difficult, especially in the surgical area. There are high risks and technical challenges associated with cardiovascular surgery, as well as trauma, local tissue adhesion, and other factors that can undoubtedly increase the difficulty of the autopsy. Moreover, even if local active hemorrhage is found during the autopsy, it may be unclear or controversial in many cases whether the hemorrhage was caused by surgical negligence.

PMCTA provided an effective solution for those cases. Because angiography was performed prior to autopsy, the malpractice in surgical incision could be ascertained by examining leakage of the contrast medium. If local leakage is present, then postoperative hemorrhage is suspected from surgical malpractice. Additionally, it can guide the forensic pathologist to focus on the suspected area during autopsy and further verify the positive imaging results. On the contrary, if there is no malpractice in incision, then there is no reason to believe that the surgical suture was controversial, thus removing considerations of medical malpractice.

Using the CTA approach for isolated cardiopulmonary organ imaging can accurately display the location of organ rupture, which further guides organ inspection and tissue sampling, and avoids irreversible damage to key regions. In conclusion, the PMCTA approach we describe here was an effective tool that can be applied to certain medical-related forensic cases.

OC14-6

Patricide by Mechanical Asphyxia

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INTRODUCTION: We present the case of a 77-year-old man found dead in an advanced stage of decomposition on the floor of his house by the older son who came to visit him. The man suffered from Parkinson's disease with severe ataxia, a condition for which he needed continuous assistance provided by a second son. The last one lived with the father's corpse for almost a week.

MATERIAL AND METHODS: On-site forensic pathologist inspection, forensic autopsy, histological examination.

RESULTS: At the on-site forensic pathologist inspection we found a corpse of an elderly man with marked hypotrophy of the lower limbs, a plastic bag covering limply the head; abnormal bilateral eyelid swelling; protrusion of the eyes and tongue; huge scrotum dilatation (both due to putrefactive gas and a large inguino-scrotal hernia); fecaloma in his pants; hypostases on the back and at the anterior surface of the lower limbs; no evident injuries were found, except for a triangular excoriation in sternal region.
At the cadaveric dissection, the neck was minimally infiltrated by blood at the left side of the soft periioid tissues and the laryngeal aditus was edematous; the right hemithorax was crushed (sternal fracture and several displaced fractures of the ribs) in the absence of haemothorax, while the intercostal muscles were affected by diffuse haemorrhagic infiltration; in addition, at the base of the right lung, emerged fine haemorrhagic petechiae. Histological examination showed acute pulmonary emphysema and fat embolism.

DISCUSSION: The autoptic and histological findings suggested a mechanical asphyxia as cause of death, compatible with violent thoracic compression, impairing respiratory mechanics and quick death. The investigative findings are consistent with the on-site and autoptic/histological evidences. In particular, the cohabiting son reported that, while he was taking his father to the bathroom because of faecal incontinence, the elder fell on the floor. In the arduous attempt to lift his father, the young man, the only care-giver of the elderly and suffering himself from depressive disorders, was taken by despair and anger.
Therefore, he mounted with his knee over his father's chest, compressing it for a few moments. Then, he moved the corpse in another room, covered it and, in the following days, he applied a plastic bag on the

victim's head, probably to collect putrefactive liquids. The first-degree sentence convicted the son of murder; upon appeal the sentence was reduced to manslaughter.

CONCLUSION: In conclusion, appropriate forensic-pathologist activities contributed to the resolution of the case, despite advanced putrefactive phenomena.

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OC15-1

The Estimation of the Post-Mortem Interval Through Blood Biochemistry

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Post-mortem biochemistry can be included among the methods reported in the literature to investigate the time since death. To address this issue, we collected blood samples from hospitalized patients who died in the presence of health personnel. Samples were collected 20 minutes after death and every 6 hours until 24 hours post-mortem, with the last Ante Mortem (A.M.) sample also included in the analyses. Each sample was immediately centrifuged and analyzed. Our preliminary results indicate a significant and consistent increase in phosphokinase (CPK) and lactodehydrogenase (LDH) blood levels, with low interindividual variation among subjects. Interestingly, the measured time trend follows an exponential function, characterized by a time-dependent growth rate. While a larger sample size is needed to confirm our preliminary findings, our results suggest that CPK and LDH blood levels could be valuable parameters for determining the post-mortem interval. Furthermore, our data were systematically compared to those reported in the literature, which was carefully reviewed.

OC15-2

Parametric Analysis of Craniocerebral Injury Mechanism in Pedestrian Traffic Accidents Based on Finite Element Methods

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The toughest challenge in pedestrian traffic accident identification lies in ascertaining injury manners. The aim of this study was to systematically simulate and parameterize three types of craniocerebral injury including the impact injury, the fall injury, and the run-over injury, to compare the injury response outcomes of different injury manners. Based on the Total Human Model for Safety (THUMS) and its enhanced human model THUMS-HS (Hollow Structures), a total of 84 simulations with three injury manners, different loading directions and loading velocities were conducted. Von Mises stress, intracranial pressure, MPS, CSDM0.25, shear stress, and cranial strain were employed to analyze the injury response of all areas of the brain. To examine the association between injury conditions and injury consequences, correlation analysis, principal component analysis (PCA), linear regression, and stepwise linear regression were utilized. There is a significant correlation observed between each criteria of skull and brain injury ($p<0.01$). A two-phase increase of cranio-cerebral stress and strain as impact speed increases. In high-speed impact(>40km/h), the Von Mises stress on the skull was with a high possibility exceed the threshold for skull fracture (100 MPa). When falling and making temporal and occipital contact with the ground, the opposite side of the impacted area experiences greater stress concentration. Run-over injuries tend to have more comprehensive craniocerebral injury, with greater overall deformation (MPS>0.8, Von Mises stress>300MPa) due to more adequate kinetic energy conduction. The angle and speed of the force of impact also play a significant role in craniocerebral injury. A regression equation of the craniocerebral injury manners in pedestrian accidents was established. The study partially distinguishes the manners of craniocerebral injury, elucidating the biomechanical mechanism of craniocerebral injury, and provides a biomechanical foundation for the identification of craniocerebral injury in legal contexts.

OC15-3

The Use of 3D-Printed Replicas of Homicide Weapons during Autopsy

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The comparison of injuries with the suspected tools used in a homicide is a routine task of the Forensic Pathologist. The currently applied methods, however, have limitations. The possibility of cross-contamination is a strong argument against bringing the weapon to the autopsy room. Using photographs from the tool for comparison does not always give satisfactory results because the third dimension is lost. A possible new solution emerged with 3D printing becoming cheap and easily accessible.

Creating a 3D replica of a tool is cheap, and the workflow is fast. Scaled photographs of the tools from the crime scene investigation are sufficient to create the replica, and the digital editing and process take only about 80 minutes. The 3D printed replicas can be easily compared with the injuries, and in case of stab wounds, they are also helpful in wound track determination, thus assessing stabbing direction. The use of 3D reconstruction methods also has high demonstrative value, which can help the understanding of forensic pathological evidence of the participants of the legal procedure.

The applicability of the method is demonstrated with a case series of homicides.

OC15-4

Death by Suicide in Subjects under the Age of 30: A Retrospective Analysis

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INTRODUCTION: Suicide among people under 30 is a major public health issue with extensive consequences worldwide. While the age-standardized rate of suicide in Italy is lower than the world average (6,7 vs 9), Lombardy, the most populated region in Italy, has a significantly higher rate (7,2). A comprehensive retrospective analysis focusing on this topic is helpful in facilitating interventions aimed at positively interacting with the unique challenges faced by this demographic.

AIM: Scope of the study was to analyze suicide cases undergoing autopsy in individuals under the age of 30 in the province of Milan and Monza Brianza, the most populated urban areas in Lombardy, from 1992 to 2022, in order to assess the incidence and different correlations between personal characteristics, time of occurrence and suicide mode.

METHODS: Cases were identified anonymously using the database of the Institute of Forensic Medicine of Milan where all autopsies were performed, considering the period from 1992 to 2022. All deaths in the province of Milan and Monza Brianza classified as suicides were included, considering subjects up to 29 years old. Cases were divided by time of occurrence, biological sex, age and mode of suicide. Statistical analysis was performed using the SPSS program, version 28.

RESULTS AND CONCLUSIONS: During the period from 1992 to 2022, 28,187 autopsies were performed at the Institute of Forensic Medicine of Milan. Of these, 677 (2.4%) were classified as suicides in individuals under 30, with an average of 21.8 cases per year. Most of these were male (76.1%). The most represented age groups were 25-29 years old

(49.5%) and 18-24 years old (41.7%). Despite the seriousness of the situation, there has been a decrease in the number of suicides among under-30 in recent years.
Regarding methods, fall from a height was the most common (34.3%), followed by hanging (30.3%), gunshot (9.3%) and rail-related deaths (8.4%). Non-violent methods such as drug poisoning and carbon monoxide inhalation counted for 9.1% of the total.
In the male group the most common modality was hanging (32.0 %) followed by fall from a height (30.7%), while in the female group the most common was fall from a height (45.7%) followed by hanging (24.7%). 42.1% of the cases had positive anamnesis for psychiatric disorders. Considering seasonality, the frequency of cases in January, June and December was significantly higher than the average, with June having the highest percentage of cases (11.65%). Analysis of suicide patterns highlighted prevalent trends within the studied sample. Recognizing these patterns is useful for implementing preventive measures and tailoring interventions to specific means of self-harm. Retrospective analysis identified common ways of committing suicide among young people. Examining these factors is relevant to designing mental health support systems and targeted prevention strategies.

OC15-5

NMR Metabolomics on Human Pericardial Fluids: A Regression Model for PMI Estimation

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To this day and age post-mortem interval (PMI) estimation still represents a forensic conundrum. The available tools are scarce and often not reliable in court. Among novel approaches, -omics sciences, and particularly metabolomics, candidate as promising tools for accurate PMI estimation. Pericardial fluid (PF) is a biological matrix of particular interest in the forensic field due to its peculiar anatomy and physiology. Most of the existing literature has mainly focused on post-mortem biochemistry and forensic toxicology. Our group has recently published a proof-of-concept study based on ^{1}H Nuclear Magnetic Resonance (NMR) spectroscopy on post-mortem human PFs demonstrating a robust prediction ability in estimating PMI, particularly for intervals up to 100 hours.

We pursued the previous experiment extending it on a larger sample and on a wider time-window in order to corroborate our preliminary results.

PF samples were collected in 70 judicial autopsies performed at Forensic and Legal Medicine Institute of University of Cagliari (n=24 previous subset of samples was extracted and analyzed again in order to have identical experimental conditions and ascertain the reproducibility of the experimental protocol).

Samples were collected from individuals displaying inhomogeneous cause of death, a male to female ratio of 2:1 and a PMI ranging from 16 to 262 hours. The only exclusion criterion was PF quantitative and/or qualitative alterations detected at the time of autopsy. Low molecular weight metabolites were obtained with a liquid-liquid extraction protocol. Metabolomic analysis was conducted via ^{1}H NMR and the obtained spectral data were submitted to multivariate statistical data analysis by using an orthogonally Constrained PLS regression model to estimate PMI.PF samples were divided into a training set and a test set for model validation. The prediction model performed well corroborating previous results on a wider time-window (262 vs 170 hours). Of note, best prediction error of our preliminary results was obtained narrowing the time-window up to 100 hours. Due to the larger dataset, present results allowed to build up a robust regression up to about 150 hours. Most relevant metabolites in the prediction model were identified. The present study confirms that PF samples collected from a real forensic scenario represent a biofluid of interest for the estimation of the time since death. Notwithstanding a significant inhomogeneity in age, sex, and cause of death which may potentially represent a bias, our results demonstrated that PMI is the main driving force in metabolomic modifications occurring after death. Whereas PF may not represent the biofluid of choice in the initial PMIs (up to 48 hours) it candidates as the proper biological matrix to be investigated in longer PMIs, at least up to 150 hours after death, when no reliable tools are currently available.

OC15-6

Forensic Multidisciplinary Approach for Post-Mortem Diagnosis of Decomposed Cadavers Retrieved from the Mediterranean Sea: A Two Years Experience

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The retrieval and examination of decomposed cadavers from water present unique challenges for forensic investigators, particularly in cases involving the Mediterranean Sea[1]. The process includes documenting external findings, such as injuries and unique features, followed by careful recovery and preservation of evidence. Autopsy is crucial for internal assessment, focusing on organs, tissues, and fluid analysis to identify injuries, signs of drowning, or possible toxins. The use of specialized techniques, like DNA analysis and dental records, aids in victim identification. Collaboration with experts and thorough documentation ensures a comprehensive analysis, aiding law enforcement in solving cases and providing closure to families. The complex decomposition process, water-related factors, and marine environment demand a comprehensive and collaborative effort involving forensic pathologists, anthropologists, odontologists, toxicologists, and biologists[2,3]. By combining expertise from various disciplines, this approach aims to accurately determine the cause and manner of death, establish identity, and provide crucial information for legal and humanitarian purposes[4,5]. In the year 2022, the Institute of Forensic Medicine of the "Paolo Giaccone" Polyclinic in Palermo encountered thirteen cases of subjects recovered from the sea in an advanced state of putrefaction. To determine the cause and manner of death, establish identity, and provide crucial information for legal and humanitarian purposes, taphonomic investigations, histological analysis, macroscopic anthropological approaches, and radiology played key roles in identifying the sex, ethnicity, and age of the deceased, despite the challenging post-mortem interval. The subjects in the analyzed cases were all males, estimated age between 19 and 40 years, and of mixed Caucasoid/Negroid ethnicity. Diatomes have been searched in nine cases from bone tissue (femoral bone) and death was attributed to drowning. In six cases Postmortem CT was performed before autopsy. This case study highlights the effectiveness of a comprehensive multidisciplinary approach in resolving complex cases involving decomposed cadavers retrieved from the Mediterranean Sea.

KEYWORDS: multidisciplinary approach, drowing, decomposed bodies, identification, anthropology

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Oral Communications 16: Clinical Forensic Medicine II

OC16-1

An Uncommon Rupture and Embolization of a Peripheral Intravenous Catheter: Whose was the Liability?

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INTRODUCTION: Peripheral intravenous catheter rupture is an uncommon complication that can occur due to misplacement or manufacturing defects. The fragments can migrate in the pulmonary circulation, causing pulmonary embolism and leading the patient to death.

CASE DESCRIPTION: In the present case, a 36-year-old woman affected by autoimmune myositis was admitted to hospital due to an acute bronchitis. During hospitalization an intravenous access was placed in the right cubital vein. The day after, during its removal, the clinicians observed that a piece of the catheter was missing. A TC scan of the thorax showed a 27.6 mm foreign body in a branch of the right pulmonary artery. The patient was immediately transferred to another hospital where she underwent unsuccessfully vascular interventional radiology. Since the woman was asymptomatic, she was dismissed without complications, but she was told that a resection of the right lung was necessary. About a month later she underwent another vascular interventional radiology. In this occasion, the fragment of the catheter was removed from the branch of the right pulmonary artery. The patient was dismissed without pulmonary complications, but she later developed an anxious disorder. The broken catheter was later examined through stereo microscope, scanning electron microscope (SEM), tomography, FT-IR spectroscopy and thermogravimetric analysis (TGA). The analysis highlighted an excess of polymeric material and microporosities at the rupture level that had made the catheter too rigid at that point, leading to its rupture. Other catheters from the same batch were examined and had some of them had the same defect.

CONCLUSIONS: According to the analysis of the catheters, the scrapping was caused by a manufacturing defect. Moreover, the catheter was correctly placed during the procedure, so the liability of the clinicians had been excluded. It is unknown whether this brand of catheters has been removed from the market.

OC16-2

Challenges in the Forensic Medicine Approach of Disaster Victims – Kahramanmaraş Earthquakes of February 6, 2023: Turkey's Experience

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INTRODUCTION AND OBJECTIVE: In the international literature, a disaster is defined as a sudden, unpredictable event with unpredictable time and place, in which a large number of people lose their lives at the same time, which causes social, economic and environmental damage and whose effects last for a long time, and in which local resources are insufficient to solve the identification process.
Especially in cases where a disaster involves a large number of casualties, the identification process, which must be carried out simultaneously with the rescue process, becomes even more difficult and complex.

In our country, the 7.7 and 7.6 magnitude earthquakes centered in Kahramanmaraş on February 6, 2023 affected 11 provinces. This study was planned to share the field experience and difficulties experienced in the forensic medicine services-identification process carried out in the most damaged provinces in the post-earthquake period.

MATERIAL AND METHOD: After the earthquakes centered in Kahramanmaraş, which occurred on February 6, 2023 in Turkey, we, as authors, will share our field experience (transportation to the region, first and subsequent days) regarding the forensic medicine services-identification/medicolegal process in Kahramanmaraş and Hatay Samandağ Districts, which are the regions where we worked, commissioned by the official authorities.

DISCUSSION: The main objective of Disaster Victim Identification is not only to recover all human remains, identify the deceased, document the cause and manner of death, but also to reconstruct the cause of the disaster and develop precautionary measures. At this point, the identification of the deceased should be done as soon and accurately as possible. This is of great importance in terms of humanitarian ethics and religion, as well as national and international law. For this reason, many countries have established Disaster Victim Identification (DVI) teams to carry out identification procedures and have determined in which situations these teams will work.

CONCLUSION: On February 6, 2023, after the Kahramanmaraş earthquakes, field experiences and difficulties related to the forensic medicine services-identification process will be shared and discussed, and solutions will be proposed for the optimal standard approaches that can be applied in the process of planning and identification of DVI teams to be formed.

KEYWORDS: Earthquake, Disaster victims, Identification, Kahramanmaraş, Forensic medicine.

OC16-3

Live Video Detection and Sampling of Semen with Multispectral Imaging Device in Sexual Assault Cases

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The body and clothes of victims may contain; materials such as hair, pieces of fabric and biological fluids such as blood, urine, and semen in sexual assault cases. Evidence collection processes in sexual assault cases are carried out in order to establish a connection between persons and things or places, or to exclude the connection. Biological evidence is the evidence that includes hair, bone, teeth, blood, semen, or other body fluids of a person that can be used to show that the accused committed the crime or to acquit the accused in forensic events. DNA analysis can establish a direct link between the crime and the accused.

When gathering evidence, the main question is where to take the samples, especially for DNA analysis. Other difficulties with sampling are gathering evidence from the body or clothes of the victim that is not visibly stained or taking a sample from a very small area that is not visible to the naked eye due to their very small size and amount of the biological evidence. In sexual assault cases, the following sampling steps of biological evidence are to pinpoint the exact position of the evidence, photo documentation of the evidence and to collect evidence that has been confirmed by imaging techniques.

In this presentation it is aimed to demonstrate the detection and sampling semen on the body and clothes of victims as a possible DNA source and to demonstrate the usability of the devices in the forensic medical evaluation of sexual assault cases by using multispectral imaging devices.

5 cases of live video sampling of the semen residue from the victims' bodies and clothes are presented. We discovered that very small amount semen residues on the body or clothes which are invisible to the naked eye can be detected by using multispectral imaging devices and can be sampled under live video imaging.

Multispectral sexual assault imaging devices provides high tech solutions such as gathering evidence from the victims' body or clothes that are not visibly stained, taking a semen sample from a very small area that is not visible to the naked eye due to their very small size and amount the evidence and enables live video sampling.

OC16-4

Sexual Assault of Older Persons: Attendances to the Sexual Assault Treatment Unit Network in the Republic of Ireland

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BACKGROUND: In contemporary society, sexual assault (SA) poses a significant threat. Although older individuals represent a notably vulnerable demographic, a considerable gap exists in the literature regarding the context in which older individuals experience SA. Sexual Assault Treatment Units (SATUs) in the Republic of Ireland play a vital role in providing care. This study seeks to address this gap by presenting a comprehensive description of attendances by older individuals to the SATU network.

METHODS: A national cross-sectional study over a 7-year period (1/12/2017–31/12/2023) was performed, analysing the attendance patterns of patients ≥65 years old, with a focused subset analysis examining Dublin SATU attendances. The analysis has provided a descriptive overview of these attendances, encompassing demographic details, assault specifics, and SATU visit information. The subset analysis provides information as regards bodily injuries, both genital and extra-genital.

RESULTS: During the study period, there were 6,478 attendances to the SATU network, with 0.93% (n=60) involving individuals aged 65 years or older. There were 59 females and 1 male, with an average age of 76.05 years. Forensic examinations (FE) were conducted in 81.7% (n=49/60) of cases, and the majority of patients (80%, n=48/60) sought assistance within 7 days of the incident. Notably, uncertainty surrounding whether sexual assault had occurred was reported by half of the attendees (n=30/60). Only one case involved multiple assailant assaults and all identified assailants were described as being male. Less than half could identify an assailant (n=29). In the subset analysis of 19 cases in Dublin, a significant proportion (73.7%, 14/19) of incidents occurred in healthcare facilities. Referrals to SATU were based on concerns of unexplained genital injury (n=5), witnessed SA by healthcare staff (n=2), and patient-reported SA (n=12). 63.2% had a dementia diagnosis, and 42.1% (n=8/19) were care dependent. Among these cases, 18 patients underwent a FE, and the majority (n=11/18) had the examination conducted outside a SATU (hospital or nursing home).
Among those undergoing a FE, 38.9% (n=7) had only an external genital examination, while 61.1% (n=11) also had an internal examination. Genital injuries were prevalent in 44.4% (n=8) of patients, primarily located at the posterior fourchette and labia majora. Extra-genital injuries were observed in only 22.2% (n=4/18) of cases.

CONCLUSION: While people over 65years represent less than 1% of SATU attendances, this study highlights the significance of these presentations. Incidents predominantly occur in healthcare settings, with single male assailants targeting mostly female victims. While rare, the fact that incidents are more likely to occur in healthcare settings emphasizes the need for targeted interventions. Half of those assessed were uncertain whether an incident had occurred, possibly due to cognitive impairment. The substantial genital injury prevalence calls for increased attention and preventive measures to safeguard this vulnerable population.

OC16-5

Female Perpetrated Sexual Assault: A Review of Attendances to the National Sexual Assault Treatment Units in the Republic of Ireland

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BACKGROUND: Female perpetrated sexual assault is under-represented in sexual assault research, and indeed possibly an underreported crime. The aim of this study is to address the lack of comprehensive data in relation to female perpetrated sexual assault attendances to the national sexual assault treatment unit network in the Republic of Ireland.

METHODS: This is a cross-sectional study analysing the attendances of female perpetrated sexual assault attendances at the six sexual assault treatment units in the Republic of Ireland between 1 January 2017 and 31 December 2022.

RESULTS: There were 95 attendances where the assailant (or one of the assailants) was identified as female. 62% (n=59) of these attendances involved a solo female assailant, 3.2% (n=3) where it was a multiple assailant assault with only female assailants and 34.7% (n=33) cases with male and female assailants. 74.7% (n=71) of victims identified as female, 24.2% (n=23) as male and 1.1% (n=1) as 'other'. The average age of attenders was 27.0 ± 10.7 years old. 54.7% (n=52) of attendances were within 72 hours of the assault. 52.6% (n=50) of these underwent a forensic examination. 30.5% (n=29) of incidents occurred in the assailant's home. 23% of assailants were described as a friend of the victim/survivor. 34.7% (n=33) sustained bodily injuries (genital and/or extra-genital).

CONCLUSION: Female perpetrated sexual assault is a distinct entity when analysing attendances to the national sexual assault treatment unit network, representing just under 2% of all attendances. We have shown that those who experience these assaults are likely to be female, be assaulted by a single female perpetrator who is known to them and attend a sexual assault treatment unit within 72 hours of the assault. Awareness of the characteristics of these attendances will ultimately allow us to develop appropriate supports for these victims/survivors and to raise awareness of this type of crime.

OC16-6

Risk of Seizures Following Traumatic Events to the Head

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AIM: In the regulations used for functioning, disability and health assessments in Turkey, a 5% disability rate is assigned for the risk of epilepsy. This study aims to elucidate the practices of Neurosurgery specialists regarding possible cranial pathologies that may occur after traumatic events directed to the head.

MATERIALS AND METHODS: A survey was conducted between November 1 and December 1, 2023, among 52 neurosurgery specialists in Turkey, including experts, associate professors, and professors. The survey aimed to identify potential cranial pathologies after head trauma, inquire about the risk of seizures in specific pathologies, and evaluate the practices of neurosurgery specialists.

RESULTS: All Neurosurgery specialists 100% (n:52) assessed the risk of seizures in cases where single or multiple contusion areas were observed in radiological imaging, subdural hematoma (acute, subacute, chronic) was detected, and penetrating gunshot wounds to the cranium or brain were present. 98.1% (n:51) evaluated the risk of seizures in cases of complicated fractures (multiple fractures, depression fractures, diastatic fractures, skull base fractures, etc.) and intracerebral hematoma seen in radiological imaging as a result of head trauma. 44.2% (n:23) considered the risk of seizures in cases of mild head trauma without pathology detected in radiological imaging but belonging to

specific groups (patients with blood disorders, those using anticoagulants/antiplatelets, thrombocytopenic pediatric and geriatric patients). 21.2% (n:11) assessed the risk of seizures in pathologies involving the cerebellum and posterior fossa.

CONCLUSION: According to the survey results, decisions can be made about the risk of seizures in cases where single or multiple contusion areas are seen in radiological imaging, subdural hematoma (acute, subacute, chronic) is detected, and there are penetrating gunshot wounds to the cranium or brain. For injuries involving the cerebellum and posterior fossa, it is considered essential to take into account the patient's other clinical findings in assessing the risk of seizures. When preparing disability reports, detailed examination of the patient's clinical condition and medical records from the date of the event is crucial.

KEYWORDS: post-traumatic epilepsy, prophylactic antiepileptic

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OC17-1

Anthropological Study of the Unknown Skeletal Remains of Partisans from the Baveno Massacre (Italy, 1944)

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Between 1943 and 1945, the Italian Resistance movement played a vital role in the liberation of Italy from the Nazi and fascist dictatorship. During a series of extensive raids by Nazi soldiers in the Valgrande area of Piedmont, Northern Italy, in June 1944, more than 50 partisans were captured and subsequent executed. In 2020, the Laboratory of Forensic Anthropology and Odontology (LABANOF) of the University of Milan signed an agreement with the 'Casa della Resistenza' Association of Verbania, the Valgrande National Park Authority and the municipal authorities of Verbania and Baveno to restore the identity of these victims. In light of this agreement, in 2023, 35 unidentified remains were exhumed from the cemeteries of Baveno and Verbania for postmortem examinations.

The present research describes the anthropological investigation of the first eight unknown partisans exhumed from the cemetery of Baveno, to recreate their biological profiles – ecompassing sex, biogeographical origin, age at death, stature, and pathological conditions – and to collect personal descriptors to be compared with antemortem data. To this end, morphometric analyses and X-ray examinations were performed on each skeleton. Additionally, clothes and personal belongings were also noted to detail their identikit.

The sample consisted of three adolescents, three adolescent-young adults, and two middle-aged adults. All individuals had male characteristics. Biogeographical origin determination estimated that five individuals were Europoid. The remaining three individuals had fragmented crania which prevented from an accurate analysis. Stature ranged between 150.5 cm and 178.53 cm, with an average of 168.36 cm. Dental and bone personal descriptors were observed in three individuals, such as inter-incisive diastema, antemortem loss of lower incisors and premolars, and palatal misalignment of one tooth. One individual presented an atypical fusion of the atlas to the occipital condyles and the incomplete fusion of the posterior arch of the atlas. Personal items that were associated to the remains included paper fragments of what may be an identity document, two rings, a watch and two combs. Evidence indicated that all individuals suffered from gunshot and blunt force trauma to both cranial and post-cranial bones.

The post-mortem data gathered will support the ongoing collection of ante-mortem data, through targeted questions to the relatives that will be interviewed in the next steps of the project. Ultimately, anthropological analyses will be extended to all the 35 individuals to fully restore the historical memory of the events of the Resistance movement in Northern Italy and to uphold the rights to identity of the victims.

OC17-2

February 2023 Earthquakes in Turkey: Evaluation of Forensic Medicine Experiences

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INTRODUCTION AND OBJECTIVES: High death tolls in mass disasters pose challenges related to identification. The recent example of this occurred in Turkey, where consecutive earthquakes of magnitudes 7.8 Mw and 7.5 Mw on February 6, 2023, resulted in 50,783 confirmed fatalities within a span of approximately 9 hours. Post-earthquake, the primary responsibility of forensic medicine experts was the execution of forensic identification and post-mortem examinations. Additionally, the chaos following the earthquakes led to a lack of authority, resulting in incidents such as looting, sexual assault, and physical harm. Some human rights violation allegations emerged during the restoration of authority. The aim of this research is to explore the experiences of forensic medicine professionals regarding forensic activities after the earthquake.

MATERIAL AND METHODS: A total of 358 participants were approached, with 208 providing complete responses. Questions were designed to assess earthquake-related needs and expectations. Participants completed the questionnaire using the online survey platform Qualtrics. Data analysis was conducted using the statistical analysis software SPSS v28.0.

RESULTS: Of the participants, 40.9% were female, and 58.7% were male. About 44.2% identified as forensic medicine resident, with the remaining being forensic medicine specialists. The median (quartiles) work experience in forensic medicine was 5 years (3, 11). Of the participants, 55.8% worked in Forensic Medicine Departments of Medical Faculties, 34.6% in Council of Forensic Medicine, and 8.2% in hospitals under the Ministry of Health. Nearly half (47.6%) of the participants actively worked in the earthquake-affected region, with 91% volunteering for duty. Among those working in the earthquake zone, 41.4% reported no DNA sampling from deceased individuals with known identities (by relatives), and 60.6% mentioned exhumation issued due to identification errors. Additionally, 11.1% reported encountering human rights violations in their working regions. About 50.5% of those active in the earthquake zone experienced post-traumatic stress disorder symptoms upon returning, with 14% seeking medical support. Among participants not involved in active earthquake duties (n=109), 12.8% reported being unable to contribute due to inter-agency coordination issues or restrictions from their respective institutions.

DISCUSSION: The earthquake, affecting 11 provinces in Turkey and resulting in over 50,000 deaths, presented challenges in identification. Due to the high death toll, burial permits were issued without further identification procedures in many cases with known witnesses. The non-application of identification algorithms, despite forensic professionals' requests, was a significant contributing factor to this issue. Professionals in the region highlighted inter-agency coordination problems. Beyond identification issues, instances of human rights violations resulting in deaths were reported in the earthquake zone. Sharing recommendations from forensic science experts who witnessed this century's disaster in Turkey with professionals worldwide is a professional ethical responsibility and should be documented.

OC17-3

Injuries and Self-reported History of Torture in a Cohort of Asylum Seekers Examined in Montpellier, France: A 4-year-Retrospective Study

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INTRODUCTION: Large numbers of refugees worldwide try to escape violence, persecution, and poverty, representing the greatest humanitarian need since World War II. The history of torture is relied to a great extent upon asylum seekers' self-reporting given that several forms of torture don't leave permanent marks. To the extent, however, that physical findings of torture or ill-treatment exist, they are valuable confirmatory evidence in support of an asylum application. Aim of the present study was to record several information regarding asylum-seekers examined in the Department of Legal Medicine of the University Hospital of Montpellier, France, during a 4-year period.

METHODS: The information was retrieved through retrospective analysis of all consecutive cases (medical certificates) of the asylum seekers examined in the Department of Legal Medicine of the University Hospital of Montpellier, France from January 1, 2019 to December 30, 2022. Exclusion criterion was age under 18 years old. The recorded variables included data related to the physical evidence (type of injury, part of the body affected, number of scars), self-reported method of torture, sexual assault, the countries of origin, reason/motive of conflict/motive of torture and several socio-demographic data.

RESULTS: A total number of 495 asylum seekers were included in the study for the aforementioned period (males 68.1% and females 31.9%)). Mean of age was 29.90 years. The majority of the sample was originated from countries of Sub-Saharan Africa (76.6%). The most common method of torture was blunt forces (88.5%). Psychological abuse was reported by 58.0% of the asylum seekers. Sexual abuse and female genital mutilation were reported in 2.9% and 11.2% of the cases, respectively. A history of incised wounds, burns, gunshot use, and food deprivation were mentioned in 31.2%, 21.4%, 7.9% and 5.6% of the cases, respectively. The other methods of torture were mentioned in less than 5% of the cases. The perpetrator was a member of the family in 30.6% of the cases, followed by police/army (27.7%) and a member of the community (20.0%). Political causes were reported by the 8.3% of the asylum seekers. Regarding the anatomical region affected, injuries were observed during clinical examination on head in 56.4%, on neck in 3.6%, on trunk in 58.8%, on upper extremities in 77.2%, on lower extremities in 74.3% and on genital/anal in 13.3% of the cases. Methods of torture showed a statistically significant association with sex. Sexual abuse was reported more frequently when the country of origin belonged to the geographic area of Middle East/North Africa (28.6%) and Sub-Saharan Africa (26.9%) (p=0.003).

CONCLUSION: The results of the study will contribute to the gained knowledge about torture invoked injuries, improving thus the capability of forensic examiners to recognize them and conduct comprehensive medical evaluations regarding alleged torture survivors.

OC17-4

Anthropological Evidence Regarding the Genocide of the Jews in the Second World War in North-East Part of Romania

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INTRODUCTION: Historical evidence attests to violent actions resulting in the killing of Jews on Romanian territory during the Second World War. The largest known mass murder took place in Iaşi in the context of Romania's entry into the war alongside Germany in June 1941. Although General Antonescu, leader of the Romanian Army, ordered the evacuation of all Jews between 18 and 60 years old from the villages on the border with the Soviet Union, the Romanian army and the civilian population committed nevertheless acts of extreme violence against Jews on Romanian soil.

MATERIAL AND METHODS: Five mass graves dating from 1941 have been discovered in the Iaşi region: 3 in 1945 and 2 in 2009 and 2019 respectively, which indicate massacres of Jewish people committed by the 6th Hunter Regiment of the Romanian army on Moldavian territory, immediately after the launch of Operation Barbarossa.

RESULTS: The forensic report from 1945 on the 3 mass graves found in Stanca, Iaşi county, revealed the following findings: a total of 311 corpses were found, placed in an unorganized manner, more men than women, while the ratio children to adults was approximately 30%. Additional findings included multiple gunshot wounds to the chest and abdomen and rarely to the head. Identity documents and the partial preservation of soft tissue which allowed the confirmation of circumcision of the foreskin permitted the Jewish ethnic identification.
The forensic anthropological report from 2009 on the fourth mass grave found in the Iasi region shares similarities to the one from 1945: same unorganized pattern of placement of the bodies, same percentage of children, lack of gunshot wounds to the head, though some cranial fractures were observed. The main differences were the small number of skeletons, 36 in total, and the marked deterioration of the bones. Personal belongings and characteristics of the skeletons led to the identification of the ethnicity.
The results from the mass grave discovered in 2019 in the same area are not presented because the investigation is not yet finalized.

CONCLUSION: The two forensic reports from 1945 and 2010 share many similarities regarding the characteristics of the victims and the traumatic injuries observed. Although the number of victims is relatively small compared to historical testimonies, anthropological reports highlight the genocide against the Jewish population, which has a negative impact on our national and human consciousness.

KEYWORDS: mass grave, genocide, Jewish population, forensic anthropology, Second World War, Romania

OC17-5

When Silence is Buried Deeper: Infrastructure and the Two Unreported Mass Graves from WWII and 90s in Croatia

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When talking about Croatia's past it is often said that it is covered in graves. The area is full of rich history so, of course, it is full of graves of archaeological importance and wonder, but it has a darker side that stems from armed conflicts in WW2 and postwar period, and more recent Homeland War in the '90s. The Directorate for Missing Persons of the Ministry for Croatian Veterans has a mandate to coordinate the humanitarian and legal efforts pertaining to forensic investigation of (mass) graves for these periods. In 2023 we uncovered two sites that had the same symptom, that is they were unearthed for the infrastructure purposes sometime after the war, but never reported to the authorities, so the victims were left buried, again. The presentation will cover the methodological approach of forensic investigation and the anthropological examination of skeletal remains that led to uncovering the truth, and in the case of the '90s clandestine site, identification of the missing persons.

OC17-6

The Missing Persons Exhumation and Identification Project of the Government of the Republic of Cyprus: 25 Years of Challenges and Lessons Learned

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The 1974 Turkish invasion of Cyprus divided this island nation into the north Turkish-occupied area and the south that is under the control of the government of the Republic of Cyprus. To this day, the country remains divided. One of the most serious outcomes of the invasion is that of the missing persons. As a response to this humanitarian issue, the Cyprus government established a unique project in 1999, with the aim to exhume and identify the remains of the individuals who went missing during the 1974 events. The focus of the investigation included potential burial sites in the territories which are still under the control of the Cyprus government. Initially, the non-governmental organization Physicians for Human Rights was recruited to conduct the exhumations and anthropological examinations. A large, multinational and multidisciplinary team conducted exhumations in two cemeteries in the Nicosia area. These sites contained war casualties, both military and civilian, many of whom had been buried as "unknown" due to the chaotic conditions that prevailed at the time.

The Laboratory of Forensic Genetics (LabFoG) of the Cyprus Institute of Neurology and Genetics (CING) was tasked with the DNA part of the project that included building a vast DNA database of all the families who had a missing or known dead relative in the war. The Laboratory also processed the bone samples from the exhumed remains in order to identify them.

Since then, almost 300 individuals have been identified. Exhumations regarding other events have also taken place, including the case of a 7-year-old boy who was shot by British colonial forces in 1956, police officers, military and civilians who died during a military coup, the victims of the bombing of the psychiatric hospital and the Greek commandos who died when their aircraft was shot down by friendly fire. Some of these investigations will be highlighted during this presentation.

Oral Communications 18: Forensic Psychiatry I

OC18-1

Intrafamilial Homicide-Suicide Involving a Female Compared with Female Homicide Cases, 2021-2023

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OBJECTIVE: Intrafamilial homicide-suicide refers to instances in which the perpetrator is involved in a romantic or marital relationship or a relationship that is typically considered familial. These occurrences are differentiated based on the specific familial connection, such as intimate partner homicide-suicide, filicide, familicide, and parricide.
Epidemiological investigations offer valuable perspectives for analyzing this phenomenon. By providing diverse insights, such studies contribute significantly to understanding its complexities. The objective of the present study is to compare intrafamilial homicide-suicide (H-S) cases involving female victims with instances of female homicide in Italy between 2021 and 2023.

MATERIALS AND METHODS: A thorough examination of newspaper reports from January 1, 2021, to December 31, 2023, was conducted. Various Italian search terms were utilized to gather data concerning the victim (age, sex, presence of chronic disease), the perpetrator (age, sex, suicide, attempted suicide), and contextual details (date, place of occurrence, time, methods, relationship with the victim, previous episode of aggression toward the victim, hypothesized motive) for each incident. The authors carefully scrutinized the information provided in the articles for coherence and precision. Additionally, a subset of the collected variables underwent validation by consulting the website maintained by the Italian Interior Minister, which monitors data related to female homicides. Subsequently, a descriptive statistical analysis was performed.

RESULTS: During the specified timeframe, Italy experienced 370 instances of female homicide. Among these cases, 109 incidents (representing 29.45% of the total) involved homicide-suicides with females as victims. A comparison between homicide-suicides (Group 1) and other female homicides (Group 2) revealed significant differences across several variables. These differences encompassed the presence of an intimate partner relationship ($p<0.001$), the utilization of sharp force injuries ($p=0.009$), the use of firearms ($p<0.001$), the existence of chronic diseases in female victims ($p<0.001$), and the age of the perpetrator ($p<0.001$). Furthermore, employing a model incorporating independent variables such as intimate partner relationship, use of sharp objects or firearms, presence of chronic disease, and perpetrator age, certain risk factors for membership in Group 1 were identified. Specifically, having an intimate partner relationship ($p=0.009$, OR 2.004 CI [1.185-3.387]), using a firearm ($p<0.001$, OR 5.43, CI [3.11-9.47]), and the presence of a chronic disease ($p=0.003$, OR 2.78, CI [1.40-5.53]) were identified as significant risk factors.

CONCLUSIONS: The high prevalence of homicide-suicide (H-S) incidents in the Italian context underscores the need for a multifaceted approach to analyzing female homicide from a preventive standpoint. The factors associated with this phenomenon suggest, on one hand, a specific subtype of H-S known as "mercy killing," and on the other hand, the prominence of a particular method of homicide, namely firearms. These factors could be relevant from a preventive point of view.

OC18-2

WITHDRAWN

OC18-3

WITHDRAWN

OC18-4

Differences between Migrant and Italian National Patients in an Italian Forensic Unit: A Retrospective Study

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According to Italian law, offenders declared NGRI (not guilty by reason of insanity) and socially dangerous are interned in REMS (Residences Execution Security Measures), forensic facilities that, since 2015, have replaced the OPG (Judicial Psychiatric Hospitals). The authors analysed a sample of migrants (134 males and 50 females) from 44 different countries. These individuals were hospitalised from January 2010 to December 2019 in the REMS of Castiglione delle Stiviere, the largest forensic unit in Italy. This study aims to describe the clinical, criminological and legal characteristics of migrant patients, an area that had not been previously explored in Italian research.

The sample was then compared with a group of Italian patients, matched by age, legal status and type of crime to analyze any differences. The results showed that, among male migrants, psychotic disorders were diagnosed more frequently, while personality disorders were less common compared to Italian hospitalized patients. This difference was statistically significant between the two groups (p=0.04). Interestingly, no such diagnostic difference was found among migrant women. Additionally, differences emerged on the discharge methods of the two groups: in Italian patients, probation and revocation of the security measure are more frequent, whereas for migrant patients, repatriation to their country represented the only discharge method.

This data is fundamental for improving care and evaluation of this cluster of patients. Future research should contribute to clarify whether discrepancies accurately reflect population differences or instead represent artifacts of the imperfect ratings. Psychiatric rating scales often do not take into account the ethnicity to which the patients are administered, altering the final score. In both cases, greater consideration should be given to the inner differences between patients. Looking ahead, the hope is to promote more extensive consideration of ethnopsychiatry in clinics and forensic structures, a field that is not widely spread in Italy.

OC18-5

Kleptomania Unveiled: Forensic Psychiatry Insights into Covert Impulses and Obsessive-Compulsive Disorder

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INTRODUCTION AND OBJECTIVE: This abstract examines two anonymous examples of persons with Kleptomania and concurrent Obsessive-Compulsive Disorder (OCD), investigating the complex relationship between mental disorders and criminal behavior. The aim is to highlight the intricacies of forensic psychiatry evaluations, analyzing the influence of mental health on legal responsibility.

CASE 1: Patient A

Patient A stole a fancy bag which she stated “only a sex worker would have” and have not ever used it. She has been afflicted with a severe and refractory variant of Obsessive-Compulsive Disorder (OCD) from childhood, exacerbated by a persistent atypical dissociative disorder. Despite experiencing significant financial losses and undergoing intense therapies, Patient A continued to engage in compulsive shopping and hoarding habits. The individuals' activities were driven by an "inner voice" that exhibited both obsessive and dissociative traits, temporarily overshadowing the awareness of the potential outcomes. Significantly, her ability to be aware and make decisions was impaired as a result of their psychiatric status during the stealing incident on a certain date. It was determined that Patient A was not legally accountable for the theft due to the temporary worsening of their mental condition, which was made worse by stopping their medicine.

CASE 2: Patient B

Despite Patient B’s affluent socioeconomic status, the subject engaged in the unauthorized acquisition of three coats, juxtaposed against a backdrop of substantial credit card expenditures on other opulent acquisitions. The thorough medical history and examination conducted at Anonymized University Hospital determined that their activities did not fit the criteria for ordinary theft. In contrast to the findings of another institute's forensic report, which stated that there were no mental disorders that would impact their legal responsibility, a comprehensive assessment that took into account medical records, consultations with psychiatrists, and information from their family revealed their underlying condition of Kleptomania and related psychiatric illnesses. As a result, it was determined that although Patient B had the mental capacity to understand the legal consequences of their activities, their reduced ability to regulate their behavior released them from criminal liability on a specific day. The recommendation emphasized the need for vigilant oversight at a psychiatric clinic.

DISCUSSION AND CONCLUSION: These cases highlight the intricate connection between mental health and criminal liability. The intersection of Kleptomania and Obsessive-Compulsive Disorder necessitates a comprehensive comprehension of the complex layers of psychiatric disorders. The acquittal of both individuals underscores the need of expert psychiatric evaluations within the legal framework, acknowledging the influence of mental diseases on persons' capacity to regulate their behavior and exercise informed judgment. The case seeks to foster dialogues regarding the enhancement of forensic psychiatric assessments and the incorporation of mental health considerations into legal frameworks.

KEYWORDS: criminal liability, kleptomania, obsessive compulsive

Oral Communications 19: Forensic Pathology VIII

OC19-1

The Consequences of Inadequate Medicolegal Examination of Crime Scenes: Implications for Justice and Forensic Integrity

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The medicolegal examination of crime scenes stands as a cornerstone in the pursuit of justice, aiming to unravel the truth behind criminal incidents. However, instances of insufficient or lackluster medicolegal examinations can have far-reaching consequences. This abstract explores the impact of inadequate crime scene investigations on legal proceedings, forensic integrity, and the reliability of justice systems.

The presentation addresses the potential consequences of inadequate crime scene documentation and evidence collection. A lack of thoroughness in these crucial initial steps can compromise the integrity of forensic findings, hindering the accurate reconstruction of events and affecting the credibility of legal proceedings. The abstract emphasizes the importance of standardized protocols to mitigate these risks.

The second part explores the broader societal impact of deficient medicolegal examinations. Public trust in the justice system may be eroded when investigations are perceived as incomplete or unreliable. The abstract underscores the role of transparency, accountability, and adherence to ethical standards in restoring and maintaining public confidence.

The presentation concludes by advocating for the improvement of training, resources, and interdisciplinary collaboration in the field of medicolegal investigations. It emphasizes the need for ongoing advancements in forensic science and technology to address challenges and enhance the rigor of crime scene examinations. Ultimately, the abstract calls for a collective commitment to ensuring that medicolegal examinations consistently meet the high standards necessary for the fair administration of justice.

KEYWORDS: Medicolegal examination, crime scene, forensic integrity, justice, evidence collection, forensic pathology, public trust, legal proceedings.

OC19-2

Evaluation of Postmortem Histopathological Changes in Dental Pulp of Rats After Drowning in Water

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The aim of our study was to demonstrate the histopathological changes in the dental pulp of rats drowned in water. In our study, 48 rats, 8 rats in each group, were used. The death of the rats in the control group was performed with high dose anaesthesia. The remaining groups except the control group were placed in containers filled with water after dissociative anaesthesia. The rats that died due to drowning were dissected after 0, 6, 12, 18 and 24 hours, respectively. In all groups, samples taken from both lung tissues were stained with H&E and analysed for findings supporting drowning. After decalcification, molar tooth samples of rats were stained with H&E stain and examined under light microscope. Pulpal stromal oedema, stoplasmic enlargement, vascular enlargement, perivascular oedema, and separation of odontoblast cell group from dentin layer were evaluated in 4 grades. Chi-Square test was used for comparison between groups. P values less than 0.05 were considered statistically significant. In our study, statistically significant differences were found between the control group and Group 2 (PM 0th hour) in some of the parameters we evaluated. Between Group 2 and some groups kept in water at different time intervals; statistically significant parameters were observed. It is seen that the changes in the dental pulp are promising to support the diagnosis of drowning. It is thought that it will be useful to be supported by other studies to be carried out in the future.

SUPPORTING INSTITUTIONS: Tokat Gaziosmanpaşa University Scientific Research Projects Commission

KEYWORDS: drowning, dental pulp, forensic dentistry

OC19-3

Challenging Forensic Clues in the Sudden Death of a Young Woman: A Case Report

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Sudden death (SD) is defined as the unexpected death of a healthy person that occurs within the first hour after the onset of symptoms or, if death is not witnessed, within 24 hours after the victim was last seen alive. Approximately 80% of SDs are of cardiac origin and are referred to as sudden cardiac deaths (SCDs). In people under 35 years of age, the main causes of SCD are inherited arrhythmogenic syndromes (IAS), myocarditis, and some coronary artery anomalies. When a comprehensive case investigation (including toxicological and histopathological analyses) is negative or inconclusive, "molecular autopsy", also called post-mortem genetic testing, allows the identification of a pathogenic genetic alteration that explain the death in about 20% of cases.

In this presentation we report the case of a 21-year-old woman who suddenly lost consciousness while with a friend. Toxicological tests were conducted upon hospital admission, and the results returned negative. Despite resuscitation maneuvers, the woman was pronounced dead 60 minutes later. At the clinical autopsy, performed to determine the cause of death, no significant findings were detected on gross examination. The histopathological examination of the cardiac conduction system (CCS) identified an eosinophilic infiltration and interstitial fibrosis of the sino-atrial node (SAN), the functional significance of which was uncertain. Molecular autopsy identified a rare intronic variant c.683+5G>A in the KCNQ1 gene that was classified as likely pathogenic (LP) according to standards and guidelines for the interpretation of sequence variants from the American College of Medical Genetics and Genomics (ACMG) and the Association for Molecular Pathology (AMP). This variant had been previously reported in more than ten people with long QT syndrome (LQTS). Therefore, we assume that histopathological alterations in the SAN may have triggered a fatal arrhythmia in a genetically predisposed heart. This case shows how molecular autopsy is a diagnostic tool that may help provide the forensic pathologist with an explanation for sudden death, especially when atypical findings of uncertain significance are detected during conventional autopsy.

OC19-4

Forensic Analysis of the Mechanisms of Death Used in Women Homicide by their Men Partner or Ex-Partner (Femicides) Committed in Spain since 1997 to 2021: Killing and "Overkilling"

Miguel Lorente-Acosta, María Cuadros, Miguel Lorente-Martínez, Belen Motalban, Manuel Lorente-Martinez
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The results of killing and the way murders are committed are consequence of the motivations and goals pursued by the perpetrator, however, most of crime classifications focus on circumstances related to the victim, context, instrumental reasons, perpetrator features… elements that are necessary, but they also hide the real meaning of violences that share some contextual factors and elements. Violence against women (VAW) has different features regarding to the rest of interpersonal violences. It is a "moral violence" (not "instrumental") used by men against women, especially in the context of an intimate partner relationship, with its motivations rooted on cultural references, and with the main goal of controlling women within the relationship. The term "overkill" is reported only in a few articles and textbooks in forensic literature (B. Solarino et al, 2019). It is referred as the infliction of massive injuries by far exceeding the extent necessary to kill the victim (JE. Douglas et al, 1992). Recent studies emphasize that the way to approach "overkill" must consider other references and should include the number of injuries, their distribution, morphology and the weapon and modus operandi used to kill the victim. We studied all the Intimate Partner Violence (IPV) women homicides Judicial Sentences from Spanish Courts, and analysed the different modus operandi used and "overkilling" along these years (1997 to 2021). Under the indicators used we get different significant conclusions for Forensic Sciences and other disciplines related to the assistance, prevention, evaluation, protection, and investigation of VAW:

- There is not a constant neither common pattern in the mechanisms of death used by men to kill their partner or ex-partner. There are 9 different mechanisms used in the crimes during this period.
- The most common mechanism of death is stabbing (41,1%), the second one beating (14,1%). Mechanics asphyxia with its different procedures represents 8,7%, and firearms 5,6%
- The degree of violence used has increase through with time, and it is higher during the recent years. Regarding to "overkilling" some of the results we found:
  - 65,1% of all VAW murders are within the concept of "overkill".
  - Most frequent mechanism of death used are stabbing and beating, representing 35,9% of all "overkill" murders.
  - Within stabbing cases, 73,4% were "overkill".
  - Within beating cases, 47,5% were "overkill".
  - Mixed mechanisms of death were used in 26,7%

These results show that "overkill" in VAW homicides based only in the number of injuries and mechanisms used represent 62,2% of all cases, although there are other elements to be considered. It proves the especial circumstances around this violence and the high degree of violence used by men to kill women in the intimate partner context.

OC19-5

Analysis of Homicides of Sons and Daughters under 12 Years (Filicides) Committed in Spain (2002-2021): Criminological, Medico-Legal Elements and Health, Social and Legal Consequences

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Filicide is defined as the murder of a child by a parent. Currently there is no clear and objective description of this term, it is described in different ways, and it is usually present in cases of gender violence and domestic violence. The current literature often uses different nomenclature and classifications, and there is no common framework to advance in research.

The present study aims to give visibility to this topic, trying to analyze the criminological, medical-legal elements and the legal, health and social consequences. To this end, we analyze the filicides' judicial sentences from Spanish Courts since 2002 to 2021.

Preliminary results show the presence of interesting elements that help to understand the circumstances around these crimes and changing the stereotypes about this violence. Some of these elements are:

- Most perpetrators are mothers: 66,7% mothers and 33,3% fathers.
- Most mothers act under some kind of mental disorders: 76,5% were diagnosed of mental disorder or triggering situations (postpartum, VAW victims...).
- In case of male offenders, the presence of mental illness is practically nil.
- Considering only cases without any mental disorder neither toxic substances, father perpetrators represent 66,7% and mothers 33,3%.
- When both parents are condemned, mothers do not participate in the aggression and homicide, but they are condemned due to their passivity to avoid the crime.

The data show that mothers and fathers kill their sons and daughter under different circumstances: Mothers mainly do in a context of mental disorder, while fathers do in a context of VAW. These elements must be considered to prevent this violence and crimes.

The presence of abuse, gender violence and other situations such as economic and social status is also studied to establish relationships that can help define and establish criteria to prevent filicides.

Oral Communications 20: Forensic Medicine III

OC20-1

WITHDRAWN

OC20-2

Facilitation of Sexual Abuse via Social Media: A Two-Case Presentation

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INTRODUCTION AND OBJECTIVE: In today's world, social media platforms such as Facebook, YouTube, Instagram, and Twitter have evolved into tools that can facilitate sexual assaults. The role of media in facilitating sexual assault is closely linked to the content of visual, written, and digital media. This influence can be seen in a total of 14 articles in PubMed and Google Scholar published from 1996 to 2022. A 14-year retrospective analysis conducted by the Victorian Forensic Pediatric Medical Service (VFPMS) reveals an increase in sexual assault cases through technology and media over the years, with technology-supported sexual assaults rising from 4% in 2007-2013 to 14% in 2014-2020. Nearly one-fifth of reported sexual assault cases among young people in 2019 and 2020 were technology-supported. And this presentation aims to build up on these literature by investigating the impact of media on sexual assaults, raise awareness in this field, and encourage further research. Emphasizing the role of media in this process, particularly the facilitative effects of social media and mass communication tools on sexual assault, is a crucial objective. As facilitated sexual assaults through social media begin to influence traditional patterns, it is essential to address this phenomenon.

CASES: Firstly, a white-collar woman, through the Instagram platform, decides to meet with an unidentified man who pressures her through coercion. Meeting in an unconventional setting, individuals residing in different cities, she becomes a victim of sexual violence after being exposed to sedatives and narcotics. She was later hospitalized while unconscious and diagnosed with intracranial hemorrhage, then she remains in a prolonged coma. Due to this situation, the allegations and consequently the investigation into the incident is significantly delayed. Secondly, a woman pursuing a high-level academic career decides to meet someone she believes to be safe through social media, within the framework of a social gathering. Falling into a trap set at the scene, she experiences multiple sexual assaults. Severe psychological trauma symptoms are observed after the incident.

DISCUSSION AND CONCLUSION: Two culturally diverse individuals can meet on social media with inaccurate information. Shared photos, personal details, and emotional closeness make the victim more open to the idea of meeting someone they don't know. In both cases, the common factor is that while social media can bring people together, it simultaneously increases the risk of sexual assault. Technology-facilitated assaults correlate with increased sexually transmitted diseases, the risk of multiple perpetrators, and severe post-incident health problems. Detecting and proving these cases pose specific challenges. Forensic science experts may need to establish new protocols for identifying these cases and documenting the crime. This research calls for increased attention to the intersection of technology, media, and sexual assaults to develop effective preventive and investigative measures.

OC20-3

Application of Advanced Medical Thermography in Minor Cervical Spinal Trauma

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Currently, the health sector is increasingly demanding new techniques that allow objective study of the pain reported by those injured in traffic accidents diagnosed with cervical sprain grades I and II, in minor spinal column trauma.

For this purpose, a research project has been designed to assess the behaviour of acute muscular injuries in a cohort of Thermographies carried out with the new high resolution and definition cameras. Medical Infrared Thermography (TIR) is a scientifically proven and contrasted technique in different fields of medicine over time, but at the present time, thanks to the immense technological development of engineering of the new Advanced Thermography cameras and sophisticated specific software developed for studies on the human body, it is possible to carry out complementary Advanced Medical Thermography tests to determine acute muscle-tendon injuries at the cervical spine level.

Many studies have been published, but the lack of references and scientific publications on thermography for the traffic accident sector is

striking. The present study has focused on validating Advanced Medical IRR as a useful and effective complementary test to determine acute processes in grade I and II trauma in cervical sprain after a traffic accident, and SMQ (patient clinical follow-up data) as quantitative data when assessing medical examinations in the consultation room. Advanced Medical IRR is a diagnostic method indicated to show physiological and metabolic processes involved in the acute inflammatory process at a muscular level, by revealing the combined effect of the autonomic nervous system and the vascular system on surface body temperature, as well as the monitoring of these processes.

This important technological development applied to the new thermographic cameras allows us to digitise, visualise and quantitatively and qualitatively assess the thermal differences between two contralateral and homologous areas. We call this temperature difference or thermal gradient obtained Δ-T®.The analysis of the results obtained allows us to affirm that the application of ADVANCED MEDICAL TIR and the measurement of the thermograms obtained by specific software for humans, provides us with a high negative predictive value that will allow follow-up doctors, together with their clinical examination, to make objective medical decisions regarding whether or not to continue physiotherapy treatment until the injury is cured or stabilised in patients diagnosed with Cervical Trauma I and II secondary to traffic accidents.

In other fields of medicine, such as forensic, labour or sports medicine, Advanced Medical Thermography is extremely useful in determining the evolutionary phases of an injury, stabilisation of acute processes and identification of chronic processes.

OC20-4

Advanced Medical Thermography. A New Milestone in the Assessment of Bodily Injury

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Medical thermography is a non-invasive, radiation-free and therefore harmless complementary test capable of detecting temperature changes in the human body. Its analysis and measurement makes it possible to detect pathophysiological alterations (vasodilatation and inflammation, caused by the release of different substances such as nitric oxide or substance P, in response to painful stimuli), identifying the areas affected by abnormal processes. Thermography has also been influenced by the continuous technological advances. New thermographic cameras with much higher resolution and precision, more subtle temperature detection sensors, much more powerful image processing systems, artificial intelligence algorithms that improve the quality of the images and the precision of the measurements, together with the use of sophisticated specific software developed for studies on the human body, allow us to advance that there is a new complementary test, Advanced Medical Thermography.

Performed by accredited technical personnel, it requires specific preparation of the laboratory and the patient, a specific execution protocol according to the muscle group and analysis of the images with specific software for humans.

Its simple application and harmlessness for the injured person allows thermography to monitor evolutionary processes with unlimited repeatability, detecting temperature changes on the surface of the skin caused by physiological dysfunction of the underlying musculature. Advanced Medical Thermography provides reliable data on the clinical situation of the pain reported by the patient both at the beginning and during its evolution after treatment. Gestimédica, Path System and the Area of Legal Medicine of the Department of Health Sciences of the University of Jaén have designed a research study to determine the parameters of normality and abnormality in both healthy subjects and in patients who suffered injuries due to traffic accidents, all of them with and without pathological antecedents, especially of a degenerative type.

Its application as a complementary medical test in the field of forensic expertise is multiple and of enormous value. It can be used in clinical procedures to evaluate acute inflammatory processes in real time, to identify alterations at a muscular level or to determine whether or not there is an acute lesion at the time the test is carried out. And all this, in some patients whose only symptom is the manifestation of pain. For all these reasons, it is an objective complementary test that makes it easier for healthcare doctors to control the evolution and treatment of muscle injuries and discharge due to healing or stabilisation of the injury.

In the expert field, we consider the ADVANCED MEDICAL TIR to be a test that will substantially change the way of evaluating and assessing the healing and injury stabilisation times in muscle injuries, which is why it is a milestone in the world of personal injury assessment.

OC20-5

Application of Bispectral Index Monitor in Narcoanalysis

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Narcoanalysis, a crucial technique of deception detection methods, plays a significant role in crime investigation. The primary challenge in narcoanalysis lies in maintaining a delicate balance of semi-consciousness, ensuring that the subject remains neither entirely unresponsive in deep sleep nor excessively awake to fabricate falsehoods. Traditional methods of assessing consciousness involve subjective clinical observations, such as responses to verbal commands, heart rate, and respiratory rate, which are susceptible to misinterpretation.

While the literature on the application of an Electroencephalogram (EEG) based Bispectral Index (BIS) monitor in narcoanalysis could not be found. A multicentric, double-blind, prospective randomized study has demonstrated its statistical advantage and significance in surgical settings (p value = 0.022). Leveraging this insight, we employed a BIS monitor in two narcoanalysis cases, establishing a BIS score of around 75 as appropriate for this purpose.

This utilization of the BIS monitor in narcoanalysis offers a more objective and precise method for assessing the subject's level of consciousness, moving beyond the limitations of traditional clinical observations. The incorporation of this technology enhances the reliability and accuracy of narcoanalysis, contributing to its efficacy in criminal investigations.

OC20-6

Istanbul Protocol Documentation Form for Police Detention Isolators in Georgia

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Istanbul Protocol implementation requires multi-dimensional activities both in medical and legal fields. Of most importance are the changes in methodology of effective medical documentation in different medical settings, including civil and parallel healthcare systems. Police detention isolators have special challenges in medical documentation and thus implementation of Istanbul Protocol standards of effective medical documentation has a special value in this system. Of special interest is examination and documentation of injuries of detained individuals that must be prompt and thorough.

As part of the Istanbul Protocol implementation activities in Georgia, the special documentation form for police isolators was introduced. The drafts of the short documentation forms according to the Istanbul Protocol were provided by PHR and used as templates to create the Georgian form for police isolators.

The form is reflecting all principles of effectiveness of medical documentation according to the Istanbul Protocol and follows the

structure of Annex IV of IP. It contains sections for general information about the case, relevant medical history, allegations of abuse, physical symptoms and/or disabilities related to alleged abuse, psychological symptoms related to alleged abuse, examination of physical evidence, assessment of medical problems and plan, assessment of alleged abuse with overall conclusion on degrees of consistency.

The form starts with short reminder to the doctor about the methodology, referral pathways for the patient and information, legal obligations in case of false information and obligation for informed consent obtaining. The informed consent is specially addressed as medical units of police isolators may have challenges with consent obtaining from the patient. The content of informed consent is structured in detail, including information about referrals and basic procedural safeguards for the patient. The special consent is obtained for photography of injuries. The reason for requesting medical evaluation is specially emphasized as, besides of routine medical checking at the admission and discharging the detainee from the isolator, other possible reasons may exist like medical complains, accidents, alleged abuse, etc. The prompt medical examinations will reveal the moments of new injuries development and help investigation to relate them to the human rights violations.

The special table was developed for description of injuries and marking them on the body diagrams. The detailed criteria for injury description are placed in the table, together with the alleged method of infliction. The criteria for description include location, form, sizes, direction, color, surface, surrounding tissues and other. Each physical finding related to the alleged method of injury must be assessed with degrees of consistency according to the Istanbul Protocol, and at the end the overall conclusion based on qualification, knowledge and experience of medical doctor must be placed using same degrees of consistency.

Oral Communications 21: Forensic Odontology

OC21-1

Advancements and Challenges: A Critical Review of Artificial Intelligence Applications in Craniofacial Reconstruction for Forensic Identification in India

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This review critically examines the application of artificial intelligence (AI) in craniofacial reconstruction within the forensic context in India. Over recent years, AI has emerged as a transformative technological tool in forensic odontology, particularly in the field of craniofacial identification. This review focuses on the specific landscape of AI-driven craniofacial reconstruction in India, addressing both advancements and challenges.

The literature reviewed encompasses studies that utilize AI-based models for facial reconstruction and recognition, with a primary emphasis on their application in forensic cranial facial reconstruction (CFR). CFR serves as a crucial method for identifying unidentified corpses, skeletal remains, and criminal suspects by approximating facial features from skull structures. The integration of machine learning and deep learning techniques, leveraging patient diagnostic images such as OPG, CBCT, MRI, and cephalometric radiographs, is explored in the context of personal identification, age estimation, and sex determination.

Four distinct methods for achieving CFR scientifically, relying on soft tissue thickness measurements, are discussed. Additionally, the review sheds light on the limited exploration of AI applications in forensic odontology in India, with a notable scarcity of research in this specific field. Two studies conducted in 2020 are highlighted, one addressing automatic Craniofacial superimposition and the other employing a 3D face reconstruction technique integrated into a sequential deep learning-based framework for face recognition.

The presentation aims to provide a comprehensive overview of the scope of CFR in India, considering both its potential and current limitations. Specific attention is given to the software and datasets accessible for CFR, including widely used tools such as Blender, Daz Studio, Autodesk 3ds Max, Maya, Reallusion, and repositories like FaceScape and FaceWarehouse.

The review concludes by identifying future prospects and challenges for AI-driven craniofacial reconstruction in India. It emphasizes the need for increased research efforts, collaborative initiatives, and the development of tailored solutions to address the unique forensic landscape of the country. Overall, this review contributes to the understanding of the current state and potential advancements in AI applications for craniofacial reconstruction within the Indian forensic context.

OC21-2

Bitemark Analysis by 3D Scanner: Experimental Study on Human Skin

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INTRODUCTION: Bitemarks may be related to defensive injuries, offensive injuries and even to self-harm injuries. Bitemarks are deemed unequivocal characters, being useful in identifying the possible perpetrator of a crime. To date, the standard for the detection of three-dimensional marks on the skin left by a bitemark is the analysis of the negative cast of self-hardening plastic. However, as demonstrated though a recent pilot study performed on wax, the bitemark's three-dimensional features are also detectable with a 3D scanner.

AIM: The aim of this study, performed on bitemarks experimentally produced on human skin was:

- to test the suitably of a 3D intraoral scanner to acquire a three-dimensional scan of a bitemark produced on human skin by plaster models of human dentition;
- to test the accuracy of this method by comparing three-dimensional scans of bitemarks produced on human skin with three-dimensional scans of plaster models.

MATERIAL AND METHODS: Human skin (with subcutaneous layers) was obtained from amputated legs donated for scientific purposes. Bitemarks were produced applying a constant weight (55 kg) to plaster models of human dentition on skin for 10 seconds. Both plaster models and bitemarks were individually scanned with the iTero® 3D scanner. Further scans were made after the removal of the stratum corneum and after 24 hours. All the scans were reworked with MeshMixer® software. A visual analysis of the characteristics and a computerized analysis with the CloudCompare software were also performed. Each bitemark 3D scan was compared with the 3D scan of the related human dentitions and to another dentition randomly selected from the study sample. Statistical analyses were finally performed.

RESULTS: The software analysis showed a different trend of the distribution curves of the points which were obtained comparing the human dentition and coincident and non-coincident bitemarks, allowing a clear association between each bitemark experimentally produced on human skin to the related human dentition. Results were even better on skin after the removal of the stratum corneum, as the 3D scan of dermis allowed an even more accurate three-dimensional reconstruction of bitemarks. At the 24-hours-later scan, more than half of the teeth were still evident and therefore scanned, allowing an association between each bitemark experimentally produced on human skin to the related plaster dentition under our experimental conditions.

CONCLUSIONS: Current results support that the intraoral 3D scanner allows the fast record and the preservation of the three-dimensional characteristics of the bitemarks on human skin, allowing the identification of the producing human dentition even hours after trauma.

OC21-3

Dental Implants as Forensic Evidence: Enhancing Precision in Identification Procedures

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INTRODUCTION: Dental implants have become a prevalent solution in restorative dentistry, offering a means to replace missing teeth or entire edentulous jaws through the process of osseointegration. This practice has witnessed a surge in popularity due to its predictable surgical outcomes and cost-effectiveness, making it accessible to a broader patient base. Consequently, the increased prevalence of dental implants in the general population raises the likelihood of their presence in deceased individuals, prompting the need for their identification in postmortem and antemortem radiographs. In forensic dentistry, dental implants serve as potent and concrete elements of evidence, playing a crucial role in the identification of human remains.

OBJECTIVE: The objective of this project is to underline the importance of dental implants as forensic evidence in enhancing human identification procedures, through the review of the international literature.

MATERIALS AND METHODS: This review includes articles published from 2008 to 2023, sourced from PubMed and the Cochrane Library databases. The keywords guiding our search were dental implants, human identification, and dental imaging in all possible combinations.

RESULTS: Dental implants withstand extreme circumstances of mass disasters as they resist mechanical and thermal insults. In cases of severe incineration, dental implants' bodies and abutments may be the only dental remains as titanium have a high melting point.
There is a plethora of dental implant systems, manufactured to achieve anatomical and aesthetic demands of each clinical case.
The evaluation of morphological characteristics of dental implants in the deceased as well as their location related to anatomical landmarks is based on radiographic imaging (MDCT, CBCT, panoramic, intraoral X-rays). Additionally, the physical removal of the dental implants for direct measurement and visual analysis will narrow the search to a smaller group increasing the chance for a positive identification.

CONCLUSION: Recent advances such as implant recognition softwares (IRS), radiographic assessment of dental implants location and recognition of batch numbers greatly assist forensic odontologists in identifying victims through correlation and comparison of post-mortem and ante-mortem records. Therefore, it is of paramount importance to educate clinical practitioners in the accurate and detailed process of dental implants documentation.

OC21-4

Gender Determination Based on Lateral Cephalometric Analysis in a Greek Sample

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INTRODUCTION: Forensic Odontology is the field of odontology that among others contributes to the process of human identification of both living and dead individuals. Research involving the skull has enabled accurate gender estimation, which is as precise as 94%. This has generated considerable interest in the forensic field, particularly since the skull may be the only human remain available for analysis. Cephalometric radiographs gender prediction accuracy rate has been reported between 82.4% and 86.66%.

OBJECTIVE: The objective of this study was to investigate whether linear, angular, and area measurements derived from lateral cephalometric radiographs can be served as an additional method for determining gender in a sample of Greek population.

MATERIAL AND METHODS: The study sample comprised digital lateral cephalometric radiographs from 400 Greek individuals who sought orthodontic treatment at the Department of Orthodontics, School of Dentistry, NKUA. Patient records were screened based on eligibility criteria for inclusion in the study. The sample was categorized by gender and age, with age intervals of ten years. An equal number of lateral cephalometric radiographs for males and females distributed within each age group. Eight cephalometric points visible on lateral cephalometric radiographs were traced using ViewBox software, including glabella, orbitale, sella, basion, porion, nasion, anterior nasal spine, and posterior nasal spine.

RESULTS: Examiner calibration results, as indicated by the Intraclass Correlation Coefficient (ICC), were above 0.9 in intra-examiner analysis and 0.8 in inter-examiner analysis. A cross-sectional study using a binary logistic regression model was conducted. In the training sample, gender was estimated with accuracy up to 85 %. In the test sample (20% of the sample, 80 lateral radiographs), the binary logistic regression model revealed accuracy of 88 %.

CONCLUSIONS: Cephalometric analysis using radiographs for gender estimation could be useful as a complementary method to other sex estimation approaches and may serve as a reliable gender predictor in the Greek population, particularly when alternative techniques cannot be used to estimate gender.

OC21-5

Post-Mortem Changes in Dental Pulps: Mutations and Histological Alteration as Measures for Post-Mortem Interval (PMI) Estimation

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BACKGROUND: A reliable estimation of the post-mortem interval (PMI) is a pivotal step in criminal investigations. One of the crucial limitations of classic technique ("compound method" and entomology) is the impossible application for estimating the late PMI (>10 days). Alternative methods are focused on post-mortem biochemical or histological changes. One of the most stable matrices for estimating the time elapsed since death from early to late PMIs seems to be dental pulp, which is protected from damaging factors by the hard tissues of the tooth. Despite having great resistance, teeth undergo morphological, histological, and biochemical changes due to physical-chemical factors related to the absence of blood circulation and regulatory mechanisms, prolonged ischemia, and then post-mortem processes.

SCOPE: The study aims to develop two different lines of research on post-mortem pulp changes: genetic and histological.

MATERIALS AND METHODS: In a previous pilot study, the authors developed a new method for post-mortem interval estimation based on the analysis of post-mortem dental DNA with the Next-Generation sequencing technique (NGS). Preliminary results highlighted the

occurrence of post-mortem mutations in the DNA of dental pulps from extracted teeth (time of death) in relation to the time elapsed since death (PMI), suggesting a promising data source for early and late PMIs estimation (from 0 to 34 days) for forensic purposes. A second phase of validation is underway: the aim is to compare teeth from different subjects at the same PMI to verify the presence of the same mutations, and different teeth from the same subject analyzed at different PMIs to verify if the mutations detected are actually acquired with the time elapsed since death and therefore indicative and applicable in PMI estimation. At the same time, a histological study on dental pulps with PM intervals from baseline up to 1 month is underway to create a more complete knowledge of the post-mortal pulp. All the pulps are stained with classic stains (hematoxylin and eosin) and with targeted stains for some types of tissue (e.g. "Red Oil O" for adipose tissue). Qualitative assessments are conducted describing the dilatation of the capillaries, homogenization of the collagen fibers, and morphology of the nuclei and cytoplasm of cells. Quantitative evaluations are instead conducted calculating the cell density with the mean of 3 different ROIs (Region Of Interest) of the histological image which include the odontoblastic layer and areas rich in cells. The aim is to verify whether there is a linear decrease in cell density that can be correlated with the PMI.

RESULTS: The results obtained will implement the innovative research lines for PMI estimation using the NGS technique and histological modification on post-mortem dental pulps.

OC21-6

Teeth as an Alternative Matrix in Forensic Toxicology: A Pilot Study

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BACKGROUND: Alternative matrices for forensic toxicology represent an area of great interest especially when dealing with dead bodies for which classical matrices are no longer available or extremely compromised to be admissible in an evaluation of criminal interest (e.g. skeletonized, exhumed carpus, charred, …). Previous literature demonstrates the presence of substances of abuse in teeth but does not provide information on the pharmacokinetics of substances and on the mechanism and site of incorporation of xenobiotics into dental tissues. Teeth seem to be applicable as an alternative matrix in post-mortem toxicology since they are highly resistant, available, and stable after death, and dental enamel, dentine, or pulp could disclose both acute or chronic drug assumptions, given the different tissues' constitutions.

SCOPE: This pilot research aims to investigate whether in the pulp can be detected the same substances found in blood in drug-related death cases. Secondly, the study aims to disclose possible deposited drugs in the hard tissues of the tooth (dentine and/or enamel), and the related degrees of accumulation in different dental tissues, thus contributing to reconstruct the drug abuse history (timing, e.g.). Finally, the study investigates the permeability of the enamel to substances typically taken orally (e.g. methadone).

MATERIALS AND METHODS: The study develops two different protocols. Phase I consists of a study in vivo collecting 10 teeth during autopsies of drug-related deaths along with blood and hair samples for classic toxicological analyses. Phase II consists of an in vitro study collecting 18 drug-free teeth and creating 6 different enamel contamination groups using three different dental conditions (intact enamel, worn enamel, and CEJ exposure), three different substances (methadone in sugar syrup, dextromethorphan in sugar syrup, and dextromethorphan in drops without sugar), and two different salivary conditions (neutral and acidic).To analyse the different dental tissues with classic toxicological analyses, a novel method to separately sample coronal enamel, peripheral (primary) and inner (secondary) dentin, root dentine, and pulp tissues by pulverization was developed and applied. Each dental tissue was extracted with acid for cocaine or opiates and metabolites and analysed by gas chromatography (GC) and/or liquid chromatography with high-resolution mass spectrometry (HR-MS). Results: Preliminary results demonstrated that teeth are different from any other classic matrix (blood and hairs) and the innovative methods for dental tissues' separation are absolutely promising for studying the different accumulation of substances in teeth. The qualitative correlation in detecting substances between pulp/blood and dental hard tissues/hair suggests that they can be useful in post-mortem evaluation for both acute and chronic assumptions of drugs. The most significant result is that the mechanism of accumulation of substances in mineralized tissues seems to be influenced by the type of molecule and the method of assumption.

Oral Communications 22: Forensic Psychiatry II

OC22-1

A Hoarder or a Collector: A Challenging Case Imprisoned-To-Be for His Treasure

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INTRODUCTION AND OBJECTIVE: This abstract explores a captivating case with a financially well-off middle-aged patient who is being accused of unlawfully importing alcoholic beverages. The main goal is to understand the psychological factors that lead to his unusual conduct, investigating the connection between mental disorders, criminal behavior, and a distinct compulsion-driven collection possibly affecting his criminal liability.

CASE: The patient in issue is wealthy, having made substantial investments in an exceptional collection displayed in his recently acquired two-story home just for his items. This varied collection includes a wide range of artifacts, such as beer bottles (empty or full), spirit bottles, mugs, dolls, cars, posters, gas masks, and many other limited-edition memorabilia. The patient justifies his activities by claiming that he was aiming to achieve a Guinness World Record for his unique collection, while being charged with the unlawful importation of alcoholic beverages. The evaluation indicates a complex and varied mental condition. The individual has a full-range orientation and cooperation, albeit a mild depression and limited affect. The patient did not mention any previous appointments to psychiatric facilities, but his health records reveal an obsessive-compulsive disorder diagnosis and treatment. The person's history comprises of incidents that could be interpreted as delusions. However, considering his document-confirmed occupation as a former Price Control Chief, these incidents could plausibly be actual occurrences, such as a bomb detonating in his vehicle after an alleged conflict confirmed by news according to the told timeline. The other claimed out-of-the-body experiences have sparked a comprehensive assessment of his mental well-being.

DISCUSSION AND CONCLUSION: This case highlights the complex interaction between forensic psychiatry and the legal system, exposing the difficulties in comprehending and dealing with mental health within a legal framework. The expert study indicated that the individual's behaviors of gathering of alcoholic beverages and other products were greatly influenced by the diagnosed Hoarding Disorder, Schizotypal Disorder. And it highlighted the need for a detailed treatment plan.
The patient's request for the restitution of confiscated belongings introduces a level of intricacy to the case, emphasizing the fragile equilibrium between legal fairness and intervention for mental well-being. It also showed that his hoarding behavior was not a mere stacking

action but a more sophisticated touch of a collector. Even if the diagnostic manuals made the Hoarding Disorder diagnosis an obligation, the delicacy of this collecting behavior is unique to the patient. In this manner, the schizotypal personality can be perceived as a mediator for his compulsions morphing into a collection by hoarding. Either he is a hoarder or a collector, the fact that his criminal liability is influenced for the unlawful import helped the court to decide on his clearance from the allegations.

OC22-2

Genetic Predisposition to Violent Behavior: Past Evidence and Future Perspectives

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Antisocial behavior has been hypothesized to result from a combination of social, toxicological, genetic, and environmental factors. Although some genetic variants have been reported to be associated with antisocial behavior, to date their role is still controversial. For this reason, we performed a Literature review to assess a possible association between genetic predisposition and the occurrence of violent/anti-social behavior, exploring its possible implications within the criminal justice system. Four main genes (i.e., MAOA, 5-HTT, COMT and DAT) were identified from our research. MAOA (also called "warrior gene") deactivates monoamine neurotransmitters and its low-activity 2- or 3-repeat variants, known as MAOA-L, are associated with impulsivity and criminal behavior (e.g., gang membership and weapon use). The serotoninergic system is crucial for emotional regulation: the polymorphisms of 5HTTLPR (coding for the serotonin transporter) and 5HTR2C (coding for a subtype of serotonin receptor) have been described as being involved in antisocial behavior. COMT is an enzyme of dopaminergic system, and its Val158Met polymorphism in at least one allele increases the risk of violent behavior in schizophrenic men by approximately 50%. Finally, the number of repeats in DAT1 (the gene for the dopamine transporter protein) has been associated with an increased risk of arrest, delinquent peer affiliation in adolescents, and alcohol use disorder. In addition, we describe two cases of violent crimes committed by young individuals carrying genetic variants associated with antisocial behaviors, both of whom claimed to be mentally ill at the time of the offense.

Therefore, we decided to go beyond this evidence and to perform a multicentric study at Università Cattolica del Sacro Cuore, in collaboration with Università degli Studi di Roma "La Sapienza" and Università degli Studi di Firenze, to investigate a possible statistically significant difference in the distribution of variants of genes associated with antisocial behavior between comparable groups with and without episodes of violent/impulsive behavior in their personal history.

OC22-3

The Death Penalty in Romania – Historical Course

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Capital punishment represents the deprivation of life of a person who was guilty of very serious crimes, and whose conviction remained final.
As of 2017, 142 countries have abolished the death penalty in law or in practice, leaving 56 countries that still use capital punishment.

The communist regime established in 1945 in Bucharest tried to abolish all forms of anti-communist resistance, thus modifying the criminal laws and reinstating capital punishment. The death penalty was reintroduced into the criminal legislation in Romania through a series of laws and decrees, the most important of which are Law no. 50 of January 21, 1945 and Law no. 312 of April 24, 1945. During the Second World War, there were special decrees issued by Marshal Antonescu's regime to reintroduce this punishment, as well as during the time of Charles II. Until this moment, capital punishment had been abolished in Romania since the time of Alexandru Ioan Cuza and the only ones who could fall under its influence were traitorous soldiers (deserters). Thus, Romania was the first European country to abolish this punishment, in 1865.

After 1989, the death penalty was abolished by Decree-Law no. 6 of January 7, 1990 and was replaced by life imprisonment. The last persons sentenced to death and executed were the Ceaușescu's (December 25, 1989).

The present work aims to carry out a review of the historical course of capital punishment in Romania, in close relation with political changes and with the need to adapt to international requirements and at the same time to analyze the ethical, social and even philosophical aspects of what this punishment means.

KEYWORDS: death penalty, life imprisonment, communist regime, legislation

OC22-4

Psychiatric Evaluation of People Injured in Traffic Accidents

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INTRODUCTION: Traffic accidents are a serious public health problem that can cause morbidity and mortality worldwide. According to the report of the World Health Organization, traffic accidents, which caused the death of 1.35 million people in 2016, are the most common cause of death between the ages of 5-29, can cause somatic and psychiatric morbidity, especially post-traumatic stress disorder, in a much larger population.

MATERIAL-METHODS: The patients who were referred to our center for disability assessment and examined in our clinic between January 01, 2021, and December 31, 2021, and who were found to have psychiatric complaints after a traffic accident, were retrospectively reviewed. Age, sex, type and nature of incident, psychiatric treatments they have, and findings of our psychiatric examination were analyzed comparatively.

RESULTS: The age of the 214 patients ranged between 10 and 82 years. The mean age was 34.7, and the median age was 34. 115 (53.7%) of them were male and 99 (46.3%) were female. Of the patients who had psychiatric complaints were examined, 108 (50.4%) had a in-vehicle traffic accident, 70 (32.7%) had a non-vehicle traffic accident, 36 (16.9%) had a motorcycle accident. It was observed that the average period between the psychiatric examination and the date of the incident was 59 (min:8-max:182) months. As a result of the psychiatric examination its observed that 131 (61.2%) of cases had no psychiatric pathology meet the diagnostic criteria. It was observed that 37 (17.3%) of the cases developed PTSD in the period after the traffic accident, but only 1 of the cases still had symptoms of PTSD at the time of examination. The other cases were found to be in remission.

CONCLUSION: To provide effective rehabilitation after traffic accidents, injured people need to be evaluated in a multidisciplinary manner. Early precautions against people's psychiatric complaints could prevent the development of psychopathologies that may cause sequelae.

OC22-5

Characteristics of Deaths by Suicide in Postmortem Study in Tunisia

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BACKGROUND: According to the WHO, over 700,000 people die by suicide annually. Seventy-seven percent of global suicides occur in low-

and middle-income countries. Suicide is one of the leading causes of death in Tunisia in recent decades. Various factors including mental disorders and adverse life events can increase the risk of suicide.
The purpose of this study was to investigate and analyze the characteristics of suicide deaths in Tunisia.

METHODS: It was a transversal descriptive study conducted in the Department of Forensic Medicine at Fattouma Bourguiba University Hospital of Monastir over 5 years (January 1st, 2019-December 31st, 2023). Data were collected from police investigation reports, medical records, deceased relatives' commemoratives, and autopsy reports. The death was considered as a suicide after a full-scale autopsy and after recording police investigations.

RESULTS: The highest rate of suicide was witnessed in 2019 (22.5%) while the lowest rate was collected in 2022 (12%). Most suicide deaths were reported in males (72.2%). The suicide rate was highest among the 20-39 years age group. The majority of victims were single (51%). In the reported cases, seasonal distribution demonstrated that suicides occurred more frequently in winter and spring (29.9% and 33.3%, respectively) than in autumn and winter (26.6% and 17.7%, respectively). We recorded three peaks of incidence in March (14.4%), August (14.4%), and October (13.3%). The majority of victims were not being followed for psychiatric disorders (60%). In psychological autopsies, previous suicide attempts were recorded in 15.5% and stressful life events in 30% of cases. The most common method used by male suicide victims was hanging (72%) and that used by females was poisoning.

CONCLUSIONS: Many predisposing and precipitating factors are associated with suicide. A psychological autopsy is a very crucial tool for assessing the underlying causes and precipitants of suicide. Improved surveillance and monitoring of suicide and suicide attempts are required for the implementation of effective strategies for suicide prevention

Oral Communications 23: Forensic Pathology IX

OC23-1

Frostbite After a Car Jack Attack: An Autoptic Case Report

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INTRODUCTION: We report the case of a young man found deceased in an open field, wearing women's clothes. The corpse was laying on the ground in the prone position, over a car jack, with a visibly swollen and ecchymotic face.

MATERIALS AND METHODS: in-site forensic medical examiner inspection, autopsy, histopathological and immunohistochemical studies, toxicological and radiological examination.

RESULTS AND DISCUSSION: the external examination of the corpse revealed head contusions with multiple, deep lacerations of the oral mucosa compatible in shape, location, and entity with the use of the aforementioned car jack, used with limited strength and small impact surface area. In the facial and mammary regions, there were linear and superficial lacerated wounds, compatible with scratches from branches or thorns. In the lateral region of the left thigh, there was a round cavity with a diameter of approximately 8 cm, with coarse loss of skin and muscle substance, likely produced after death by rodent-type animals.
Radiological examination of the cranio-facial structure ruled out any fractures.
The autopsy examination revealed marked blood infiltration of the deep layers of the scalp and of the temporal muscle, frontal subarachnoid haemorrhage and significant brain edema.
Histopathological and immunohistochemical analysis of the skin samples taken from the facial wounds allowed to date their occurrence at a time frame of two and three hours before his death. This claim was supported by the toxicology test results on blood samples, which revealed low levels of cocaine and its metabolites, and high blood alcohol concentration (1,5 g/L).
The victim was subsequently identified as a transgender sex worker, who was last seen alive by his coworkers three days prior to the discovery of his body, at around four in the morning, while leaving on a client's vehicle. One of his roommates reported hearing from him on the phone about two hours later, evidently drunk, in the company of a client. He also reported the victim's habitual, excessive alcohol consumption and sporadic use of cocaine.

CONCLUSIONS: Cause of death was traced back to the head injuries, which determined the frontal subarachnoid haemorrhage and, most likely, loss of conscience, and to hypothermia, caused by the fact that the body was laying on cold ground, with progressive cardio-pulmonary and nervose impairment. High blood alcohol levels, likely much more elevated at the time of the attack, contributed further to heat loss by peripheral vasodilation.

OC23-2

Forensic Autopsy and Identification of Deceased Migrants in North Macedonia in the Period From 2015-2023

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The migrant crisis that erupted in 2015 put North Macedonia at the center of events as large numbers of refugees and migrants from the Middle East, Asia and Africa poured through Turkey into Greece and north through North Macedonia and Serbia to the EU border with Hungary and Croatia.

The Institute for Forensic Medicine, Criminology and Medical Deontology in Skopje covers two thirds of the territory of North Macedonia in terms of performing forensic autopsies and identifications of deceased persons. However, all deceased persons who cannot be identified and whose death is considered suspicious by the order of the public prosecutor are autopsied at our Institute.

The forensic autopsy provides data on the cause and manner of death, all necessary identification data (height, hair color, eye color, specific marks such as scars, tattoos, detailed description of teeth, description of clothing, jewelry and found documents) and material is taken for DNA profile. If possible, fingerprints are taken by the Police.

In the period from 2015-2023, 40 autopsies were performed at the Institute of Forensic Medicine on persons who migrated to/or across our country. Autopsies were performed on 6 deceased female persons and 34 autopsies on male bodies. The bodies on which forensic medical expertise was performed were aged from 16 to 69 years. In terms of the manner of death, violent death dominates, but primarily as an accident, in 27 cases out of a total of 40 cases processed, and 3 cases of murder. In the course of the research, it was determined that out of the 40 processed, natural death was determined in 6 cases and in 4 cases due to advanced putrefactive changes, negative macroscopic findings and negative toxicological findings, the cause of death is unknown. What obliges us socially and professionally is to establish the identity of the deceased persons. The most reliable method for determining the identity of a deceased person, especially when it comes to persons belonging to the migrant category, is DNA analysis or dactyloscopy. Due to institutional and international inconsistencies, the identification of the persons who were autopsied at our institute was mostly identified on the basis of recognition and documentation, i.e. only 4 autopsied persons were identified using the previously mentioned methods and 10 autopsied persons have not yet been identified.

OC23-3

Forensic Investigation of a Complex Case of Murder

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Our paper presents a complex case of murder which had to be investigated from all points of view (forensic, medico-legal and psychiatric) due to the fact that the author obviously continued to deny his guilt and tried to turn the investigation on a false way. The conflict started in the house of a Moroccan student at the University of medicine and his girlfriend of Romanian origin. The best friend of the student was a colleague of him, also of Moroccan origin who came to visit them one evening. Both hosts were found dead three days later. The purpose of the murder was not very clear because no money or values were missing from the house. Even if from the beginning the author was the main suspect, he declared that many other people visited his colleague in that evening and especially some guys of Albanian origin who had a quarrel with the host concerning some depts to pay. A complex psychiatric examination of the suspect showed some inadvertences in his declarations which connected afterwards with the forensic evidences became very solid proofs in convicting the author.

OC23-4

The Dual Role of "Molecular Autopsy" in Sudden Cardiac Death Cases

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Molecular autopsy refers to the post-mortem examination of genetic material, with the aim to identify genetic variations and mutations that may have contributed to an individual's death. The dual role of molecular autopsy can be understood in two main aspects, one is the diagnostic role of genetic disorders that may have contributed to the individual's death. This includes inherited conditions such as cardiac arrhythmias, cardiomyopathies, and other hereditary diseases. The other role is the forensic role; molecular autopsy can have important legal and ethical implications. It can provide material evidence for the court cases; and help determine whether the death was due to a genetic condition with potential implications for surviving family members. This information may impact inheritance, family planning, and genetic counseling, which allows for intervention and treatment, reducing the risk of similar deaths in the family. In this report we present several cases of sudden cardiac death autopsied at the Institute for Forensic medicine, criminalistic, and medical deontology, Medical Faculty, Skopje.

MATERIALS AND METHODS: The research included 60 subjects autopsied at the Institute of Forensic Medicine, Criminology and Medical Deontology. The extracted DNA from 30 subjects was eligible for the molecular analyses with next generation sequencing with the Ion Torrent GeneStudio™ S5 platform. We used targeted research panel of 92 selected genes for cardiomyopathies and arrhythmias. Two first-degree relatives of a deceased subject were tested for possible inheritance of associated gene variants. Results: The study resulted in a positive detection of significant variants, with pathogenic and/or likely pathogenic clinical significance. The presence of more than one significant variant, as well as compound heterozygotes and double compound heterozygotes, was determined in some of the subjects. Causality was established between the detected genetic variants and the subject's phenotype. Likely pathogenic variants were confirmed in affected relatives. Variants of uncertain significance, associated with SCD in the noncoding region were found in most of the probands.

CONCLUSION: We introduced an efficient protocol for next generation sequencing of post-mortem samples. The cause of death and the mechanism of death were determined, and at the same time it opened the possibility to initiate a process that would prevent sudden cardiac death in other family members. It's important to note that molecular autopsy should be performed in conjunction with traditional autopsy methods, which involve the examination of tissues, organs, and other physical aspects of the body. Integrating both molecular and traditional autopsy findings provides a comprehensive understanding of the factors contributing to an individual's death, and at the same time it can give possibility of reclassification of variants.

OC23-5

Estimation of Wound Age using Regression Modelling of MRNA Expression of IL1β, IL-6, VEGF and HMGB1

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INTRODUCTION: In forensic medicine practice one of the most important tasks of forensic specialists is the determination of wound age. This helps in providing answers to questions associated with the investigation of criminal-legal cases, such as. The time of infliction of an injury, the survival time post-injury, evaluation of the causal relationship between wound and time of injury and death. The aim of this study was to develop a more accurate method for wound age determination. The principal aim was to determine the changes in mRNA expression in the wound healing process and to apply them in estimating wound age.

MATERIAL AND METHODS: The study included 60 wound samples of cases upon which autopsy was performed at the Institute of Forensic Medicine, Criminalistics and Medical Deontology, Faculty of Medicine, Ss. Cyril and Methodius University in Skopje. The following data were obtained when samples were taken: age, information on the mechanism of wounding, exact time of the wound occurrence, exact time of death, exact date and time when autopsy took place. The study included cases with post-mortem period up to 72 hours and deceased persons at the age up to 60 years. Wound samples were taken with scalpel with sterile cut within the injury margin, which were immediately frozen and were stored in a freezer at -80oC. Sample homogenization was manually done by pressing the frozen sample with a macerator in a plastic tube. RNA isolation was performed manually and automatically with the automated extractor. The obtained complementary DNA was analyzed for determining the cycle threshold (CT) level of transcripts of interest and CT level of housekeeping gene in order to assess the relative abundance of the transcripts in each of the phases of injured tissue. Real-time PCR was accomplished by application of commercial reaction mixture. At this point, one Real-time PCR reaction was made to each sample for examined transcript (IL-1 β, IL-6, VEGF and HMGB1) and one Real-time PCR reaction for the reference gene (GAPDH and 18S) gene.

RESULTS: Wound samples were divided into five groups. Increased VEGF expression was detected in the group of samples with wound age from 72 to 152 hours. HMBG1 levels were peacked also in the fourth group with survival time between 24 and 72 hours. The study detected increased expression levels of IL-1 β mRNA in the second group with survival time from 1 to 6 hours.

DISCUSSION: IL-1 β, IL-6, VEGF and HMGB1 are potential markers for determination of wound age. Using regression modelling, the mRNA expressions of IL1β, IL-6, VEGF and HMGB1 were identified as statistically significant predictors of injury age and were used in the development of a regression model for human dermal injury age estimation.

Oral Communications 24: Forensic Imaging I

OC24-1

What's "Neckst"? Micro-CT vs Post-Mortem Fine Preparation in Upper Airways Forensic Traumatology

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Due to its high density of vital anatomic structures, the neck is frequently injured in suicidal, homicidal and accidental scenarios. Among these structures, upper airways are commonly affected in sharp force and neck compressive traumas. However, in cases of asphyxiation, upper airways may appear unharmed during autopsy, requiring extensive manipulation and irreversible alterations to the sample to reveal small potentially informative lesions.

In recent years a spread in experimental applications of micro-CT as a potential technique in forensic practice has been published. Its high resolution, the preservation of sample integrity, the possibility to store images for consultation at different times and settings are some of the undeniable advantages of microradiology. Specifically, in cases of strangulation, micro-CT has proven to be useful for detecting minute fractures of laryngeal cartilages.

In this context, we isolated several hyoid-laryngo-tracheal complexes from three cases of throat cutting, three cases of strangulation (as defined by Sauvageau in 2010) and six controls (i.e. anatomical complexes sampled from bodies in which upper airways were not directly injured). Micro-CT scans of the samples were performed before and after immersion in an aqueous solution of Lugol as a contrast enhancer. As a final step, the current gold standard to study the district, post-mortem fine preparation, was carried out. The above-mentioned two techniques were analyzed comparatively in order, firstly, to assess the recognizability of anatomical structures and, secondly, to detect eventual physiological variants or any traumatic features.

Micro-CT scans in basal conditions showed a remarkable capacity to assess the anatomy of bone and calcified cartilages, including their variants, such as the presence of triticeous cartilages. It also allowed to detect injuries involving these structures, permitting in particular a characterization of fractures' features. The application of the Lugol-based solution, despite occasionally creating some artifacts, enhanced the detectability of cartilagineous structures and soft tissues, as well as sharp force injuries involving them.

The presentation will further discuss the advantages and limits of the different techniques. The results of this preliminary study suggest that integrating basal and post-Lugol treatment acquisitions, to obtain somewhat complementary results, would be advisable. However, while encouraging a systematic future application of microradiology in upper airways traumatology, further studies are needed to achieve forensic validation.

OC24-2

Advancements in 3D Surface Scanning Techniques for CSI and Forensic Medicine

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Digital surface scanning technologies have been actively developing over the past decade, with notable penetration into forensic science and forensic medicine, particularly within the last five years, and more prominently within the last three years. While laser scanning and LiDAR scanning remain the predominant technologies in crime scene investigation, there is an increasing adoption of photogrammetry (an inherently older method), structured light scanning, and hybrid scanning, which integrates multiple methods. Notably, hybrid mobile scanning, leveraging the LiDAR sensor in iPhones alongside professionally developed software products, has emerged in the last three years. The diversity of new technologies necessitates an evaluation of their practical utility.

Over a three-year period, we have conducted experiments with various three-dimensional surface scanning technologies, assessing their positive and negative aspects, as well as their convenience in the routine work of a basic unit, during crime scene investigation, and in forensic medicine. Our analysis has revealed different details and clarified new aspects of the use of each technology.

We demonstrate the practical application of these technologies in forensic medicine and at crime scenes, highlighting their specific benefits and peculiarities under various circumstances. We propose leveraging their strengths in different situations, including their utility in reconstructing facts and presenting evidence in court. Special emphasis is placed on mobile variants of the technique, such as structured light scanning and LiDAR+photogrammetry scanning. Additionally, we showcase specific software applications used in routine practice.
The use of surface 3D scanning in forensic medical practice offers undeniable benefits. However, it requires knowledge of the specific advantages of each technology and consideration of equipment accessibility in basic units. This presentation elucidates the most accessible applications and nuances of their use in real-world practice.

OC24-3

VIRTOPSY: Bridging Forensic Pathology and Radiology – A Study on Virtual and Traditional Autopsy

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BACKGROUND: A virtual autopsy is a sophisticated postmortem examination method in which the deceased person's body is scanned using radiological imaging techniques to determine the cause of death and other assets. Compared to a regular autopsy, this method has many benefits. Radiological imaging can help visualize internal injuries that are oftentimes imperceptible to the human eye. Enhancing virtual postmortem imaging techniques can allow for re-examination of the crime scene and the corpse even decades after the location is visited where the body was buried and can help in providing the evidence with accuracy and three-dimensionality that traditional documentation may lack.

AIM AND OBJECTIVES:
1.To find correlation between virtual and traditional autopsy.
2.To evaluate the role of VIRTOPSY in confirmation of causes of death.

MATERIAL AND METHODS: A study was conducted in different districts of Sindh, Pakistan. Each case underwent a full body postmortem-CT scan, and then a traditional autopsy.

RESULTS: A total of fifty (50) cases were studied, who died due to different causes, such as falls from a height, automobile crashes, burns, drowning, and heart and brain injuries, using VIRTOPSY.
The study of traumatic and gun-related deaths benefited greatly from the use of virtual autopsy, which was superior to traditional autopsy in identifying skeletal lesions and bullet trajectory. To identify foreign body aspiration, drowning, and metastatic cancers, virtual autopsy proved to be a helpful additional tool. An ordinary autopsy yielded the same amount of information as non-contrast imaging when used to investigate natural deaths. A drawback of virtual autopsy that resulted in erroneous findings was the misinterpretation of usual post-mortem changes as

abnormal clues. However, post-mortem magnetic resonance imaging and contrast enhancement might increase accuracy.

DISCUSSION: The objective of virtual autopsy is to eliminate the subjective nature of self-visualization that characterizes traditional autopsy. The word "virtopsy" is derived from the two separate words "autopsy" and "virtual." For this, radiological scanning techniques are applied. It is a process to replace antiquated, laborious, traditional autopsy procedures with more contemporary, digitalized ones to improve the scientific value of the results, reduce subjectivity, and elevate the status and significance of forensic medicine as a specialty. Our findings might encourage the application of VIRTOPSY technology in forensic pathology.

CONCLUSIONS: In virtual autopsy, radiological imaging instruments play a major role. An essential tool in the study of gunshot and trauma deaths can be a virtual autopsy. In cases of asphyxiated fatalities, stillbirths, and deteriorated bodies, a virtual autopsy can be helpful in addition to a traditional autopsy. Virtual autopsies should be utilized cautiously in cases of natural deaths since they are not very useful in distinguishing between antemortem and post-mortem alterations and carry an additional risk of misunderstandings.

OC24-4

WITHDRAWN

OC24-5

Difficulties and Challenges in Whole Body PMCT Angiography in the First Virtual Autopsy Center of India

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Centre for Advanced Research and Excellence in Virtual Autopsy had been established as a joint collaboration of two premier health organization of India i.e. Indian Council of Medical Research (ICMR) Headquarters and All India Institute of Medical Sciences (AIIMS), New Delhi. The facility has been planned to introduce and develop the technique of Virtual Autopsy and other imaging modalities for minimal /non-invasive autopsy in India for Dignified Management of Dead. A total of about 3200 PMCT have been conducted and it has been proved an invaluable and reliable scientific technique in the diagnosis of traumatic deaths. Further Whole-Body Postmortem CT Angiography (PMCTA) was started due to limitation of non-contrast PMCT particularly in the diagnosis of vascular pathologic conditions, stenosis in lumens of the coronary arteries and assessment of myocardium or other soft tissue abnormalities. After initial failures, whole body PMCTA has been successfully conducted in a total of 55 cases till now. The procedure had been done via femoral artery access. The presentation will focus on the difficulties which were encountered for maintaining a positive pressure for the contrast for reaching all areas of interest and the required instruments, material and methods for pumping the contrast in the body. The aqueous and oil-based contrast agent which were used will be discussed along with the improvisation which led to the significant variations in their concentrations and volumes. The cause of death in studied cases were due to cardiovascular diseases, respiratory systems, and gastrointestinal systems. It has been observed that there is a definitive advantage of PMCTA over non contrast PMCT particularly in diagnosis of coronary artery diseases in Sudden Deaths. The presentation will serve as guide to new developing centers of Virtual Autopsy to start the PMCTA with minimal costs and with equipment which could be easily available in Autopsy centers or attached hospitals.

OC24-6

Pros and Cons of CT in Forensic Ballistics. A Preliminary Experimental Study on Retained Bullets in Human Legs

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INTRODUCTION: In forensic ballistics, radiology of retained bullets holds significant interest, focusing on analysing bullet characteristics such as caliber, length, and density values of its components. A crucial consideration is the susceptibility of bullets containing ferromagnetic components (iron or steel) to magnetic fields. Consequently, the movement of such type of bullets could potentially cause serious harm in the living and create post-mortem wounds in the deceased. The aim of this preliminary study was to assess the pros and cons of radiology for analysing projectile morphometry, estimating ferromagnetic properties, and quantifying displacement after exposure to a magnetic field using magnetic resonance imaging (MRI).

MATERIALS AND METHODS: The study involved eight human legs and two projectiles, one made of steel and one of lead (non-ferromagnetic), both with a copper jacket. The skin of each leg was cut using a scalpel, and each bullet was inserted into four legs. Subsequently, the legs underwent preliminary CT, MRI, and a final thorough CT scan. In total, 16 CT scans were performed (applying the standard Hounsfield scale for eight of them and the extended Hounsfield scale for the others), along with eight MRI scans. The evaluations included (1) CT accuracy in measuring the length and diameter of the bullet; (2) densitometry (in HU values) of the core and the jacket; (3) eventual bullet displacement after MRI.

RESULTS: CT mean measurements of the diameter and length of projectile were 0.83 cm and 2.79 cm, respectively, for the lead projectile, 3.51 cm and 0.83 cm for the steel projectile. Using a Vernier caliper, the measurements were 2.70 cm and 0.76 cm for the lead projectile and 3.40 cm and 0.79 cm for the steel projectile. In terms of accuracy, the lead bullet exhibited the highest percent error values (9.21 % for diameter, 3.33 % for length), while the steel bullet yielded the most accurate results, with an estimated error of 5 % for diameter and 3.24 % for length. Regarding HU values for lead and iron, the HUs returned 3071 for all of them. Using the extended scale, we obtained a mean value of 10956 for the lead bullet and four different values for each of the steel bullet scans. The jacket mean value was 27571. The lead bullet did not move after MRI, while the steel one rotated and translated in all of the three space dimensions.

CONCLUSIONS: CT proved helpful in identifying bullet dimensions but was unable to discriminate its components. Our results confirm that a strong magnetic field displaces steel bullets. Therefore, it is highly unrecommended to expose bodies, whether dead or alive, with retained bullets to MR scans.

Oral Communications 25: Clinical Forensic Medicine IV

OC25-1

Forensic Identification on Male Sexual Function for Twenty-One Rape Cases

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OBJECTIVE: Through retrospective analysis on cases of rape suspects to provide beneficial reference for the trial of rape cases.

METHODS: During 2012-2021 our institute received 21 cases of male sexual function identification which were all suspected rape but not enough evidence. All suspects claimed to be impotence and unable to

commit rape, so the police commissioned us to conduct forensic assessments of the suspect's sexual function. Firstly, all cases received audio-visual sexual stimulation test (AVSS). If AVSS screening erectile function was normal (positive), we could conclude the suspect cases had no impotent. Secondly, if AVSS were negative then the following lab examinations should be completed: Nocturnal penile tumescence (NPT) was used to confirm whether the suspect has organic erectile dysfunction through three consecutive nights of NPT monitoring. Neurophysiological examination (the pudendal nerve evoked potential, quantitative sensory testing, etc.) to confirm the pudendal nerve conduction function related to erectile function. Penile Doppler blood flow to confirm the penile blood flow condition related to erectile function. Hormone testing to confirm the endocrine hormone levels related to erectile function.

RESULTS: 2 cases were positive (normal erectile function) through AVSS, 10 cases were positive (without organic erectile dysfunction) through NPT, the remaining 9 cases which were almost all more than 60 years presented with organic erectile dysfunction and were found that there were nerves or vascular system diseases by neurophysiological examination and penile Doppler blood flow. So, our conclusions were that 9 cases were really impotent but other 12 cases had normal erectile function. The conclusions were all adopted by the Court.

CONCLUSION: For any suspected cases of rape suspects without sufficient evidence, Male sexual function should be identified to ensure the legitimate rights and interests.

OC25-2

Medico-Legal Considerations on Implant-Prosthetic Rehabilitation Following Unjustified Dental Extractions: A Cross-Sectional Study with a Review of Jurisprudence

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BACKGROUND: In most countries, the predominant dental activity is carried out in a private context with an increasing risk of conflict of interest between professionalism and the financial market. The International Team for Implantology observed the phenomenon of unjustified destructive treatments in around 15% of the applied dental implants in Italy as "improper treatments". The implant-prosthetic rehabilitation is one of the therapeutic alternatives indicated for "replacing the missing dental elements or with an unfavorable prognosis" [Italian Ministerial Guidelines 2017]. The use and abuse of that "useless" treatment to replace "existing teeth" has various medico-legal repercussions: the difficulty in recognizing the limit between a diagnostic error and the application of deliberately destructive treatments [tooth extraction] in malpractice evaluations; the condemn by the maximum expression of Italian jurisprudence [Court of Cassation] of some cases of unjustified extraction of teeth replaced with implant-prostheses for the crime of accidental or malicious personal injury (Court of Cassation, criminal section IV - 04 /10/2022, n. 4146; Cass. Criminal section V, 27/10/2011, (hearing 27/10/2011, dep. 26/01/2012), n .3222); repercussions on Insurance policy, which often doesn't cover damages deliberately caused. Currently, it is not possible to know the absolute incidence of the phenomenon in Italy due to the lack of national databases on healthy litigation cases.

SCOPE: The study aims to consider cases of unjustified tooth extraction (destructive treatments) deliberately arranged for implant-prosthetics purposes in disagreement with the provisions of Guidelines, as defined by forensic experts in the assessment of dental damage operating on behalf of the Insurance Companies.

MATERIALS AND METHODS: The sample consists of 100 medico-legal reports produced by forensic experts of Insurance Companies [conservative attitude towards professionals]. Inclusion criteria: all the cases in which dental extractions are subsequently rehabilitated with implants are defined as unsustainable, unjustified, or uselessly destructive. Exclusion criteria: reports not corresponding to the inclusion criteria for type of treatments and outcomes. Each report is examined in terms of the correlation between "tooth extraction for implantology" and: incidence of private professionals, public or private structures, and franchising structures; payments with Bank financing or through Insurance Companies; ministerial or accredited guidelines applied by evaluators to define the extraction treatment as "unjustified" and/or "deliberate"; Insurance coverage or extinction of the contract. The criminal Court of Cassation sentences issued in the last 5 years are analyzed with particular attention to unjustified tooth extractions, the type of related crime, and condemnation.

RESULTS: The results of this study will offer interesting guidance for forensic experts who can cope with the evaluation of this type of damage for both civil and criminal interests, areas of responsibility of dental professionals, the legitimacy of insurance coverage, and a partial inference of the commercial phenomenon in dental healthcare.

OC25-3

Use of Toluidine Blue in the Medicolegal Evaluation of Victims of Sexual Assault Resulting in Anal Penetration

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Sexual assault cases are one of the events that are difficult to investigate by forensic medicine, because of the lack of eyewitnesses and the low rate of macroscopic findings. Although it is not a clinical diagnosis and there are no diagnostic criteria to confirm sexual assault, the likelihood of genital injury during rape is greater than the likelihood of injury resulting from consensual sexual intercourse. For these reasons, it is recommended to use some additional medical methods, including colposcopy and the use of toluidine blue, in the medicolegal evaluation of rape victims.

Toluidine blue is a basic thiazine metachromatic dye. It has a high affinity for acidic tissue components; therefore, it stains tissues rich in DNA and RNA. The epithelium of the external genitalia does not have nucleated cells and prevents contact of stain with the nuclei. Where the epithelium is damaged and the underlying nucleated cells are exposed, the nuclei stain blue. Toluidine blue dye stands out in handling these cases with its ease of use, being safe and cheap, and not affecting other medical procedures.

In our study, the findings obtained from 45 cases sent to our forensic medicine department by public prosecutors due to suspicion of anal penetration were evaluated. Toluidine blue application revealed the presence of trauma in 5 cases in which no findings were detected in colposcopic and naked eye examination despite the presence of acute penetration in the history, enabled us to confirm these findings in 5 cases with macroscopic findings, and enabled us to detect traumatic findings in other areas in addition to the acute findings we detected in the examination in two cases. We have two cases that could not be revealed both on examination and by toluidine blue, although there was a claim of acute penetration in the history. We did not have any case in which false positivity was detected with toluidine blue although there was no allegation of penetration in the history.

OC25-4

Domestic Violence Against Men

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Interpersonal violence and abuses represent a serious public health issue. In most of the cases victims are women, but different forms and contexts of abuse may also concern men. In the latter cases, as for women, sexual/physical/psychological/economic violence against men generally occurs in the domestic context. The issue of violence against men is still underestimated and under-addressed, also because of social/cultural factors (i.e., the social perceptions of the male gender role). We analyzed the accesses to the Emergency Department of Careggi University Hospital due to violence against men. In this institution, for victims of abuse/interpersonal violence/hate crimes a special program of support interventions (called "Emergency Rose Code") is activated. We applied the following inclusion criteria: male sex; age > 18 years; reported episode(s) of domestic abuse occurred between January 1, 2017 and December 31, 2022; availability of Emergency Room and Emergency Rose Code reports filled between January 1, 2018 and December 31, 2022. We found 80 eligible cases. We will describe the epidemiological data concerning victims, the relationship with the perpetrator, the observed lesions (in terms of nature, localization, severity), and the kind of support interventions. The medico-legal aspects will be discussed, stressing the importance of designing and activating special programs of support interventions for the male victims of domestic abuse to flag these cases and promptly address their health needs. Moreover, the role and the importance of the expert in legal medicine will be discussed, to detect and describe lesions of interest and thus to obtain scientific evidence for legal purposes.

OC25-5

Traumatic Injuries Related to Conventional and Electric Bicycle Accidents: A Comprehensive Analysis from an Italian Major Trauma Center (2019-2022)

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BACKGROUND: The increasing popularity of cycling as a sustainable means of transportation has raised concerns about road safety and legislative gaps, despite its numerous health and environmental benefits. This study explores the impact of accidents involving conventional and electric bicycles, assessing injuries requiring Emergency Department (ED) intervention at a major trauma center in Italy from 2019 to 2022.

MATERIAL AND METHODS: A retrospective analysis of 763 patients involved in bicycle accidents was conducted. Clinical data, injury circumstances, and helmet use were collected. The Abbreviated Injury Scale codes and Injury Severity Score were recorded for each patient.

RESULTS: Among the study cohort, 30.4% suffered multitrauma, with a mortality rate of 0.3%. Most incidents occurred in 2020, following the easing of pandemic-related restrictions, predominantly on weekends. The median Injury Severity Score was 9, correlating significantly with AIS Head Neck, Face, Chest, and External. Helmet use was observed in 41% of cases. Multivariate analysis highlighted that collisions with other vehicles increased trauma severity and ICU admission risk. Helmet use significantly reduced trauma severity by 34.4% and ICU admission risk by 73.5%. Notably, toxicological investigations were not performed on any ED-admitted patients.

CONCLUSIONS: Despite a comparatively low mortality rate and multitrauma incidence, preventive measures such as safety devices, expanded cycle paths, and improved infrastructures are essential. Stricter legislation is warranted, especially regarding helmet use, as it remains lower among patients with higher Injury Severity Scores. Mandatory helmet use for all ages on bicycles is recommended. Furthermore, advocating for toxicological testing for all bicycle-related accidents is crucial for comprehensive accident investigations in Italy.

OC25-6

Forensic Medical Examination of Victims of Sexual Violence in Barcelona (Spain), 2021-2023

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INTRODUCTION: Sexual violence is a global public health problem that affects people of all genders and ages, although some groups like young women experience a higher burden of victimisation. Forensic intervention is an important part of society's response to sexual violence. In Catalonia (Spain) the Institute of Legal Medicine and Forensic Sciences is the public institution that provides expert services to the justice system. In 2020, as a result of the COVID-19 pandemic, forensic medical assessments of survivors of sexual violence decreased significantly.

OBJECTIVES: The aim of this work is to describe the trends and main characteristics of forensic medical examinations of victims of sexual violence after the COVID-19 pandemic in the city of Barcelona (Spain).

METHODS: The source of information was the basic data set of case records at the Institute of Legal Medicine and Forensic Sciences in Barcelona (Spain), years 2021 to 2023. The forensic medical assessment is carried out in coordination with health care services, according to protocols and guidelines.

RESULTS: During the 3 years studied, 1304 victims were assessed. In 2022, cases reached a historical maximum (n=487) and increased by 51,2% compared to the previous year (n=322). In 2023 a historical maximum was reached again (n=495); however, the increase compared with the previous year was very slight (1,6%). The victims were mostly women (90,1%). The average age in women was 26,7 years (s.d. 10,67) and in men 29,4 years (s.d. 10,22). Women aged between 16 and 29 years were the largest group in the series as a whole (54,8%) and in every year of the study. Drug-facilitated sexual assault was suspected in 24,1% of cases. Multiple perpetrator rape represented 9,5% of cases, with a decrease in 2023 (2022: 12,0%; 2023: 6,2%). By quarters of the year, a greater number of cases was observed in the third (28,6%), a lower number in the first (20,1%) and intermediate numbers in the second (26,2%) and the fourth (25,2%). Half of the cases (49,4%) were assessed on Saturday, Sunday or Monday. Toxicological sampling was carried out in 59,9% of cases and biological sampling in 91,2%.

CONCLUSIONS: After the COVID-19 pandemic, cases of sexual violence have increased significantly in Barcelona (Spain), resuming the previous growing trend. Despite media concerns, no increase in the relative frequency of drug-facilitated sexual assault or multiple perpetrator rape was observed.

Oral Communications 26: Forensic Imaging II

OC26-1

Postmortem Computed Tomography in Stabbing Deaths: Case Series from the Institute of Forensic Medicine of the University of Modena and Reggio Emilia

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INTRODUCTION: Postmortem computed tomography (PMCT) is performed in several cases of judicial autopsy at the Institute of Legal Medicine of the University of Modena and Reggio Emilia. Although autopsy is considered the gold standard for obtaining information regarding the causes and manners of death, literature documents that PMCT has demonstrated heightened sensitivity in detecting bone lesions, free air in body cavities (pneumoperitoneum, pneumopericardium, pneumothorax), and hemorrhages. Conversely, the non-contrast-enhanced PMCT presents challenges in identifying vascular or soft tissue lacerations, organ ruptures, and wound trajectories.

MATERIALS AND METHODS: A retrospective analysis was performed on a total of 221 PMCT to assess the diagnostic value in cases of fatal stab wounds using records from the Institute of Legal Medicine of Modena spanning the decade from 2013 to 2023.
The study included 25 cases of fatal stabbings where both PMCT and full autopsy were performed; of these, 4 were suicides and 21 were homicides. The cases were categorized into 5 groups based on the anatomical regions affected by injuries: group 1 - head, group 2 - neck, group 3 – thoracoabdominal region, group 4 - limbs, and group 5 – injuries in more than one region.
The medical examiner and the forensic radiologist viewed the CT images before the autopsy; subsequently, CT images were re-evaluated by the radiologist incorporating autopsy findings. Discrepancies between autopsy and radiological findings were assessed using the modified Goldman Classification score.

RESULTS: Detecting stabbing wounds via PMCT is challenging as they do not produce distinct cavitations in the pierced tissues. In our cases, the PMCT delineated the weapon path of stab wounds only when air was present in the soft tissues penetrated by the blade. On the other hand, PMCT successfully identified fragments originating from the weapon, such as metallic or vitreous fragments, within the wounds.
Although reconstructing the path of the wounds posed challenges, PMCT effectively identified small bone lesions, air, and hemorrhages, such as hemopericardium or hemothorax. In some cases, PMCT successfully identified vascular lesions leading to death. Reassessing CT images after performing the autopsy has frequently allowed the identification of lung and diaphragm injuries. Conversely, hepatic injuries remain difficult to detect on CT scans.

DISCUSSION: Our findings highlight the relevance of PMCT scans in forensic examinations, as the CT findings guide dissections and reveal details that might otherwise go unnoticed. In our experience, interpreting PMCT scans is most valuable when considered in conjunction with external examinations or autopsies. It is recommended to re-evaluate CT scans post-autopsy, especially in cases marked by significant disparities between radiological and autopsy findings. This can lead to understanding whether these discrepancies are related to the expertise of the forensic radiologist or the technique used, and improve the experience in this field.

OC26-2

Study on Cheiloscopy and Dactyloscopy among University Students

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BACKGROUND: Cheiloscopy and Dactyloscopy, both well-established forensic tools used in individual identification in any scenario, be it a crime scene or civil cause. Like fingerprints, lip prints are unique and distinguishable for every individual. But their relationship to personality types has not been established, except for the hypothesis that fingerprints could explain these personality patterns.

AIMS: The study was aimed to record and correlate the lip and fingerprints with the of character/ personality of a person.
1. The study was aimed to record and analyze the lip and fingerprints of University students.
2. To analyze the character of person based on self-designed questionnaire.
3.To correlate the lip and fingerprints with that of character/ personality of a person.
Settings and Design: The lip and fingerprints and character of a person were recorded, and the data obtained was subjected for statistical analysis, especially Pearson's Chi-square test and correlation and association between the groups were also studied.

MATERIALS AND METHODS: The study sample comprised of 100 students, aged between 18 and 22 years. For recording lip prints, brown or pink-colored lip color was applied on the lips and the subjects were asked to spread the lip color uniformly over the lips. Lip prints were traced in the normal rest position on plain white paper. For recording the fingerprints, imprints of the fingers were taken on plain white paper using an ink pad. The collected prints were visualized using a magnifying lens. To analyze the character of a person, a self-designed questionnaire based on a multivariable personality inventory was used.
Statistical Analysis Used: The data obtained was subjected for statistical analysis, especially Pearson's Chi-square test and correlation/association between the groups was also studied.

RESULTS: In University students, the predominant lip pattern recorded among male students was type II whorls and finger patterns, with the character being ego ideal, pessimism, introvert, and dogmatic. Conclusion: Many studies on lip pattern, finger pattern for individual identification and gender determination exist, but correlative studies are scanty. This is the first study done on correlating patterns, that is, lip and finger patterns, with the character of a person. With this study, we conclude that this correlation can be used as an adjunct in the investigatory process in the forensic sciences.

OC26-3

Unenhanced PMCT In Delayed Deaths from Head Injuries: A Non-Invasive Approach

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INTRODUCTION: Traumatic deaths are by definition violent deaths and thus are subject to forensic investigation which requires a full autopsy in most legislations. In cases of delayed traumatic death with variable time of hospitalization any forensic evidence (e.g. cranial trauma patterns) are gradually disappearing and often times the cause of death may be a complication of trauma (e.g. hospital-acquired infections). In such cases clinical doctors are unable to issue a death certificate since the manner of death is not natural. This paper suggests a different approach in handling such cases.

MATERIAL AND METHODS: From a total of 245 cases submitted to full-body Postmortem Computed Tomography (PMCT) at the Forensic Medicine Unit of the University Hospital in Heraklion Crete, 11 cases of delayed traumatic brain deaths were selected for the purpose of this study. All cases involved craniocerebral or cerebral injuries with Antemortem Computed Tomography (AMCT) scans available at the clinical records. Unenhanced PMCT and external examination were conducted in all cases while a full autopsy was not deemed necessary. Manner of death was deemed as accident in all cases.

RESULTS: Age of the deceased ranged from 59 to 95 y.o. (mean 81.2 years ±11,4). There were 8 males and 3 females. Survival time ranged from 9 to 107 days (mean 41,5 days ±36,7). Causes of death include: craniocerebral injuries (3), cerebral injuries (3), hospital acquired infections (3) and multiple organ failure (2). In 36.4% of the cases neurosurgical interventions (craniectomy) were conducted. In 4 cases, the accident involved falls on the same level with underlying pathologies. PMCT findings were generally in line with AMCT findings. Inconsistencies were noted mostly in longer survival intervals, involved cases with craniectomy, size and location of brain damage and undetected fractures antemortem.

DISCUSSION: Unenhanced PMCT appears to be a sufficient form of postmortem examination –without the need for a full autopsy- in cases of delayed traumatic brain deaths when the following conditions are met: 1. AMCT is available 2. Clinical data on the circumstances of death are available 3. Any criminal activity is excluded by the authorities 4. Any legal and civil liability is excluded 5. Family is informed and consents to the suggested protocol (External examination+PMCT+Clinical file review).

KEYWORDS: unenhanced PMCT, delayed deaths, craniocerebral injuries, postmortem examination

OC26-4

The Contribution of PMCT in the Forensic Investigation of Water-Related Deaths

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INTRODUCTION: Water-related deaths are classified as violent deaths and thus are subject to forensic investigation which requires a full autopsy in most legislations. Causes of death vary from drowning (in sea or fresh water) to air embolism and include near-drowning cases. The current study examines the value of Postmortem Computed Tomography (PMCT) in such cases in an effort to establish a protocol for such deaths in Greece.

MATERIAL AND METHODS: A total of 17 water-related deaths were reviewed from 3 different forensic services. All cases were submitted to PMCT, external examination and toxicological analysis, while full autopsy was performed in 13 cases. Autopsy was not performed in 3 cases of possible COVID+ individuals and in one case due to religious restrictions. PMCT and autopsy findings were compared when possible. All findings were evaluated as to their contribution to the cause and manner of death and the potential identification of the deceased.

RESULTS: The examined cases included 12 males, 3 estimated males and 2 females. Of these 4 were children (age range 2-9 years), 1 was estimated as adolescent and 12 were adults (age range 23-63 years). Postmortem interval ranged from 10h to approximately 10 years. Causes of death included: drowning in sea and fresh water, air embolism, near drowning, probable drowning (in absence of trauma) and undetermined. Manner of death in 76.5% was determined to be an accident. PMCT was used to assess skeletal injuries in all cases, contributed to the cause and manner of death in 14 cases and to the biological profiling and positive identification in 6 cases. In 4 cases cause of death was based solely on PMCT, external examination and toxicological analysis.

DISCUSSION: This case series highlights the advantage of PMCT in assessing skeletal trauma and acquiring useful data for biological profiling and positive identification that can be stored and used upon request. Full autopsy can be substituted by PMCT under certain conditions. Naturally, these remarks need to be verified in a larger sample.

KEYWORDS: PMCT, water-related deaths, drowning, biological profiling

OC26-5

Suicide in Prison: A Peculiar Case of Choking on a Table Soccer Ball

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INTRODUCTION: Inmate suicide is a frequent issue and an accurate understanding of cause, means of production and dynamics of these deaths is the first step in implementing preventive strategies aimed at safeguarding the prison population. This is highlighted in the present case about a 52-year-old male arrested for detonating homemade explosive devices at an airport, acting on behalf of a persecutory idea. The subject had a history of alcohol-related disorders and gambling disorder and died approximately 36 hours following admission to the prison, after being escorted to a playroom equipped with a table soccer game.

MATERIALS AND METHODS: In this case, procedures for circumstantial-clinical documentary and necroscopic ascertainments were applied, including a medico-legal examination performed at the scene, a full body post-mortem CT scan (PM-CT), forensic autopsy, microradiological, histopathological and chemico-toxicological analyses.

RESULTS: The medico-legal examination performed on site excluded fatal traumatic injuries but noted a hard bulge on the anterior surface of the neck. The PM-CT detected a rounded foreign body completely occluding the airway at the laryngeal aditus level. The most important autopsy findings were the identification of the foreign body in a table soccer ball, precisely placed below the laryngeal aditus, and hyperinflated lungs. Furthermore, a plastic bottle cap, not identified by PM-CT, was found in the esophagus. The hyoid-larynx bone block, after fixation in formalin, was subjected to micro-CT, which showed the integrity of the bony and cartilaginous structures. Forensic toxicology analysis of blood and urine samples revealed traces of benzoylecgonine and medications consistent with those administered by physicians. CCTV footage analysis ruled out the involvement of others in the dynamics of the event.

CONCLUSIONS: In most inmate suicides, the cause of death is asphyxia by hanging, while other types of asphyxia are extremely rare, including asphyxia due to choking, consisting in the obstruction of the airway by a foreign body lodged below the epiglottis. The peculiarities of the present case consist in the means chosen to induce asphyxia, specifically by choking (i.e. table soccer ball), never described in the literature in adults, and in its suicidal dynamic. Moreover, this case highlights the importance of adopting an integrated approach during the necroscopic ascertainment including both PM-CT and forensic autopsy, since the PM-CT allowed the foreign body detection in the airway and guided the autopsy to its exact localization; likewise, the autopsy confirmed its presence, allowed its identification, and also detected a second object (i.e. plastic bottle cap) in the esophagus, which was invisible to PM-CT because it was radiotransparent. Forensic psychiatry and toxicology allowed the complete analysis of the case. Understanding such incidents provides insights both for the prevention of such occurrences and for the protection of the population currently held in detention facilities.

OC26-6

Multiphase Post-Mortem Computed Tomography Angiography (MPMCTA) in Sudden Unexpected Death Cases: The Experience of Institute of Legal Medicine of Modena

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Post-mortem imaging is considered a good complement for conventional autopsy and it is very useful not only in traumatic deaths, but also in investigation of natural deaths and, in particular, in sudden and unexpected deaths.

Multiphase post-mortem computed tomography angiography (MPMCTA), consisting of a native scan and three different phases of angiography, allows a complete visualisation of whole vascular system and the detection of haemorrhages, vessels rupture, stenosis, aneurysms and dissection even

for small vessels. Thus, in the diagnosis of cardiovascular death, MPMCTA has proven to be an important complementary tool.

In this study the authors evaluated the contribution of MPMCTA in the diagnosis of sudden and unexpected death in the casuistry of the Institute of Legal Medicine of Modena.

A total of 37 cases were analysed: 32 males and 5 females, median age and BMI were 54.2 years (25-78 years) and 27.5 (17.3-37.9) respectively. The cause of death was cardiovascular in 35 cases and neoplastic in 2 cases.

In all cases anamnesis and circumstances of death were recorded, and in all cases, external examination, native CT scan, MPMCTA, autopsy, histological analyses and in selected cases, toxicological analyses (on samples collected under ultrasound or CT guidance prior to angiography) were performed.

For each case MPMCTA data, autopsy data and histological findings were compared.

MPMCTA has a significant impact on autopsy practice in our casuistry. In 21 cases, MPMCTA directly contributed to the determination of the cause of death. The autopsy can be planned taking into account the results of the angiography, and the autopsy technique can be modified.

In our experience, the concordance between MPMCTA and autopsy is high, and histological artifacts produced by the oily contrast agent usually do not compromise the histopathological diagnosis.

Oral Communications 27: Bioethics & Medical Law

OC27-1

Romanian Doctors' Perspectives on Risk Factors for Medical Malpractice Complaints

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INTRODUCTION: Medical practice has been accompanied over time by the responsibility of the doctors for their actions, sanctioning them when the results were bad for the patients. The rate of medical malpractice complaints is on the rise worldwide, but these complaints do not always reflect mistakes on the part of doctors. Starting from the need to reduce the number of medical malpractice complaints, the aim of this paper was to identify the factors that predispose doctors to complaints from their patients, as they emerge from the opinion of Romanian doctors.

MATERIAL AND METHOD: The study was based on a questionnaire addressed to doctors in Romania through the GoogleDocs platform, which included both closed and open questions. The present paper was developed starting from the qualitative analysis of the responses of the study participants to the open question regarding the factors that predispose doctors to complaints from patients.

RESULTS: The study group included 1684 doctors from the entire country, and through the qualitative analysis of the answers, the authors identified 5 categories of factors which, according to the participants, predispose doctors to complaints: 1. factors related to the doctor (e.g., the style of communication, concern for updating knowledge, fatigue, conditioning the medical act of material benefits, paternalistic attitude); 2. factors related to the medical institution/medical system (e.g., inadequate equipment of the medical institution, insufficient staff, large number of patients, short time allocated to consultations, lack of institutional procedures, lack of protocols); 3. factors related to the patient (e.g., difficult character, poor medical education, desire for material gain from complaints, unrealistic expectations); 4. factors related to external influences (e.g., the influence of the media, the influence of other doctors or the influence of lawyers who want to win from lawsuits); 5. factors related to legislation (e.g., gaps in the investigation system, lack of patient accountability).

CONCLUSIONS: Knowing the factors that predispose doctors to complaints is an important starting point in identifying strategies that can lead to a decrease in the number of complaints regarding the professional responsibility of the doctor.

OC27-2

Consent to Treatment in Telemedicine: An Ethical-Deontological Perspective

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Telemedicine, according to the World Health Organization is the provision of health care services when distance is a critical factor. Acting in telemedicine means for a health care professional to assume full professional responsibility, like any medical act with particular attention to the limitations due to physical distance and the protection of data confidentiality. Telemedicine does not replace traditional performance in the doctor-patient relationship but constitutes itself as a complementary tool to improve effectiveness and efficiency of performance. In this context, informed consent is not only the legitimization of the medical act but the foundation of the care relationship. Italy the expression of consent to the medical act, according to Law 219/17, must be in writing and the information must cover diagnosis, prognosis, benefits and risks of diagnostic tests and health treatments as well as possible alternatives. With Telemedicine we are confronted, for the first time, with the "splitting" of consent, which also becomes a consent on the modality of the medical act. Some ethical-deontological doubts concern the preference of the patient over the mode of service as a requirement for eligibility for the service itself rendered in telemedicine or the need to define a clear separation between consent to the medical act and consent to data processing, which are based on different legal bases but are still improperly overlapping in some realities. These are open ethical-deontological issues that are little or never addressed in the current growing European and international legislative and regulatory landscape. Therefore, a careful and preliminary medical-legal examination from an ethical-deontological perspective seems appropriate in order to ensure patient protection and safe care.

OC27-3

Unraveling the Legal Void: Exploring the Intersection between Forensic Autopsies and Post-Mortem Tissue Donation in Italy

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In Italy, the Public Prosecutor authorizes the removal of material from a corpse during a judicial autopsy for investigative purposes only, in the absence of the consent of a third party. To date, there is a law regulating the donation of one's own body for research purposes, but the legality of using biological material taken from a corpse for this purpose in the context of a judicial autopsy remains controversial.

Historically, the use of cadavers for research purposes was regulated by the Mortuary Police Regulations (Presidential Decree No. 285 of 1990), referring to Royal Decree No. 1592 of 1933, which permitted the exploitation of unclaimed bodies. Subsequent legislation (Laws No. 235/1957; No. 644/1975; No. 91/1999) mostly regulated removal for transplantation purposes, characterized by a soft opt-out system.

Regarding use for research purposes, in 2013 the National Bioethics Committee ruled that presumed consent was inapplicable in this context as well, as it was contrary to the "principle of informed and conscious

consent", confirming the ethical unacceptability of the rule contained in the Royal Decree.

Today, Law No. 10 of 10 February 2020 "Regulations on the disposition of one's own body and post-mortem tissues for the purposes of study, training and scientific research" is in force, repealing Article 32 of the Royal Decree No. 1592 of 31 August 1933. Among the various points, it is provided that the consent to post-mortem donation must be requested on the forms provided for the prior declaration of treatment (Law No. 219/2017), with the possibility of revocation and the obligation to designate a trustee responsible for informing the doctor of the existence of the consent. It also provides for the return of the body to the family in dignified conditions within twelve months.

This law, based on the proposals of the Italian Bioethics Committee, excludes the principle of tacit consent, with the aim of guaranteeing the development of scientific research and the protection of individual and collective health (in accordance with articles 9 and 32 of the Italian Constitution), while protecting the right of self-determination.

In Europe, Directive 2006/17/EC establishes the need for a consent specifying the purposes for which tissues and cells may be used, but it seems to refer to any therapeutic or research use, without the need for further specification (unlike the provisions on living treatment).

Finally, Italian law is silent about forensic autopsies, where, due to the existing legal loophole, removal for research purposes may be authorized by the public prosecutor even in the absence of explicit consent from the deceased, thus going beyond what is provided for by the current legislation.

OC27-4

The Legal Review of Expert Opinions in Medical Malpractice Cases: A Study of Supreme Court Decisions

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The development of medical specialties has increased the need for technical knowledge in the resolution of legal disputes, and consequently the importance of the expert witness system in judicial activities. This study investigates the reversal decisions given due to expert opinions in medical malpractice cases, classifies the reasons why the Supreme Court finds expert opinions unfit for consideration, and establishes the standards for expert opinions that are fit for consideration by the parties, the court, and the Supreme Court.

The study examines the reversal decisions given by the 13th Civil Chamber of the Supreme Court due to the insufficiency of expert opinions in medical malpractice cases filed between 2013 and 2018.

According to the results of the study, expert opinions in medical malpractice cases are found to be insufficient by the 13th Civil Chamber of the Supreme Court, mainly due to the following reasons:

- The opinions of the plaintiff are not fully met.
- The reports are groundless and conclude with abstract expressions.
- The contradictions between the reports are not resolved.
- The issue of informed consent is not examined by the expert.
- The report is prepared without the participation of an expert panel on the subject.
- Another expert opinion in the file or an expert opinion submitted by the parties is not taken into account in the expert opinion.
- The decision is inconsistent with the file scope.
- The report is prepared based on incomplete or unhealthy records.

In cases where expert opinions are found to be insufficient, the Supreme Court often specifies the need to obtain a new expert opinion from a panel of expert witnesses consisting of faculty members of medical faculties of universities that are fit for consideration by the parties, the court, and the Supreme Court.

OC27-5

Tele-Expertise: Telemedicine in the Field of Expertise. Ethical and Deontological Aspects

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Telemedicine can be defined as the provision of a healthcare service carried out by healthcare professionals using new Information and Communication Technologies (ICT).

The emergence of the COVID-19 pandemic led to the widespread use of telemedicine and other telematic means by most health services around the world. The main purpose of their use was to prevent the spread of infection, as it not only reduced human exposure between healthcare professionals and patients, but also reduced the community and nosocomial spread of infection. However, the use of telemedicine today has multiplied exponentially and the field of medical expertise has not escaped this.

The use of this care modality provides security for healthcare professionals and patients, avoiding unnecessary transfers and risks, while facilitating universal access to healthcare, regardless of whether it is healthcare or expert care. It is also capable of shortening waiting times and saving professionals and patients an infinite amount of time, with all the consequences that this entails.

However, the indiscriminate use of telemedicine in the expert field is not free of drawbacks and potential legal, ethical and deontological conflicts.

Legislation is not well defined and very few countries have addressed a minimum regulation of this modality of care.

In this paper we address the main legal, ethical and legal conflicts that may arise in the use of telemedicine in the field of medical expertise, a type of expertise that we call tele-expert, proposing this term to the scientific community.

All medical expertise must guarantee such essential issues as access to it, the professional qualifications of the expert, the unequivocal identity of the expert and the patient, the patient's consent to this type of expertise, compliance with minimum standards in the quality of the expertise, access to all the medical documentation necessary for the preparation of the expertise and the privacy, confidentiality and medical secrecy that must be similar to the face-to-face type.

The field of medical expertise must adapt without delay to the implementation of this new form of expertise, tele-expertise, which, on the one hand, will provide legal certainty for the experts and guarantee all the medical rights of the examinees.

OC27-6

The Proposal for European Regulation No. 2022/0402 to Recognize Parenthood from Surrogacy

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The European Union has proposed a Regulation to establish that if a child is the offspring of a couple in one state of the Union, the other states should also recognize parenthood, even if it arises from surrogacy.

It is controversial whether this solution is the best way to reconcile the couple's interests, the child's best interests, and the surrogate mother's dignity.

We argue that the automatic recognition of parenthood established abroad does not strike a proper balance. First, it is not in the child's best interests but serves the interests of adults who aspire to have a child.

Moreover, it encourages surrogacy, which undermines human dignity. It is preferable to give the judge the power to concretely determine whether it is in the best interests of the child to be adopted by the partner of the biological parent, as required by the Italian Supreme Court in alignment with the European Convention on Human Rights. Consequently, a stepchild adoption procedure needs to be completed to verify that the partner of the biological parent has shared the procreative plan and has been involved in the care of the child since birth.

OC27-7

User Satisfaction with a National Health Service Acute Hospital Medical Examiner Service in England and Wales: The Perspective of Next of Kin and Doctors

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INTRODUCTION: The new Medical Examiner (ME) system in England & Wales addresses the following issues: a) What was the patient's cause of death? b) Does it need to be notified to His Majesty's Coroner (HMC)? c) Are there any care concerns? Medical Examiners (MEs) 1) review the patient records; 2) discuss the case with the treating doctor (the Qualified Attending practitioner – QAP) including the proposed MCCD and if there are care concerns; 3) explain the MCCD to the Next of Kin (NoK) and ask whether they have any care concerns.

AIMS OF STUDY: 1) To determine the acceptability of the MES to QAPs; 2) To determine the acceptability of the MES to the NoK.

METHODS: Surveys were sent to QAPs and NoK.

RESULTS: 100/288 (34.7%) QAP surveys responded. 93% (n=100) considered the MES assisted in the formulation of MCCDs. For 76% QAPs (n=99) the MES suggested modifications to the MCCD. 79% (n=100) thought the MES helped determine whether cases needed referral to HMC. 91% (n=99) felt confident about raising concerns about patient care. 70% (n=100) felt the MES assisted in understanding after-death processes. On a scale of 1 (not at all likely) to 10 (very likely) when asked 'would [you] recommend a colleague to access advice and support from the MES?' 90% (n=100) QAPs scored 8-10.

179/279 NoK (65%) surveys were returned. Questions listed below give numbers and % of responses: When the ME or MEO phoned you, did they clearly explain their role to you and the reason for the phone call (responses)? Yes -164(93); No - 2(1); Can't recall - 10(6). Were they compassionate and polite at this difficult time? Yes - 171(97); No - 0(0); Can't recall - 5(3). Did they offer condolences for the loss of your loved one? Yes - 167(95); No - 1(1); Can't recall - 8(4). Did they discuss what would be recorded as the cause of death of your loved one? Yes - 166(95); No -4(2); Can't recall - 5(3). Did your conversation help you better understand the cause of their death? Yes - 155(89); No - 11(6); Can't recall - 9(5). 77 (45%) respondents reported care concerns. Of those with care concerns, 71 (92%) of these felt listened to. 85% NoK respondents rated the call from the MES as 'outstanding' or 'excellent'.

CONCLUSIONS: The ME system aims to identify poor care, occult crime, inappropriate treatment and escalate concerns. The ME system in England & Wales will review ~400,000 deaths per annum. The QAP and NoK contacts are key to the efficacy of the role and must be appropriately engaged. It appears that the ME system is well accepted by the NoK and QAP.

OC27-8

Changes in Nature and Outcome of Notifications to HM Coroner from the Norfolk and Norwich University Hospital, UK, Before and After the Introduction of a Medical Examiner Service: 2018 vs 2022

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INTRODUCTION: In England & Wales some types of death must be notified to His Majesty's Coroner (HMC) for further investigation. These are described in the Notification of Deaths Regulations 2019. Notification result in several different outcomes including post-mortem examination (PM), an inquest or no further action (NFA). The Medical Examiner Service (MES) is responsible for ensuring appropriate notification of cases to HMC. The Norfolk & Norwich University Hospital (NNUH) MES has documented the reasons for notification since the MES was introduced in 2019.

AIMS: To determine and compare: 1) the number and nature of notifications to HM Coroner for Norfolk from NNUH in 2018 compared with 2022 (after the introduction of the NNUH MES and the new Notification Guidelines); 2) to determine the outcome of those notifications; 3) to establish patterns of change in the number and nature of notifications in 2022 compared with 2018.

METHODS: Data were extracted from the NNUH and HMC databases and comparisons of the two datasets were made to determine any differences between notifications to HMC and outcomes between 2018 and 2022.

RESULTS: There were 2605 deaths at NNUH in 2018 and 2969 in 2022. There were 659 (25.3%) notifications to HM Coroner from NNUH in 2018 and 522 (17.6%) in 2022. There were no significant differences in % notifications between the two years for most categories including violence, trauma or injury (32.9 vs 27.8); unknown cause of death (26.5 vs 25.9); injury attributable to employment (5.5 vs 6.2); identity of the deceased is unknown (0.2 vs 0.2); and poisoning, including by an otherwise benign substance (0.2 vs 0.0). A significant decrease in notifications was noted for persons undergoing any treatment or procedure of a medical or similar nature (24.0 vs 16.2) $p<0.0014$. A significant increase in notifications was noted for neglect, including self-neglect (3.3 vs 12.2) $p<0.001$. Of post-mortems undertaken to establish cause of death 14.1% remained unascertained in 2018 and 13.8% in 2022. Of the coronial outcomes there were significant increases in the numbers of post-mortems (29.3 vs 35.5) $p = 0.0276$ and inquests (26.0 vs 31.4) $p = 0.0485$). There was a significant decrease in NFA by HMC (5.7 vs 2.3) $p= 0.0485$).

CONCLUSIONS: This study shows that there has been a real change in the nature of some HMC notification categories, in that they are more appropriate, and result in an increased proportion of inquests and post mortems with a reduction in 100A or no further action outcomes. These findings represent the early days of a developing and maturing service and indicative of better quality of notification to HM Coroner and thus ensuring appropriate further investigation of those deaths which warrant it.

Oral Communications 28: Forensic Imaging III

OC28-1

Postmortem Computed Tomography (PMCT) Scans with 3D Reconstruction as a Tool to Investigate Gunshot Wounds – A Homicide-Suicide Case Report

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INTRODUCTION: Forensic radiology, particularly postmortem computed tomography (PMCT) scanning, has become an invaluable tool in investigating gunshot wounds. CT scans generate detailed cross-sectional images, allowing forensic experts to visualize and analyze the trajectory of projectiles within the body. Advanced software can be employed to reconstruct the acquired CT images into a detailed 3D model of the affected area. This process is crucial to identify key structures such as bones, blood vessels, and vital organs, conceiving the complex paths that projectiles may take through tissues and organs.

CASE 1: 44-year-old woman with no relevant pathological history. She reported to the police being a victim of domestic violence, involving verbal abuse, stalking, as well as threats of kidnapping, rape, and death. The alleged perpetrator was her former partner, with whom she lived for 14 years, having a child together. One day, after requesting a meeting, he shot her with a firearm. Autopsy findings revealed three entrance wounds (head, chest and left hand) and one exit wound (left hand). Death was attributed to traumatic craniomeningoencephalic and thoracic injuries.

CASE 2: 59-year-old man with no criminal record. He called his brother saying he had killed his former partner and was going to commit suicide. The brother immediately called the police, who quickly rushed to the crime scene. The man was found inside his car, sitting in the driver's seat, with the arms bent over and head falling forward. When the police moved the body, they found a gunshot wound in the head and a firearm near his feet. The autopsy revealed traumatic craniomeningoencephalic injuries as the cause of death.

Both corpses underwent a PMCT scan with 3D reconstruction. We were able to determine three gunshot paths in Case 1 and one gunshot path in Case 2.

CONCLUSIONS: We report a homicide-suicide case, a rare form of domestic violence. The application of PMCT reconstructions in forensic medicine for gunshot wound analysis provides detailed insights into the trajectory of projectiles. These findings are part of the forensic investigation and can be essential in legal proceedings, helping to establish the circumstances surrounding the gunshot injury.

OC28-2

PMCT in Cases of Multiple Gunshot Wounds: The Only Way to Perform a Targeted Autopsy

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Gunshot wounds pose a significant challenge for forensic pathologists due to several factors, such as the variability of the type of firearm, the firing distance, and the fragmentation of the bullet. Post-Mortem Computed Tomography (PMCT) and 3D reconstruction serve as powerful tools for the investigation of firearm injuries contributing to the resolution of criminal cases. Especially, PMCT may allow easy detection of retained bullets, analysis of bullet trajectories within the body and identification of bone fractures. It also enables the documentation of imaging results in legal proceedings. In this presentation we report two cases of fatal firearm injuries that underwent full forensic examination at the Section of Legal Medicine of Università Cattolica del Sacro Cuore. Each corpse underwent a spiral/multidetector PMCT. In addition, 2D and 3D multiplanar reconstructions, along with a comprehensive conventional autopsy, were carried out. In Case 1, PMCT showed firearm injuries in the sacral region, including multi-fragmentary burst fractures of the sacral body, both sacral flaps, S1 superior articular processes, and iliac wings. Moreover, a marginal fracture of the right inferior articular apophysis of L5 and multiple bone fragments within the small and middle gluteal muscles bilaterally were reported. In Case 2, PMCT revealed marked subcutaneous emphysema in the head, neck and thorax. Additional findings included pneumothorax, pneumomediastinum, pneumopericardium, pneumoperitoneum, and retro-pneumoperitoneum. Bilateral pleural effusion with high density, indicative of hematic origin, was observed. A hyperdense/metallic foreign body (i.e., bullet) was identified in the left dorsal suprascapular region. An injury to the right lateral thoracic wall was identified as a probable bullet exit point, which was detectable especially in 3D reconstructions.

In both cases, PMCT findings were correlated with those found at conventional autopsy.

These case reports depict the importance of PMCT as a reliable diagnostic tool in the investigation of fatal gunshot injuries and the advantages offered by a multidisciplinary approach given by the combination of different forensic techniques.

OC28-3

Forensic Interpretation of PMCT Findings in Charred Bodies: An Italian Bicentric Study

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Post-mortem computed tomography (PMCT) is able to provide essential information in forensic field, in particular flagging traumatic features (especially bone lesions) and foreign objects (like prothesis for personal identification). The main challenges in the forensic investigation of charred bodies are 1) to infer on whether the victim was alive when exposed to heat (i.e., to discriminate events of potential legal/medico-legal value from accidental deaths), 2) to distinguish traumatic from heat-related lesions (e.g., skull and long bones fractures), 3) to help in identifying the victim, especially when the visualization of external characteristics of the body (e.g., facial structures and genitalia) is impeded by the extent of the carbonization. PMCT allows to guide and broaden forensic investigation, being often able to detect features that help in inferring the viability of the victim at the time of the exposure to heat, to distinguish traumatic from non-traumatic lesions and to detect primary and secondary identifiers. However, PMCT also shows many features that are related to heat but are of no forensic interest. In our bicentric study, we performed PMCT on 15 cases of charred bodies (10

males and 5 females) collected at the Florence University (Florence, Italy) and Catholic University of The Sacred Hearth (Rome, Italy) before the external examination and/or full autopsy examination. In both the institutions, PMCT was performed through a Siemens SOMATOM 16-slice CT scanner (Siemens Aktiengesellschaft, Berlin, 2010).

The aim is to critically analyze the recurring features found at PMCT in charred bodies, focusing on if and what forensic significance/implications they are able to convey.

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OC28-4

Analyzing Burnt and Cremated Bones by CT Scanning: Lessons from Archaeology

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Recovering and analyzing burnt and cremated bones form part of forensic pathological and anthropological casework. As with unburnt, dry bone finds, the analyses focus on evaluating age and sex. However, burnt and cremated bones are brittle and easily break up into smaller pieces when handled, especially when retrieved from the place of find, e.g., a soil matrix.

We have analyzed archaeologically found cremated and burnt remains from 40 Danish Bronze Age cremation graves and 4 urns by applying CT scanning and micro-excavation. We found that CT scanning and 3D segmentation allowed us to better record the amount of preserved bone; to visualize the bones (especially the trabecular bone); and hence extract relevant bone structures for sex and age estimation.

In most of the cases, this information could not be retrieved from the cremated bones after micro-excavation and retrieval from the matrix. Trabecular bone may be preserved to some degree in situ in the urn, but crumbles and is very difficult to retrieve intactly from the matrix. This may in turn lead to under-estimation of preserved bones and bone structures. Specifically, bone structures such as acral articular surfaces with thin compact bone, may also disintegrate. This is a problem as these bone parts may be of special significance for judging age, e.g. growth place fusion and joint surfaces of iliac bone surface morphology. While bone elements with compact bone may be better preserved, the integrity of long bones is also disrupted when excavated. This is due to the heat-related fragmentation with the characteristic thumb nail fractures. This is a problem as long bone length and bone robusticity is used for assessing stature and sex.

This presentation will show examples of how cremated bones and bone structures may be analyzed by in-situ CT-scanning, image segmentation and 3D post-processing, as compared to analysis of excavated cremated bone fragments.

OC28-5

Forensic Puzzle Solving: Deciphering a Decapitated Body – A Forensic Case Report

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INTRODUCTION: Decapitation cases present challenges in forensic medicine due to the intricate nature of these incidents. The forensic examination includes the determination of the level of decapitation, the associated injuries to the subsequent search for missing body parts, and subsequently unravel the identity of the decedent. The unique circumstances surrounding decapitation cases demand a comprehensive understanding of forensic techniques, anatomy, and investigative procedures to reconstruct the events accurately.
This case explores the multifaceted challenges encountered in forensic medicine when faced with decapitated bodies, emphasizing the need for meticulous examination and collaborative efforts to unravel the mysteries surrounding such cases.

CASE REPORT: A decapitated body, discovered in an advanced state of decomposition. Post-mortem CT-scan and forensic examination revealed a level of decapitation at C5. The vertebra showed a two-spot loss of bone tissue. Anthropological study of the available bones was done to identify the gender, the height and the age of the victim. Four days following the discovery of the body, the perpetrator was apprehended, and provided critical information on the location where the decapitated head was disposed. Post-mortem CT-scan and forensic examination of the cephalic end showcased a perfect correspondence with the cervical vertebrae, while linear fractures were observed on the last vertebra (C4). This detailed analysis provided critical insights into the dynamics of the decapitation event.

CONCLUSION: This forensic case report highlights the effective collaboration between forensic experts, imaging experts and law enforcement agencies in solving a complex crime and intricate forensic puzzles involving decapitation.

Oral Communications 29: Child Abuse I

OC29-1

Factors Influencing the Disclosure of Sexual Abuse in Minors: Study of 40 Cases

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BACKGROUND: Throughout history, sexual abuse of minors has had enduring, detrimental effects. Despite its prevalence, obstacles hinder the disclosure of such incidents. The objective of this study is to highlight profile of sexual assaults in the context of forensic consultation, and then analyze the various factors influencing the disclosure of sexual abuse in minors.

METHOD: This qualitative and quantitative prospective study was conducted from December 2017 to February 2019, involving 40 cases of sexual abuse of minors, collected at the medicolegal institute of the IBN ROCHD University Hospital in Casablanca.

RESULTS: Notably, the study revealed that these assaults predominantly affected girls from lower socio-economic backgrounds, with the perpetrator often being a known but non-familial male. The modus operandi typically involved solitary acts in the perpetrator's residence, encompassing various forms of sexual assault, including penetration, often accompanied by coercion or violence. Among the factors influencing the disclosure of sexual abuse in minors in our study: the relationship between the victim and the perpetrator, the frequency of abuse, the manner of disclosure, and the fear of negative consequences if the abuse is disclosed. The inconclusive nature of physical evidence emphasized the significance of prioritizing the victims' testimonies.

CONCLUSION: The study underscored the rarity of intrafamilial abuse and the frequent occurrence of abuse involving penetration. It also emphasized the critical role of timely disclosure and the importance of creating a supportive environment for victims to come forward.

Detection and intervention by families and responsible individuals were highlighted as pivotal in preventing further abuse. Additionally, it emphasized the vital role of medical intervention, serving both therapeutic and legal purposes.

OC29-2

A Decade of Child Protection Center Experience

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AIM: This study is designed to understand the profile of child sexual abuse cases reported to the interdisciplinary child protection unit, identify the risk factors associated with these cases, and develop effective protection strategies in this regard.

MATERIALS AND METHODS: A retrospective analysis was conducted on cases referred to the Child Protection Unit between 2012 and 2022, considering demographic characteristics, family structures, types of sexual abuse, and psychiatric evaluations from unit records. Data analysis utilized percentage ratios and statistical methods.

FINDINGS: Of the 579 cases of child abuse included in the study, 74.3% are female children. It is claimed that 98.3% of the cases have experienced sexual abuse. 30.4% of the cases have non-intact family, and 22% were within the scope of incest. According to psychiatric evaluations, 76.5% of the cases have received at least one psychiatric disorder diagnosis. The most common diagnoses among these are Post-Traumatic Stress Disorder (PTSD) and major depression (MD). Additionally, a history of suicide attempts was identified in 15.3% of the cases.

CONCLUSION: According to our findings, sexual abuse is essentially a psychological trauma, and additionally physical trauma. Therefore, a system should be developed to monitor and rehabilitate every child exposed to sexual abuse. Given the high frequency of sexual abuse even within their own families which they should feel safe, it is essential to educate children from a young age on this matter.

OC29-3

The Importance of Holistic Forensic Medicine Approach to Chronic Sexual Abuse in Childhood: Case Report

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INTRODUCTION AND OBJECTIVE: Child abuse is not only a crime but also a biopsychosocial problem that concerns all segments of society. There are different legal regulations on child abuse in the world. In Article 6 of the Turkish Penal Code, individuals under the age of 18 are considered as children.
In our country, sexual acts against children are considered within the scope of sexual abuse crime. In the criminal sanction of these acts; apart from the documentation of the incident; it is also important whether there is a qualified case (aggravating factor).
In this case report, our aim is to discuss the medical procedures performed within the scope of the holistic evaluation of the patient and their legal effects.

CASE: An 18-year-old female patient, who was referred to our department in December 2023, was requested by the prosecutor's office to have a body examination and to prepare a forensic report on whether there were any traces of sexual abuse and traumatic event on her body.
In her anamnesis, she stated that when she was 11-12 years old, her cousin's 18-year-old boyfriend kissed her one day, deceived her by saying nice words, had sexual intercourse, sexual intercourse occurred approximately every 2-3 days in the next 7 years, pregnancy occurred in February 2022, she had curettage by concealing her identity, she had been receiving psychiatric treatment for 1 year, and she attempted suicide in June 2023.
On examination; no traumatic lesion was found on her body and anogenital region. Hymen was evaluated and verrucous lesions were seen in the anal region. Gynecology, dermatology, infectious diseases and psychiatry consultations were requested. A medico-legal evaluation was performed in accordance with the responses received from the relevant departments.

DISCUSSION AND CONCLUSION: Child abuse is not only a crime but also a public health problem that concerns all segments of the society. In addition to the competence of the team performing the forensic medical evaluation, the importance of a biopsychosocial approach to the case for both our patients and the functioning of the justice system should not be ignored.

KEYWORDS: child abuse, forensic medicine, HPV, pregnancy

OC29-4

"Compressed Baby Head": A New "Abusive Head Trauma" Entity?

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Child abuse represents an important issue in the medico-legal and social context. The term child abuse identifies multiple nosological entities that have been studied and categorized over the years. Indeed, child abuse encompasses abusive injuries of various types and entities, including acts of violence, sexual or non-sexual, as well as cases of neglect in the care, affection, and attention of a minor. In the last few decades, various aspects and mechanisms have been identified in child abuse case studies. After the case presentation, we will present a case of a new entity of Abusive Head Trauma that has come to the attention of medico-legal experts. First, the American Academy of Pediatrics and later the Centers for Disease Control and Prevention (CDC) defined the term abusive head trauma (AHT) to identify the set of clinical manifestations and injury mechanisms associated with abusive head injuries, judging the term to be more appropriate and precise Discussion: The trauma analysis performed on the cranio-encephalic district of the baby revealed quite peculiar lesions that led the authors to exclude that the injuries had been solely caused by violent shaking of the baby's head, as suggested by Shaken Baby Syndrome. Instead, we hypothesized that another lesion mechanism had been added to this one, namely latero-lateral cranial compression. The comprehensive and exhaustive analysis of the case led the coroners to present a new possible entity in child abuse trauma, namely 'Compressed Baby Head'. The presence, in fact, of two symmetrical fracture complexes on the parietal bones, one of which was larger (on the right) and one of which was smaller (on the left), led the authors to assume that this injury was produced by a double coeval impact, from both cranial surfaces, right and left, caused by a compressive action at the cranial level applied laterally.
First lesion complex, at the level of the left parietal bone, presented a cranial fracture with a linear course, starting from the sagittal suture, with craniocaudal direction. There was an extensive subgaleal haematoma in the parieto-occipital area.
Second lesion complex, on the right parietal bone, presented a fracture complex consisting of three radiating fractures branching off from the 'point of impact': inferior "branch" (A); upper "branch" (B); posterior "branch" (C). The author proposed the diagnostic criteria for the definition of 'Compressed Baby Head'. The medical and forensic literature is of great help in identifying and recognizing even the most complex cases of child abuse, and the guidelines offer important help and recommendations to handle the case properly and the abused child. In the current literature, no similar clinical cases have ever been described. The case's uniqueness deserves to be brought to the attention of experts and the entire scientific community.

OC29-5

Medico-Legal Investigations in Maternal Deaths

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OBJECTIVE OF THE STUDY: This study primarily aims to describe the epidemiological profile and causes of maternal deaths identified through autopsies at the Ibn Rochd University Hospital in Casablanca.

MATERIALS AND METHODS: This was a series study of 57 cases of maternal deaths collected at the Institute of Legal Medicine of the Ibn Rochd University Hospital in Casablanca over a period of 15 years, from January 2009 to December 2023. We examined all cases in which a woman was pregnant or had given birth within 42 days before death, regardless of the cause of maternal death.

RESULTS: Over this 15-year period, 57 maternal deaths underwent autopsy. The age group between 21 and 30 years was the most represented, with age extremes ranging from 17 to 44 years. Among the deceased women, 32% were primiparous. These deaths occurred in the postpartum period in 67% of cases and during all three trimesters of pregnancy in 35% of cases. After autopsy and histopathological and toxicological examinations, the causes of death were directly obstetric in 75% of cases, with 45% attributed to hemorrhages.

CONCLUSION: Literature data on medico-legal studies of maternal deaths are varied worldwide and not well-documented in our country. Medico-legal investigation is part of the action plan to reduce maternal mortality.

KEYWORDS: Maternal death; medico-legal investigation; autopsy

Oral Communications 30: Forensic Pathology IX

OC30-1

Global Overview of the Utilization of Postmortem Imaging in Medicolegal Casework

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Over the last decade the utilization of postmortem imaging in forensic casework has increased, as is indicated by the increase in publications addressing this subject. During the 2023 International Society of Forensic Radiology and Imaging (ISFRI) congress in Toulouse, an inspiring discussion amongst the attendees arose on how often an autopsy is still performed after a whole-body PMCT has been obtained. The primary objective of this ISFRI endorsed study is to provide a global outline of the current application of postmortem imaging techniques, especially PMCT, in relation to autopsy practices within forensic casework.

An online survey using Qualtrics® was created addressing the use of postmortem imaging in forensic casework. To ensure a global perspective, the aim of this study was to receive one response from organizations or institutes conducting or using postmortem imaging in forensic casework. Therefore, the online survey was sent to current ISFRI members, an attendance list of an ISFRI congress as well as to corresponding authors of recent publications (2013 to 2023) addressing forensic imaging with a deadline on March 1st 2024. An anonymous link was used making it possible for every approached individual to share this link with any individual, organization, or institute they deem should participate. The link was also shared on LinkedIn.

(EXPECTED) RESULTS: The survey included questions about which postmortem imaging techniques are applied, the average amount of postmortem imaging studies performed, who reads and reports the PMCT images, who decides whether or not to perform a full autopsy after PMCT, the legal aspects of this decision, in what kind of cases is postmortem imaging applied, and if the use of postmortem imaging affects the autopsy rate.

We expect that with the diversity of questions from this survey the results will show a variety of approaches on how to implement postmortem imaging in different forensic cases within a variety of legal systems. It will provide crucial information that will enhance our understanding of the application of these methods in forensic casework and can therefore contribute to national and international guidelines.

OC30-2

Fatal Ileo-Ileal Intussusception in a 16-Year-Old Female with Peutz-Jeghers Syndrome: A Case Report

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INTRODUCTION: Peutz-Jeghers syndrome, is a rare hereditary disorder characterized by intestinal polyposis and mucocutaneous pigmentation and is known for its association with various gastrointestinal complications. Among these, ilio-ileal intussusception stands out as a distinctive yet potentially life-threatening manifestation.

OBJECTIVE: The study aims to provide insights into the rare occurrence of intussusception in adolescents, particularly in the context of an underlying genetic predisposition, in this case a Peutz-Jeghers syndrome.

CASE: A 14-year-old female with acute onset of abdominal pain and vomiting of two days. and a history of recurrent slight abdominal pain died shortly after admission to the emergency department, before any diagnosis was made. The autopsy findings revealed an ileo-ileal intussusception as the primary cause of death, prompting a retrospective examination of the patient's genetic background. The review of the patient's medical history unveiled a previously undiagnosed Peutz-Jeghers syndrome, a hereditary condition associated with intestinal polyposis and an increased risk of various malignancies. Genetic analysis of the patient's father showed a similar anomaly. The patient was lost to follow-up a few months after this diagnosis, due to financial issues.

CONCLUSION: This case underscores the importance of considering unusual gastrointestinal presentations in pediatric patients and highlights the significance of a thorough post-mortem analysis. The identification of Peutz-Jeghers syndrome in this case emphasizes the importance of recognizing hereditary factors in seemingly isolated incidents of ileo-ileoa intussusception. Increased awareness among healthcare professionals, coupled with comprehensive genetic evaluations, is crucial for timely diagnosis and intervention in similar cases.

OC30-3

Drowning Deaths in Attica, Greece: A Forensic Approach

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According to the WHO, drowning accounts for 7% of all injury-related deaths, thus being the third leading cause of unintentional injury death worldwide. Hellenic Statistical Authority recorded 78 and 105 drowning deaths in 2020 and 2021 respectively in Greece.

A retrospective analysis of the cases from the region of Attica, examined at the Department of Forensic Medicine and Toxicology of the Athens School of Medicine between the years 2021 to 2023, was performed.

A total of 98 cases of drowning death victims were retrieved, 63 (64%) of which were male and had a mean age of 73,7 years old, ranging from 41 to 95 years old and Greek natives constituted 89 (90%) of the victims. Most of them (40 out of 98) were married (40%) and were retired (74%). The most common place where the drowning occurred were various beaches of Attica (88 cases, 90%), while 4 of them occurred in ports and 2 of them in private pools. 84 of the cases occurred during the warm months in Greece (May-September). Accidental or suicidal submersion in water, constituted 12 of the examined cases (13%). Incidence of drowning deaths peaked during noon (14:00-16:00) and a second lower peak formed in late afternoon (19:00-21:00).

From a total of 98 victims examined, 62 of them (63%) presented cardiovascular diseases (commonly coronary disease), 20 of them (20%) neurological diseases (commonly Parkinson's) and 23 of them (23%) known psychiatric conditions (commonly depressive disorders).

Food consumption prior to swimming was confirmed in 28 cases (29%), while toxicologic examination proved that 10 of the victims (10%) consumed alcohol prior to drowning, (range: 0,34 mg/ml - 3,68 mg/ml). Cocaine was detected in one case and psychoactive drugs (antidepressants and benzodiazepines) were detected in 27 victims (28%).

During November 2022, a shipwreck off the coast of Evoia island involving 27 asylum seekers occurred. To ensure demographic data reliability, we opted to examine these cases separately. The mean age of the victims was 26,6 years old, (range: 12-60), while 17 of them (70%) were male.

According to the present study, most drowning victims in Attica were male, elderly, of Greek origin. From the underlying pathology ascertained by the post-mortem examination cardiovascular and psychiatric disease were the most common. Apart from the shipwreck incident, no children or adolescents were present in the sample examined, a finding in discordance with the literature. Possibly, close Greek family bonds deter most accidents of young children and people in Greece are accustomed to swimming since childhood because of the easy access to beaches in Attica. Based on our findings, the most common modifiable drowning risk factors are food and alcohol consumption prior to swimming.

OC30-4

Isolated Cranial Blunt Trauma: Discussion of the Medico-Legal Form and the Injuring Object

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INTRODUCTION: Deaths resulting from blunt cranial traumas are common, often categorized as accidental or criminal. The purpose of the autopsy is to examine cranial lesions, particularly those affecting the bones, with the objective of determining the medico-legal nature of the injuries and the object that caused them. This study aims to discuss the medico-legal nature of the injuries and identify the causing object based on the lesion characteristics observed during the autopsy.

OBSERVATION: A 55-year-old adult with no notable medical history, was found unconscious in the street on 14/08/2023 around 7 a.m. Upon admission, he was in a mild coma (Glasgow Coma Scale 10/15), associated with an elevated blood pressure and tachycardia. An ethylic breath and a centimetric contused occipital wound were noticed. An emergency brain scan revealed a severe head injury with extradural and subdural hematomas causing mass effect on the ventricular system, along with fronto-edematohemorrhagic lesions and a comminuted left parietal embayment fracture. The patient's neurological condition worsened, leading to his death on 15/08/2023 at 03:55. A medico-legal autopsy was performed. The external examination and the autopsy revealed a severe cranial trauma consisting of a centimetric median occipital wound, associated with brain and meningeal lesions similar to those reported on the CT scan. Regarding the bone lesions of the cranium, there was a 6 cm diameter left occipital embayment fracture with the depression of two bone fragments near its supero-internal end, a left fronto-parietal fracture, and a fissure extending to the homolateral temporal bone. Furthermore, an ecchymotic abrasion had been found on the posterior aspect of the left elbow, measuring 2 cm in its longest axis.

CONCLUSIONS: In cases of doubtful isolated cranial traumas, the criminal form should be considered first and foremost. In these litigious cases, the results of the judicial investigation are crucial to confirm the medico-legal form.

OC30-5

Subdural Haemorrhage in Lower Spine – A Puzzle to Complete the Picture of Shaken Baby Syndrome

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Shaken baby syndrome (SBS) is certainly the most recognized pattern of abusive head trauma in children. Forceful repetitive head movements produced by violent shaking an infant present a mechanism which is widely accepted in the forensic community as being suitable to produce the injuries. The triad of intracranial subdural haematoma, retinal haemorrhages and hypoxic-ischaemic encephalopathy is considered to be highly suggestible if not pathognomonic for SBS, especially when supported by circumstantial evidence. Since the gross findings at autopsy can be of variable extent or even absent, additional neuropathology and neuroradiology procedures – the latter bringing to light bleeding in spinal cord visible on MRI – are very welcome in verifying the diagnosis of SBS.

Herein, we present a case of two-month-old whose father called the emergency reporting the sudden collapse of the infant. Upon arrival, breathing and pulse was absent with asystole on ECG. Resuscitation recovered cardiac action, with the need for assisted respiration and GCS 3. Clinical examination at hospital admission revealed no injuries. CT scans showed extensive brain swelling, bleeding in subdural space of brain, scant subarachnoidal bleeding and bilateral retinal bleeding. MRI was not performed. Repeated CT scanning of the brain in the following days showed progression of encephalopathy which was in accordance with poor clinical condition. On the day 4, death was pronounced.

Forensic autopsy confirmed findings of diagnostic imaging, but also revealed pronounced bleeding in subdural space along the spinal cord canal, clearly visible in cervical, thoracic and lumbar segment. Death was classified as violent, due to traumatic subdural bleeding and brain lesion.

State attorney's office ordered investigation against the father which resulted in indictment for child abuse with lethal outcome. Court trial ended in pronouncing him guilty and sentencing.

We live in the era of continuous extending the clinical diagnostic workup, which – in case of patient's death – makes forensic autopsy more comfortable task. Still, some important findings can be clinically overlooked and therefore the responsibility of forensic medicine to perform detailed and comprehensive autopsy remains actual. Present guidelines encourage us to our best when conducting the autopsies. On the other side, limited resources could compromise the excellence of work of many forensic doctors, even in developed countries. However, we believe there is no excuse for any of us to resign sticking to the autopsy guidelines, especially in sensitive cases of deaths in infant age. Doing that way, on many occasions we will be able to provide additional findings useful for making medicolegal expertise. In this particular case, forensic medical expert – provided with autopsy finding of spinal subdural bleeding – disposed of important fact to support the conclusion that the death of a child was attributable to the act of shaking.

Oral Communications 31: Child Abuse II

OC31-1

A Centre of Excellence for Child Abuse and Forensic Pediatric Medicine

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The provision of clinical forensic medical services (i.e. the medical and legal aspects of patient care) to both adults and children varies considerably around the world. Paediatric forensic medical services (child sexual and physical abuse and neglect) are very well organised in some regions of the United States of America and some specific jurisdictions elsewhere. In many locations, however, it is fragmented and it some regions non-existent. Where services are provided, their provision is not always within the ideal location which is hospital based. Training of paediatric forensic practitioners is similarly variable.

The Victorian Paediatric Forensic Medical Service (VFPMS), co-located at the Royal Children's Hospital and Monash Children's Hospital in Melbourne, has evolved into a Centre of Excellence for child abuse and forensic paediatric medicine. Established in 2007 as a 24-hour, 7-day a week specialist service, VFPMS provides inpatient and daily outpatient services in both hospitals. In addition, it provides advice to paediatricians and general practitioners throughout the state of Victoria, a state about the size of the United Kingdom and twice the size of Greece but with only a population of about 6.7 million people (5 million living in Melbourne). VFPMS is independent of police and the judicial system and is funded by the health department. It is staffed by a full-time director and deputy director, about 10 sessional specialist paediatricians (plus one forensic physician), 3 – 4 registrars/fellows, two effective full-time nurses, and two administrative staff. Patients range in age up to 18 years and include acute sexual assaults, physical abuse and neglect cases. Forensic opinions based on the available medical records are also provided on request from police. All the specialist staff are required to undertake or to have undertaken further training in forensic medicine and usually this means completing the Master of Forensic Medicine course run by Monash University. Research is encouraged and increasingly undertaken. Medico-legal reports are written for all cases seen and all reports are peer-reviewed before release. Case discussions and reviews are conducted on a monthly basis. The service is one of the few accredited training positions in forensic medicine in Australia. Despite initial hesitance from the general hospital paediatric community, the benefits of having a specialist forensic service familiar with the medico-legal system that is separate to the treating practitioners is now widely accepted. With direct benefits to both the patients and judicial system, VFPMS has become a Centre of Excellence and provides an ideal template for quality forensic paediatric medical services in other jurisdictions.

OC31-2

The "Athenian Child Abuse Task Force" – 2 Years of Multidisciplinary Approach

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According to WHO, both physical and sexual children abuse constitute a major global health and social problem. It is estimated that worldwide 23% of children are physically abused, while 18% of girls and 8% of boys are sexually abused at least once during the childhood and adolescent period. Allegations filed for children abuse in Greece appear to have increased during recent years, thus increasing workload in involved services. More specifically, in the Department of Forensic Medicine and Toxicology of National and Kapodistrian University of Athens, workload relevant to child abuse cases (either physical or sexual) has more than doubled during recent years. From 1st January 2022 to 31st December 2023, some 216 allegations were filled at the Public Prosecutor's Offices in the Attica Metropolitan Region. These cases were referred to our Department for clinical forensic evaluation. Most allegations concerned sexual abuse (71.76%), just 6.02% concerned physical abuse, and approximately 4.17% involved both. Not all cases of filed allegations were examined, as in our sample 20 minors (9.26%) did not show up for examination, whilst 17 (7.87%) did not consent to be examined. In our sample, 22.69% of the victims were hospitalized. In most cases the timing of allegation filing prohibited prompt forensic evaluation. More specifically, 71.76% of cases filed after the lapse of 3 days, 20.83% after one year and merely 11.11% within the first 72 hours. As multi-disciplinary co-operation in the forensic evaluation context is considered invaluable in our Department, we collaborate with either a pediatrician (23.61%), a gynecologist specialized in children and adolescence gynecology (28.70%), or both (26.85%). Sex distribution clearly demonstrates the predominance of girl victimization (77.31%), while puberty seems to be a rather vulnerable time (49.54%) regarding the matter in question. As expected, most victims were Greek nationals. Victim's psychiatric history (e.g. depressive disorders) represented an acknowledgeable factor in abuse cases (12.04%). Single parent families were a rather important finding which involved 41.20% of cases, while 10.65% of victims resided within social support institutions/organizations. Alleged perpetrator was the father (24.54%), or another relative (31.02%), or a friend (23.15%). In 16.20% of cases, girls have reported consensual sexual intercourses before or after the alleged incident. Evidence of past sexual contact was attainable in 15.28% of cases, while on the other hand evidence of a recent one (e.g. hymenal tears, lacerations of posterior fourchette) was ascertained in just 1.39%. In 6.02% of cases superficial notches/clefts were noticed. Self-harm injuries were ascertained in 7.41% of cases, while injuries suggestive of physical abuse were present in 6.02% of cases.

OC31-3

Questioning the Safety of Children at Home Following Two Recent Child Abuse Case Reports

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CASE REPORT 1: A 7-year girl child was brought to the Emergency Department after reportedly falling 8-9 days earlier. Examination revealed two burn wounds on the front of both legs. The history provided stated that the mother applied oil to the child's body and had made her sit close to the fireplace because she was having difficulty moving and got burnt in leg region. However, there is a discrepancy between the reported history and the nature of the injuries.

CASE REPORT 2: A 4-year-old boy was brought to AIIMS Bathinda's emergency department after reportedly ingesting paraquat poison at home. Further investigation with his grandfather revealed that the child's grandmother had administered the poison. The grandfather, noticing the boy's worsening condition, quickly took him to a nearby Primary Health Center for gastric lavage and initial treatment. He was then referred to our Emergency Department for advanced care. Laboratory tests showed elevated urea and creatinine levels and hematuria, indicating acute kidney injury. The child received treatment in the pediatric department for three days before being discharged without any complications. This case is noteworthy due to the unusual

nature of homicidal poisoning by a close family member, a fact confirmed during the police investigation.

In India, where family dynamics and caregiving structures are diverse, this issue is particularly pressing. The establishment of robust systems for monitoring and supporting both caregivers and children is crucial. This includes enhancing the capabilities of foster care systems and ensuring they are equipped with the necessary resources and training to identify and prevent potential harm to children in their care. By fostering a culture of shared responsibility for child welfare, communities can help identify at-risk children and intervene appropriately. Training community leaders and members in child safety and protection can significantly contribute to creating safer environments for children.

Building a network of support and safety around each child, especially in more vulnerable areas such as foster homes, is imperative to ensure their well-being and security in what should be their safest environment - their home.

KEYWORDS: Paraquat, Poisoning, Homicide, Acute kidney injury, burn, child abuse

OC31-4

The Medico-Legal Diagnosis of Burns Among Children in Forensic Clinical Practice

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Burns among children are not rare. Although medical care is consensual and theoretically does not raise a problem when burns are minor, the context of their occurrence might be questionable. In these situations, clinical forensic consultations are required. The aim of this study was to analyze the medico-legal aspects of burns among living children.

We conducted a retrospective study over a period of three years, from January 1, 2021, to December 31, 2023. This study was carried out in INJED, the forensic clinical unit of Charles Nicole Hospital in Tunis, Tunisia. We collected all cases of burns among consultants aged between 0 and 18 years old. We were interested in the profile of the child, the context of the medico-legal consultation, the characteristics of the burns (alleged circumstances of happening, localization, age, the assumed burning tool/mechanism, etc.), and their medico-legal qualification (criminal or accidental).

We collected 28 cases of burns within our study. The majority of victims were females, with a sex ratio of 4.6. The mean age of the victims was 11 years old, with extremes of 2 and 17 years old. When data were available, nearly half of their parents were married (n = 12; 46.4%), and five of them were separated. The majority of children were examined in a context of alleged physical child abuse (n = 12; 42.9%), and nine cases were about a combination of sexual and physical assault. Burns were not systematically related to the primary reason for consultation and were incidental findings in four cases. In thirteen children, a member of the family was defined as the aggressor (mother = 7; father = 2; both parents = 1; sister =1; stepmother = 1; other member of the family = 1). Aggressors were recognized in 85.7% of cases (n = 24). None of the burns were auto-inflicted, and children identified the circumstances of their occurrence when they could express themselves. On clinical examination, burns were old in the majority of the cases at the time of consultation (n = 16; 57.1%). Burning cigarettes were the most used source of heat (n = 16; 57.1%), testifying to the criminal character of the burn. Among the four cases of alleged accidental burns, only one was forensically consistent with the sayings of the accused mother. The characteristics of the three other cases were not conclusive.

In conclusion, differentiating between accidental and criminal burns may be challenging in forensic clinical practice, especially when the responsibility of the parents is questionable.

KEYWORDS: medico-legal, child, abuse, burns, Tunisia

OC31-5

Multiomics Approach in the Discovery of Biomarkers for Pediatric Abusive Head Trauma

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INTRODUCTION: Abusive head trauma is a leading cause of mortality and morbidity in infants. Recent studies have shown an incidence of 38,8 cases for 100'000 births per year. Incidence of Shaken Baby Syndrome (SBS) could be higher than accidental head trauma.
Diagnosis of SBS is hard in acute cases with atypical presentation, as well as in subacute and chronic presentation. At the present time, there is a lack of diagnosis tests for these clinical entities. This is why diagnosis of SBS often remains uncertain due to absence of confirming evidence.
Recent studies showed early biomarkers of traumatic brain injury as a possible diagnostic and prognostic tool. Development of metabolomics is bringing new insights into SBS biomarkers discovery and understanding its pathophysiological processes.

MATERIAL AND METHODS: The aim of this project is to identify SBS biomarker-s via metabolomics analysis of peripheral blood that would be applied to living patients to make SBS diagnosis easier and improve its prognosis through early and specific medical and family care.
In this retrospective pilot study (N=8), we performed untargeted metabolomics in peripheral postmortem blood to identify SBS biomarkers. Results of SBS group were compared to control group (infants who died of sudden infant death syndrome).

RESULTS: Postmortem blood revealed to be an excellent matrix for metabolomic investigations with more than 12'000 components detected. Fifty-three interesting metabolites were significantly different (increase or decrease) in the blood of SBS cases.

DISCUSSION: This pilot study has shown promising results in the identification of biomarker-s characteristic of SBS. These results will be discussed during the presentation.

OC31-6

Analysis of Catecholamine and Cortisol for the Evaluation of the Fetal Distress in Third Trimester Stillbirths

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BACKGROUND: Catecholamines, particularly adrenaline and noradrenaline, and cortisol are humoral factors and hormones, the levels of which are considered indicative of the intensity of physical stress in adults. In fetuses, intrauterine distress, intrapartum events and modes of delivery can affect the endocrine stress response. The timing of onset of fetal distress and the accurate estimation of the precise moment of death represent controversial issues in forensic pathology, despite the significant impact of these factors on profiles of medical liability. So far, maceration parameters, histological valuation of fetal organs and placenta and type of hypoxic-ischemic injury are used as surrogate to estimate intrauterine dead fetus retention and in utero survival time. The aim of the present study was to evaluate the role of catecholamines and cortisol as markers of ante-mortem fetal distress and to assess whether said hormones could allow to distinguish between acute and chronic deaths.

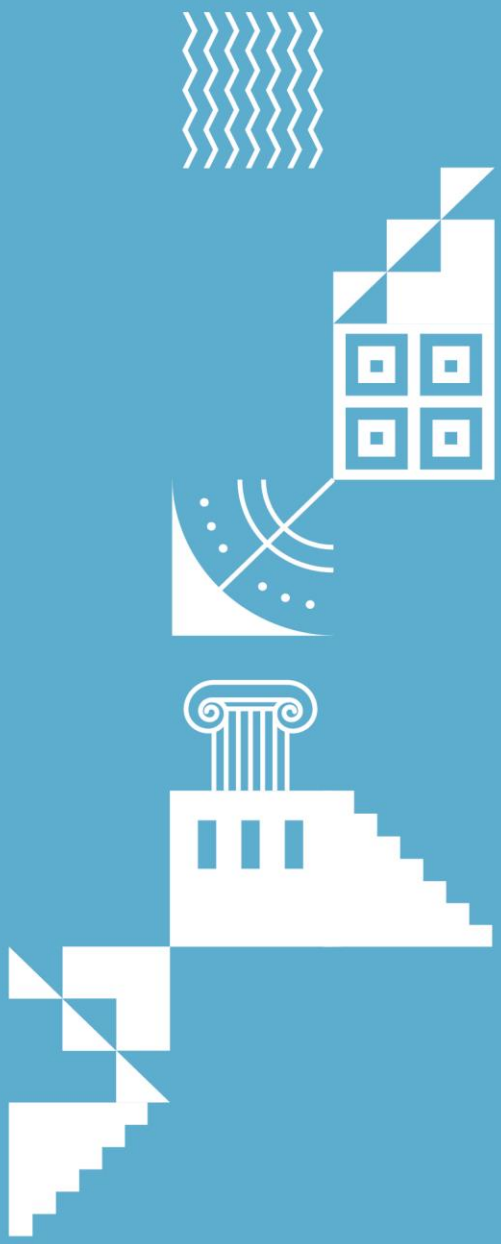
METHODS: A 2-year prospective cohort-comparison inclusion of third trimester stillbirths, as cohort of interest, and newborns, as comparisons, took place with collection of antemortem data, labor parameters, neonatal outcome and post-mortem data. Stillbirths were classified as acute or chronic based on a multidisciplinary evaluation. Heart blood of stillbirths and cord blood of newborns were collected and analyzed by high pressure liquid chromatography (HPLC) for adrenaline and noradrenaline and by immunoassay for cortisol determination.

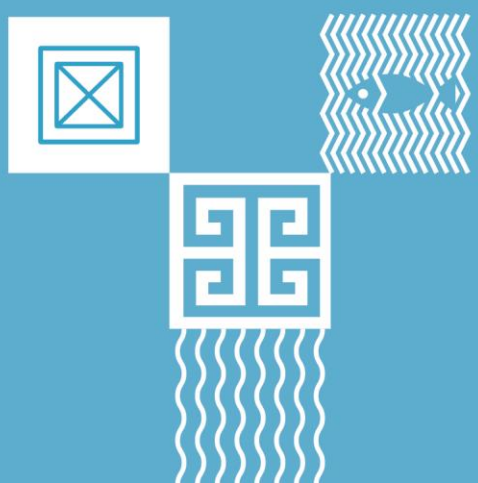
Statistical comparisons between stillbirths and newborns, as well as between acute and chronic stillbirths were performed.

RESULTS: Sixty-one subjects were included in the study, consisting of 15 stillbirths and 46 newborns, as comparisons. Newborns delivered by spontaneous vaginal birth, elective and emergency cesarean sections were included. Stillbirths' most common cause of death, as determined after complete post-mortem examination, was cord thrombosis. Levels of adrenaline and noradrenaline (median: 14,188 pg/ml and 230.5 pg/ml, respectively) were significantly higher ($p < 0.001$) in stillbirths than in newborns and were also higher in fatalities characterized by an acute compared to a chronic distress. Cortisol levels did not show a statistically significantly difference between the cohort of interest and comparisons but were higher ($p < 0.05$) in spontaneous vaginal delivery (median: 18.2 µg/dl) compared to elective cesarean sections.

CONCLUSION: Our results suggest that adrenaline and noradrenaline levels might reflect in stillbirths a marked physical stress response during the process of death. The elevation of cortisol levels might be more influenced by maternal levels. The post-mortem biochemical analysis of catecholamines could provide additional information on the duration of distress, useful to integrate the forensic diagnosis in the evaluation of stillbirths.

Poster Presentations





Poster Discussion Session 1

P01-001 | *Perinatal Medicine & Deaths in Pregnancy*

Newborn Thrown into the Stove – Difficulties in the Medico-Legal Assessment of the Status of "Born Alive" – Legal Consequences of the Necropsy Findings – Case Presentation

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Establishing the status of "newborn alive" represents a challenge for the forensic pathologists, as the macroscopic and microscopic aspects are not always characteristic.

The authors present the case of a newborn found burned in the stove of the family home, having been thrown there by the mother.

The corpse was in an advanced state of degradation (charring) and the essential problem for the investigators was to establish whether the mother had thrown a live or dead newborn into the fire, an essential aspect for the correct legal qualification of the criminal act (murder or desecration of corpses), the punishments for the two crimes being different.

The answer had to be given by the forensic pathologist who had a difficult mission due to the high degree of destruction of the corpse by burning and the marked changes in the viscera produced by exposure to high temperatures.

The paper presents the on-site investigation data, the necropsy findings and the results of laboratory examinations (histopathological, serological, toxicological examinations).

The toxicological examination could not help solving the case, the blood being unsuitable for the determination of carboxyhemoglobin (dry blood).

The resolution of the case came through the histopathological examination of the lungs, which revealed: " fetal lung tissue with partially breathed appearance, with marked lesions in the context of hyperthermia/carbonization; bronchial/bronchiolar lumens or adjacent alveolar spaces showing material with compact or granular black-brown pigment appearance (without birefringence in polarized light - soot appearance)". Immunohistochemical tests were also used.

The medico-legal autopsy report concluded that the newborn's death was violent and due to acute cardio-respiratory failure, as a result of III-IV degree flame burns on 100% of the body surface.

This mechanism of death is supported by the histopathological examination of the lungs, which objectified the presence of soot in the lung alveoli, which undoubtedly attests to the existence of breathing in the context of combustion, soot particles not being able to reach the lung alveoli in the absence of breathing.

At the autopsy, burned textile material was found wrapped around the neck, and on the neck there was a compression groove with a relatively uniform depth, the consequence of compressing the neck with the textile material. This compression of the neck contributed to the death through the hypoxia it produced but did not directly determine the death because, under the conditions of the subsequent action of the flames, the existence of breathing was objectified by the presence of soot in the pulmonary alveoli.

The fetus was born alive, it was viable, it was strangled with a textile noose that did not cause death and it was thrown alive into the flames in the stove, the act being classified as murder.

P01-002 | *SARS CoV2*

A Rare Case of Infant Death Following a SARS-CoV-2-Related Ischemic Colitis

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The SARS-CoV-2 infection is characterized by multiple clinical manifestations. Gastrointestinal symptoms are among these, thanks to the virus's ability to infect cells within the gastrointestinal tract.

In this study, the authors present the case of a SARS-CoV-2 positive two-and-a-half-year-old child who was urgently admitted to the Emergency Room following a sudden cardiac arrest and showed a condition of irreversible post-anoxic coma upon admission. The child passed away on the following day after the clinical condition rapidly worsened with the onset of melena.

The autopsy revealed myocardial anemia, congestion of the mucosa in the lower 1/3 of the esophagus, and distension of the intestinal loops. The colon exhibited a loop with hemorrhagic impaction of the serous tunica and a "leopard spot" hemorrhage in the ascending colon and parts of the transverse colon.

Post-mortem histopathological examinations highlighted widespread ulcerations of the intestinal mucosa, which extended into the submucosa and the superficial portion of the muscularis propria. The cause of death was attributed to multiorgan failure accompanied by acute gastrointestinal hemorrhage in a Covid-19 positive individual who suffered previous cardiac arrest, subsequent resuscitation, and a resulting post-anoxic coma.

The comprehensive post-mortem investigations made it possible to identify the primary cause of death as cardiac arrest on a potentially arrhythmic basis. Considering the negativity of macro and microscopic examinations, such cardiac arrest is classifiable as sudden cardiac death (SCD), even though the circulation was restored following adequate resuscitative maneuvers.

The autopsy and histological investigations also revealed a picture of ischemic colitis that clinically led to the acute decompensation of the child's condition, ultimately resulting in their death.

The post-mortem examinations permitted the identification of SARS-CoV-2 infection as a potential co-contributing and accelerating factor in the child's death, giving rise to the acute gastrointestinal hemorrhage that terminally decompensated the fragile clinical condition of the child.

This paper contributes to the existing body of knowledge by correlating ischemic colitis with SARS-CoV-2 infection, something not exhaustively documented to date in the literature. The evidence collected shows that the virus appears to be capable of directly infecting gastrointestinal cells using ACE-2 as a receptor for its spike protein.

While there is no definitive pathogenetic certainty, COVID-19-related ischemic colitis seems to be secondary to the hypercoagulable state induced by the infection. Also, other studies suggest that the underlying cause of this condition may be intense vasoconstriction with reduced mesenteric blood flow, that the ischemic damage could be attributed to infection-induced endotheliitis or direct tissue damage.

P01-003 | *Perinatal Medicine & Deaths in Pregnancy*

Maternal Cocaine Abuse and Perinatal/Neonatal Deaths – Two Autopsy Case Reports

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INTRODUCTION: Perinatal death occurs between 28 weeks of gestation and the first 7 days of life, and neonatal death is defined as the death of an infant within the first 28 days of life.

According to the literature, drug-involved mortality in the perinatal/neonatal period is rising worldwide (more than tripled from 1999 through 2017). Cocaine has vasoconstrictive and sympathomimetic effects, crosses the placenta and is also excreted in breast milk. Exposure during pregnancy is associated with poor obstetric outcomes, such placental abruption and preterm birth, and in infants can cause irritability, vomiting, diarrhea, cardiac dysrhythmias, convulsions and even death.

METHODS AND RESULTS – CASE REPORTS:
Case 1: a 33-week pregnant woman gave birth to an alleged stillborn at home, without medical assistance. The baby underwent a medicolegal autopsy in our Institute. The postmortem examination found a slight hemorrhage under the scalp, possibly caused during vaginal delivery; absence of maceration or natural pathology that could explain the death. Histological examination showed peripheral alveolar distension and placental chorangiosis and abruption. Blood toxicology analysis was positive for cocaine (47 ± 14 ng/mL) and its metabolites. It was concluded that there was evidence of a live birth and that the death was due to acute placental abruption, associated with chorangiosis lesions, in relation with maternal cocaine abuse. The manner of death was ruled violent-accidental.
Case 2: a 3-week-old male infant, with no pre/post-natal pathology, was found unresponsive in his bed, 2 hours after being breastfed. He was pronounced dead at the scene by the emergency team and underwent a medicolegal autopsy in our Institute. The postmortem examination only found multivisceral congestion and no signs of natural disease or traumatic lesions. The histological and microbiological examinations found no pathological alterations. Blood toxicology analysis was positive for cocaine metabolite benzoylecgonine (54 ± 16 ng/mL). After being inquired by the police, the mother admitted she had smoked crack 2 days before the infant's death. It was concluded that the infant's death was probably due to the effects of the cocaine metabolite, possibly administrated via breastfeeding. The manner of death was ruled violent-accidental.

CONCLUSIONS: These case reports intend to demonstrate that medicolegal autopsy plays a crucial role in deaths during pregnancy and in sudden neonatal deaths, not only in establishing the cause and manner of death in these apparently natural deaths, but also in providing social and parental education in order to prevent future lethal outcomes and/or long-term consequences in infants exposed to maternal drug abuse.

P01-004 | *Perinatal Medicine & Deaths in Pregnancy*

An Autopsy Case of Maternal Death Resulting from Aortic Dissection

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BACKGROUND: Maternal mortality stands as a significant global health concern, necessitating a thorough understanding of the epidemiological profiles and causes of such deaths, particularly within the specific context of university hospitals. To address this issue comprehensively, it is crucial to delve into individual cases and glean insights that can contribute to overarching strategies for maternal health. By dissecting the details of this case, we aim to contribute valuable information to the broader understanding of maternal mortality, with the ultimate goal of informing strategies to improve maternal health outcomes.

CASE PRESENTATION: A thirteen-year-old girl, already a mother of two, underwent a cesarean section for the birth of her third child. Despite medical intervention, the young mother tragically succumbed to complications within 24 hours postpartum. An autopsy was conducted to determine the cause of death. The results revealed hyperflexity and laxity of the fingers. External examination showed abundant hemopericardium with multiple ruptures of the aorta. The report concluded that hemopericardium was secondary to aortic dissection. A history of Marfan syndrome was suspected, and samples for histopathological examination were obtained. No genetic testing was performed due to its unavailability.

CONCLUSION: This case underscores the importance of individual case studies in contributing to the broader understanding of maternal mortality and informs strategies for improving maternal health outcomes.

P01-005 | *Forensic Toxicology*

Sudden Death in a Young Athlete: Lifestyle or Genetics?

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Anabolic-Androgenic Steroids (AAS) represent a group of synthetic testosterone derivatives that have anabolic effects. Athletes abuse AASs in order to improve their performances since they determine an increase in muscle size as a consequence of dose-dependent hypertrophy.

On the other hand, the prolonged abuse of AASs may increase the risk of sudden cardiac death, myocardial infarction, altered serum lipoproteins, and cardiac hypertrophy.

We present a case report, apparently simple to solve, but where the cause of death turned up to be a combination of causes, underlining, once again, the importance of a multidisciplinary approach.

In December 2022, a 26-year-old man was found on the floor of his bedroom by his mother, unconscious, cyanotic, and with agonal breathing, after a sushi dinner. Suspecting food poisoning, the mother called an ambulance, but the man was dead upon his arrival at the emergency room.

Hidden in the son's room, she later found a large amount of drugs and medical devices, that were seized by the police: anabolic steroids, growth factors, hormones, metabolic modulators, other non-doping drugs, syringes, and needles.

The analysis of the medical history revealed that, at the age of 13, he was diagnosed with Wolff-Parkinson-White (WPW) syndrome. No therapy and no contraindications to sporting activities were ever given. The man used to go to the gym regularly and had played soccer for a long time.

We performed a complete autopsy, during which samples of biological material were collected for histopathological and toxicological analyses. The heart was fixed in toto in a 10% formalin solution. The organ pieces were dyed with hematoxylin and eosin (H&E) stain.

Necrosection examination revealed the presence of organ congestion and edema, especially in the lungs and the brain, several pulmonary petechiae, and heart hypertrophy (607 g).

The examination of the formalin-fixed heart showed a thickening of all the ventricular walls (left ventricular wall: 2.5 cm; septum 2.9 cm; right ventricular wall: 1 cm).

The histopathological examination of the myocardium displayed grade 2 colliquative myocytolysis, areas of fibrosis, and myofiber break-up. Acute pulmonary emphysema with septal rupture was also observed.

The toxicological investigations revealed the presence of Boldenone, Testosterone, Episterone, Androstenedione, and Dihydrotestosterone (DHT) in blood and urine samples; moreover, Trenbolone, Methandienone, Stanozolol, and Tamoxifen were found in the hair samples. In the urine sample, the Testosterone/Episterone ratio was 39.

The autopsy revealed that the cause of death was an acute and irreversible cardiorespiratory failure, as a consequence of a fatal arrhythmia, in a chronic user of anabolic-androgenic steroid drugs (for, at least, 8-9 months before death) with cardiomegaly, left ventricular

hypertrophy and Wolff-Parkinson-White syndrome. A fatal overdose was excluded.

The AASs had, therefore, an etiopathogenetic role in the determination of death.

P01-006 | *Forensic Toxicology*

Misuse of Performance-Enhancing Substances: A Case Report. Part 1: Forensic Toxicology

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This study investigates the death of a professional bodybuilder, shedding light on the potential risks associated with the consumption of performance-enhancing substances. The deceased was discovered at home by a familiar. During the forensic medical inspection, four boxes of pharmaceutical methylprednisolone pills, one package of galenic preparation of sibutramine and two unlabeled galenic preparation containing 15 and 100 of caps, respectively, were found and seized. The presence of these pharmaceuticals suggested a potential link between the cause of death and the unsupervised consumption of these substances. The forensic toxicological approach included a gas-chromatography mass spectrometry (GC-MS)/library search analysis on the seized caps and the liquid-chromatography mass spectrometry (LC-MS/MS) analysis of blood and hair samples collected during autopsy.

The analysis of the unlabeled caps showed the presence of methandrostenolone and sibutramine in the caps of both packages. Quantification of the compounds was possible by using the corresponding reference material and an ad-hoc method development. Data will be presented and discussed. Forensic toxicological analysis on blood highlighted the presence of methylprednisolone at the concentration of 19 ng/ml, methandrostenolone at the concentration of 27 ng/ml and sibutramine at the concentration of 29 ng/ml. Hair analysis confirmed the presence of sibutramine and methandrostenolone at the concentration of 80 pg/mg and 1.28 ng/mg, respectively. All the detected substances are correlated to adverse effect when misused. Methandrostenolone is an androgen and anabolic steroid (AAS) and can exert significant strain on the cardiovascular system, potentially leading to hypertension and heart-related complications. Furthermore, its misuse has been linked to liver dysfunction and psychiatric disturbances. The deceased individual's autopsy revealed signs of cardiac stress, suggesting a possible correlation with methandrostenolone intake. Methylprednisolone, a corticosteroid commonly prescribed to manage inflammatory conditions, was also detected in the bodybuilder's blood. Long-term use of corticosteroids has been associated with cardiovascular issues, immunosuppression, and metabolic imbalances. Sibutramine has been associated with severe toxic effects. Its toxicological impact includes heightened cardiovascular risks, leading to hypertension, palpitations, and increased heart rate. The toxicological data on hair revealed that the subject had been consuming sibutramine and methandrostenolone for months. Moreover, circumstantial data suggest that sibutramine was assumed both through the voluntarily consumption of known material but also by the unaware consumption of unlabeled material. The lack of proper packaging and labelling raised concerns about the origin and safety of the seized caps. In conclusion, the consumption of performance-enhancing substances poses serious risks to the health of athletes, especially in non-professional fields, where deterrent effectiveness of anti-doping controls is absent.

P01-007 | *Forensic Toxicology*

Exploring Drug-Related Deaths in the Friuli-Venezia Giulia Region: Insights from the Regional Register of Sudden Cardiac Deaths in the Young

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INTRODUCTION: The Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5), distinguishes substance use disorder from Substance-Induced Disorder, highlighting the severe cognitive, behavioral, and physiological symptoms associated with continued substance use. Drug-related deaths are a critical consequence of substance abuse, carrying significant societal implications. While various countries and international bodies, such as the European Monitoring Centre for Drugs and Drug Addiction (EMCDDA), are actively addressing substance abuse, this study focuses on Italy's Friuli-Venezia Giulia region.

METHODS: This study leverages data from the Friuli-Venezia Giulia Regional Register of Sudden Cardiac Deaths in the Young, established in 2020. It encompasses individuals under 50 who experienced sudden, unexplained deaths and underwent comprehensive post-mortem investigations, including toxicological analyses. Additionally, the study integrates data from the local Service for Addiction.

RESULTS: Between January 2021 and May 2023, the register enrolled 75 subjects, of which 31 tested positive for one or more substances. Among them, 19 deaths directly resulted from drug toxicity. Most subjects were male (68.4%), with an average age of 37.3 years. Toxicological assessments examined various samples, revealing a history of drug abuse in one instance. Polydrug use was prevalent, with cocaine, benzodiazepines, methadone, and heroin among the detected substances.

DISCUSSION: The unexpectedly high prevalence of drug-related deaths uncovered by the register underscores the strong connection between substance misuse and mortality. Notably, some subjects were actively receiving treatment from the local Service for Addiction, often involving methadone prescriptions. The study underscores the intricacies of drug-related deaths and their implications for prevention and treatment approaches.

CONCLUSION: The Friuli-Venezia Giulia Regional Register of Sudden Cardiac Deaths in the Young has brought attention to the issue of drug-related deaths in the region, revealing a previously underestimated societal concern. The amassed data can guide future studies, assist in identifying risk factors, and inform policy development. Nonetheless, limitations, such as sample selectivity and the exclusion of indirectly related deaths, must be addressed to gain a more comprehensive understanding of drug-related fatalities. Improving analytical methods remains crucial in this endeavour.

P01-008 | *Forensic Toxicology*

Analysis Trends in Toxicological Investigations of Drivers and Road Traffic Accidents over a 10-Year Period in Brescia Country (Northern Italy): Are Punitive Policies an Effective Deterrent for Accident Prevention?

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INTRODUCTION, MATERIALS AND METHODS: Traffic accidents are a relevant social problem, and a relationship is established between

alcohol/drug consumption and a higher risk of an accident. To decrease the number of accidents and their harmful consequences, the Italian legislator intervened several times, with both preventive actions and deterrent policies.
The crime "road homicide" was introduced in the penal code in 2016: anyone driving a vehicle in a state of alcoholic drunkenness or psychophysical alteration from illicit drugs and culpably causing the death of a person, shall be punished with 8 to 12 years imprisonment. This law increased the previous penalty, aiming to make people understand the risk of driving after alcohol/drug assumption.
Every driver involved in a road accident is tested for alcohol and drugs on blood and urine samples, thus processed by an accredited Forensic Toxicology laboratory.
In a 10-year time (01.01.2013 – 31.12.2022), 18412 subjects were involved in road accidents and subjected to urine and blood tests for alcohol and illicit drugs by the Brescia Institute of Forensic Toxicology. The cut-offs identifying positive samples were 0.5 g/L and the minimum detectable by the instrument, respectively for alcohol and illicit drugs.

RESULTS: Among 18412 subjects, 17903 consented to the analysis (M:F ratio = 13767:4136); blood alcohol concentration was positive (≥ 0.02 g/L) in 3638 subjects (20.3%), specifically > 0.5 g/L in 3214 (17.9%). Looking at the trend over the years, the highest percentage of test positivity was found in 2013 (23.8%), there were a steady decline until 2019 (15.1%) and a stabilization around 17% in the next years.
Concerning the exams carried out in the days of the week, the highest percentage of positivity was found on Saturdays and Sundays (26.6%), compared to a minimum on Tuesdays (11.4%).
630 subjects (4.3%) tested positive for at least one illicit drug; the most frequent substance was THC (51.9%), followed by cocaine (19.5%) and morphine (11.5%). The trend of positivity over the period was fluctuating, but a steadily decreasing trend has been observed from 2020 to 2022.
Age groups 22-30 and 31-40 presented the highest positivity for both alcohol and drugs.

CONCLUSIONS: In the considered time of 10 years, no significant changes in the percentage of positivity were observed before and after 2016 (entry into force of stricter penalties for traffic accidents committed under the influence of alcohol and drugs).
The prevalent positivity was found in subjects aged between 22 and 40 and on weekends.
Therefore, in our opinion, in order to prevent the excessive consumption of alcohol and illicit drugs, and so to reduce the number of road accidents, it would be appropriate to raise awareness of binge drinking and drug use risks among young people.

P01-009 | *Forensic Toxicology*

Child's Life in Jeopardy: The Callous Act of Deliberate Paraquat Poisoning

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Paraquat, a widely used synthetic herbicide in agriculture, poses a grave threat to human health. Ingesting toxic amounts of paraquat can lead to fatal consequences, causing severe damage to vital organs. World Health Organization categorizes paraquat as a 'class II moderately toxic pesticide.' Unfortunately, there is no specific antidote or effective treatment to save lives in cases of paraquat poisoning, resulting in a dismal prognosis worldwide.

A 4-year male child was brought to the emergency department of AIIMS Bathinda with alleged history of ingestion of paraquat poison at home. On detailed enquiry with his grandfather, it was found that the boy was given poison by his grandmother. Grandfather noticed the deteriorating condition of child at home and rushed the child to a nearby Primary Health Center where gastric lavage and initial treatment was done. Subsequently, he was referred to our Emergency Department for further management. Upon conducting laboratory investigations, the results revealed abnormal levels of urea and creatinine in the patient's blood, along with the presence of hematuria, indicating the development of acute kidney injury. The child was treated in pediatric department for 3 days and finally discharged uneventfully. The case is presented here as it is rare of its kind regarding the manner of homicidal poisoning by a close relative within home which was also confirmed during the police investigation. Paraquat is a widely used herbicide globally due to its easy availability and affordability, known for its high fatality rate. It's vital to educate public health professionals and the public about its severe risks and not to let trust impede homicide investigation in poisoning cases, even when not suspicious.

KEYWORDS: Paraquat; Poisoning; Homicide; Acute kidney injury

P01-010 | *Forensic Toxicology*

New Psychoactive Drugs: Isopentedrone Method of Analysis and Literature Review

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Iso-pentedrone, 1-methylamino-l-phenyl-pentan-2-one, is a structural isomer of the synthetic cathinone pentedrone, identified in Austria for the first time in 2011.This drug, belonging to the family of cathinones, has effects like cocaine, amphetamine, and MDMA, including, S-T segmental changes, myocarditis, cardiac arrest, and others as overdoses. Synthetic cathinones undergo to thermal degradation during gas-chromatographic analysis. The aim of our study is to show the results of toxicological analysis carried out on seized powders, in which Isopentedrone was identified.14 samples seized during a surveillance service by State Police were analyzed. Samples were contained in transparent plastic bags and appeared white, odorless, and fine-grained powder. An aliquot of 10 mg of each sample numbered from 1 to 14, was solubilized in absolute methanol and then subjected to screening analysis by GC coupled with MS (Agilent Technologies). The analyzes showed the presence in all the samples of Isopentedrone (immonium ion m/z. = 120 formed in the El spectrum). For quantitative analysis, 10 mg of substance were taken from each bag and placed in a plastic test tube. Subsequent dilutions 1:10.000 in methanol Q were then made to obtain a solution at a concentration of 100 ng/ml. Diluted samples were injected into an LC/MS/MS system with electrospray ionization (Agilent Technologies). The validation of the method was done according to the guidelines of the Forensic Toxicologists Group, with 3 quality control samples: one negative, one at 40% of the positive cut off and one greater than 25% compared to the positive cut off, this one set at 25 ng/ml. The specificity was determined by analyzing five samples lacking the analyte and adding only the internal standard, while the analytical sensitivity was calculated as the minim amount of detectable analyte in a sample, accuracy, and precision were calculated respectively as deviation from the nominal values and the percentage coefficient, analyzing the QC solutions five times each. Finally, the linearity of the response was estimated by calculating the equation of the calibration curve and its correlation coefficient (R2). The linearity of the method estimated by calculating the equation of the calibration curve and the related correlation coefficient (R2) was found to be close to the unit, with a value of 0.99918, being excellent in the chosen concentration range. The analysis of the samples showed a good method specificity, such the sensitivity, showing an Isopentedrone peak clearly separated from the background noise. An inaccuracy of less than 5% of the relative standard deviation was found. The lower limit of detection (LOD) was 1 ng while the lower limit of quantification (LOQ) corresponded to 10 ng. Considering that synthetic cathinones may undergo changes in the molecular structure using gas-chromatographic technique, it was considered appropriate to proceed, once the molecule has been identified by GC/MS, analyze the sample by LC/MS/MS.

P01-011 | *Forensic Pathology*

Death by Chemical Burns Caused by Chemical Agent – Black Liquor

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INTRODUCTION: Chemical burns can cause devastating corrosive burns when in contact with skin, eyes and upper respiratory/gastrointestinal tract. In deaths related to chemical burns, the amount of tissue damaged depends on the type of agent, its quantity and strength. This burn may involve a large area of body surface and lead to multiorgan dysfunction. In forensic practice, deaths by chemical burns are rare and pose a challenge in the autopsy technique and documentation of injuries.

CASE REPORT: We present the case of a 31-year-old male, who was transported to the hospital with 3rd and 4th degree burns in 99% of his body surface. According to the circumstantial information provided, the injuries occurred in the context of a work accident with a chemical agent called black liquor, which is a solution which is used in the pulp and paper industry.
During the autopsy areas with irregular edges with blackish, reddish and greenish color, with the absence of the superficial layers of the skin were observed, sparing only the anterior genital region and the distal end of the feet, compatible with chemical burns. The toxicological exam carried out on the blood sample was positive for multiple medications which were compatible with hospital care, and was negative for the search of ethanol and drugs of abuse. It was concluded that the victim's death was due to chemical burn injuries, affecting more than 99% of the body surface, leading to multiorgan dysfunction, compatible with the action of a chemical agent (black liquor), as suggested in the circumstantial information provided.

CONCLUSIONS: With the presentation of this case, we intend to highlight an injury mechanism and a chemical agent that are rare in the medical-legal practice, as well as the necropsy findings related to chemical burns and the difficulties presented with these types of cases.

P01-012 | *Forensic Toxicology*

Formic Acid Poisoning – A Case Report

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Formic Acid is a corrosive chemical classified under weak acids bearing chemical formula HCOOH (CH_2O_2). This compound is a natural constituent of few fruits as well as wine and is commonly used in industries as descaling agent, leather tanning agent and in coagulation of latex and rubber. In lower concentrations is causes burns but is usually non fatal whereas in higher concentrations it results in perforations and painful death.

A case was encountered where an elderly male consumed formic acid with suicidal intent and died within 3-4 hours of consumption. Post mortem examination revealed burn injuries near lips and chin, hardening, thickening and blackish discolouration of gastric mucosa and blackish discolouration of oesophageal mucosa. Histopathology was suggestive of necrosis of stomach and oesophagus. Viscera report was positive for formic acid. Circumstantial evidence corroborated the findings.

Formic acid poisoning patient can be saved if dosage is low or if immediate treatment is available. However, induction of emesis and gastric lavage are contraindicated. As a chemical formic acid is easily and commonly available and hence should be handled with care.

This pictorial presentation will discuss the autopsy findings, histopathological details and viscera report of Formic acid poisoning.

P01-013 | *Forensic Psychiatry*

Sociodemographic and Clinical Characteristics of Sexual Assault Cases Evaluated by Forensic Medicine

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Sexual act when it is applied to adults against their will, those who do not have the ability to make decisions on their own, and children, it is considered within the scope of sexual behavior that is considered a crime. In this study it is aimed to examine the demographic characteristics of patients subjected to sexual assault, such as the type of violence, whether the attacker is known or not, and to draw attention to the effects of these characteristics on each other and on forensic medical evaluation. The population of the study consists of cases (n:123) for which a medicolegal evaluation report was issued by our Department due to sexual assault in the 10-year period between January 2012 and December 2022. Nearly 60% of the cases were between the ages of 18-29. It was observed that 65 cases (52.8%) did not have a profession. It was observed that 37 cases (30.08%) were married, and 12 of them were subjected to sexual violence by their spouses. Mental status evaluation was performed in 76 cases (61.78%), and 70 of them had a clinical picture that met psychiatric diagnostic criteria. It has been observed that the cases are mostly in the young adult age group, and the rate of sexual assault by someone they know and by the spouses of married cases is high. The traumatic effect of sexual assault on mental health was noted because the majority of cases whose mental status was evaluated had a clinical picture that met psychiatric diagnostic criteria.

KEYWORDS: Sexual assault, Sexual violence, Medicolegal evaluation, Sociodemographic characteristics

P01-014 | *Forensic Psychiatry*

Errors and Prejudices in the Management of Violent Behavior: Psychiatric-Forensic Aspects

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The relationship between violent behavior and mental disorders is often characterized by prejudices which inevitably lead to a whole series of operational errors which can affect both psychiatrists, in their clinical and forensic psychiatric activity, and the judiciary personnel.
One of the prejudices that is most frequently found in common thinking is characterized by the almost automatic combination between some types of mental illnesses and intrinsic violence as in the case of schizophrenia.
At the basis of this belief there is often the erroneous association between the concept of "cause" and the concept of "risk factor". In clinical and forensic psychiatric practice, in fact, these two concepts do not coincide at all and should never be overlapped.
The presence of some mental disorders can be considered a "risk factor" for violence, like many others, within the broader concept of the multifactorial nature of human violence.
The prejudice of the intrinsic dangerousness associated to some types of mental disorders is linked to considering the risk only in relation to the diagnosis, without taking into account a whole series of clinical elements that can influence the presence of the risk itself.
On the practical side, the possibility of violent acts is often closely related to factors such as the phase of the disease, the syndromic type, etc. rather than diagnostic classification as an end in itself.
A further prejudice that deserves careful reflection among the clinical, forensic and scientific psychiatric fields concerns the idea that the risk of violence can be controlled by adequate pharmacological therapy.

This belief, although certainly desirable, appears incorrect from a clinical and scientific perspective at least at the time of current knowledge: in fact, there is no psychotropic substance which in a safe, documented and specific manner manages to always or almost always contain aggressive and violent behavior (to give just one concrete example, the well-known problems of drug resistance).
Furthermore, the situation is complicated by the effects of the use/abuse of new psychoactive substances with great pharmacological potency and often difficult even to trace with the most common toxicological research techniques available in daily clinical practice.
Also, the lack of evaluation or the underestimation of violent behavior is also a frequent mistake among mental health professionals.
It is quite clear that this kind of error, often anchored to ideologies that are not based on concrete scientific data, can lead to various serious errors in clinical judgment with consequent hypotheses of professional liability.
In this work, the results of the investigations conducted on the healthcare personnel involved in the initial interventions on the patient with violent behavior will be explained.

P01-015 | *Forensic Psychiatry*

Homicide and Serious Mental Illness: A Systematic Review and Meta-Analysis for Forensic Evaluation in Cases of Schizophrenia, Depression and Bipolar Disorder

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Risk of violence and homicide among people with mental disorders is a topic that has been extensively explored in the literature due to its significant implications in both clinical and social contexts. Thornicroft, in his article in The Lancet in 2020, reported that people with mental illness are more likely to be victims of violence or homicide than perpetrators. However, Thornicroft also observed that people with more severe forms of mental disorder were more likely to commit violent crime than the general population. These findings were also supported by a recent review published in The Lancet 2021 by Whiting et al, which highlighted an increased risk of violent behaviour in severe mental disorders compared to the general population.

Consequently, forensic pathologists may be required to intervene in homicide cases involving psychiatrically ill people, who may represent either the victim or the perpetrator, particularly in cases involving people with serious mental illness.

The present systematic review intends to analyse and compare data of forensic interest (characteristics of perpetrators, victims, and dynamics of homicide) in cases of murder where the perpetrator suffers from serious mental illness. The aim of the review is to identify potential differences in the distribution of the variables analysed across different serious mental disorders, with the purpose of identifying distinct risk factors that can provide insight for the development of targeted prevention strategies.

The review included homicides committed by people with the main severe mental illness, represented by schizophrenia, depression and bipolar disorder. Personality disorders are excluded because of their heterogeneity, which poses challenges for their inclusion in a single category for statistical calculations. Publication period is from January 2000 to December 2023. Data extracted include psychiatric diagnoses, perpetrator characteristics (age, sex, treatment, addiction, suicide after homicide), victim-perpetrator relationship and homicide dynamics. A total of 41 studies were included in the systematic review, 20 of which were included in the meta-analysis.

Among the most significant findings, meta-analysis reveals that out of 2384 homicides examined, schizophrenia was the diagnosed condition in nearly all cases (2053), despite being less common in the general population compared to bipolar disorder and depression.

Victims were mainly family members of the perpetrator rather than acquaintances or strangers. Specifically, parents, acquaintances and strangers were more frequently offended by schizophrenics (47.4%, 25.1% and 16.9% respectively), while children by bipolars (53.4%) and partners by depressives (74.2%). The weapons use (sharp and blunt instruments, firearms) was the most common homicide dynamic compared to non-weapon-related methods (strangulation, drowning, and poisoning). Specifically, perpetrators with schizophrenia more frequently employed weapons compared to individuals with bipolar and depressive disorders, who tended to utilize non-weapon-related methods. These data underscore the importance of focusing preventive interventions on family setting and accessibility to weapons.

P01-016 | *Forensic Pathology*

Sudden Death due to Aortic Dissection: About 40 Autopsy Cases

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INTRODUCTION: Aortic dissection remains a serious cardiovascular disease that involves vital prognosis. Therefore, it is essential that every clinician knows the population at risk as well as clinical signs pointing to this pathology so that the diagnosis and management are in time.

METHODS: It is a retrospective study of cases of sudden death by aortic dissection whose autopsy was performed at the Forensic Medicine Department in Fattouma Bourguiba University Hospital Monastir, over a 12-year period (2011-2023).

RESULTS: We collated 40 cases of sudden death due to aortic dissection over a 12-year period (3.3 cases/year). This pathology was the cause of sudden death in 3.28% of cases. A predominance of males was noted (90%) with an average age of 54.7 years.
As risk factors noted in the medical history, we noticed mainly hypertension (37.5%) and atherosclerosis (30% of cases). Sudden discomfort was the most common prodrome before the death (30%) then chest pain (27.5%) and digestive symptoms (17.5%).
For our study, the dissection involved, in 60% of cases, the ascending aorta, which represents type A according to Stanford classification. It extended to aortic arch in 27.5% of cases (Type I according to the Bakey classification). Microscopic examination was carried out in 16 cases; dissecting aneurysm was confirmed in 2 cases and cystic medial necrosis in 2 cases too. Marfan's disease was noted in 4 cases. Regarding the cause of death, tamponade, leading to cardiorespiratory failure, was incriminated in 62.5%. It resulted from type A dissection in 92% of cases. In our series, around half of the population studied (48%) were found dead at home. Most of cases occurred in winter (60%) mainly in the morning (40%) and at rest (57.5%).

CONCLUSION: Necropsy data can be used to draw the attention of practitioners to possible anomalies in diagnosis and management, and thus more understanding the features of aortic dissection. Communication between forensic pathologists and other doctors is therefore essential to improve medical care in terms of diagnosis and treatment, in order to reduce the mortality from this devastating disease.

P01-017 | *Forensic Pathology*

An Explosive Finale

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INTRODUCTION: Deaths related to explosive substances or devices are rare in medico-legal practice and can occur, in mines, quarries, chemical factories and in a military context. Death can be caused by several injury mechanisms, namely the effects of the shock wave/barotrauma, impact

of projectiles originating from the explosive device, impact of objects propelled by the explosion, projection of the body against surfaces and burns (thermal or chemical).

CASE REPORT: We present the case of a 61-year-old male victim, who was found lying on ground in the courtyard of his residence with a "disfigured face". According to the circumstantial information provided, electrical wires, matches and plastic fragments belonging to a probable explosive device were found nearby. In the initial approach of the case, x-rays of the skull were taken which revealed fractures of the facial bones, with no radiopaque objects being observed. Samples of any explosive residues with STUBS were also carried out on the hands and around the facial lesions. In the examination of the external habit, almost total destruction of the normal morphology of the face was observed, more evident on the lower floor with exposure of adipose, muscular and bone tissue, with multiple lacerations with irregular edges and blood infiltrations. with associated loss of substance. Upon examination of the internal habit, linear fractures were observed in the anterior layer of the base of the skull, a thin layer of subarachnoid hemorrhage in the upper right convexity of the brain and multiple fractures involving the entirety of the facial bones, especially those of the lower stage. The toxicological exam carried out on the blood sample revealed ethanol at a concentration of 0.95 ± 0.12 g/L, which was negative for the search of drugs of abuse and medication. Given the impossibility of visual recognition of the corpse, medico-legal identification was carried out using lofoscopy. It was concluded that the victim's death was due to cranial, meningeal and facial traumatic injuries, compatible with blunt trauma, including the possible effects of barotrauma, such as what may have been due to the explosion of an "explosive device", It was not possible to rigorously establish a medico-legal differential diagnosis (accident, suicide, homicide).

CONCLUSION: With the presentation of this case, we intend to highlight an injury mechanism that is uncommon in the medical-legal practice, as well as the necropsy findings, the particularities and challenges of autopsies of deaths related to explosives, such as highlighting the difficulty in identifying the corpse, the need to carry out prior imaging exams, collection of explosive residues, the importance of documenting different types of injuries and interpreting the pattern of injuries to help reconstruct the event.

P01-018 | *Forensic Pathology*

Suicide by Cutting and Stabbing: A Case Report

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INTRODUCTION: Suicide by sharp-force injury is rare, accounting for approximately 1–3% of all attempted suicides according to the literature. Suicide through cutting and stabbing injuries poses a challenge to forensic expertise because it can mimic homicide acts.
When examining such cases, it is essential to consider the characteristics of the injuries, as well as the circumstantial information available about the case and the underlying psychiatric aspects that may motivate such extreme behavior.

CASE REPORT: We present the case of an 83-year-old male victim with no known psychiatric history, reported to have been seen by his daughter "inflicting multiple cuts to the neck and stabbing a knife in the upper left chest, subsequently falling to the floor and bleeding profusely." According to the circumstantial information, this incident occurred inside the victim's residence, which was reportedly locked, and the daughter witnessed the situation through a glass window. According to the police information, the entrance door had to be forcibly opened to access the scene.
During the necropsy examination, four cervical sharp-force injuries were identified, one of which not only completely penetrated the platysma and left sternocleidomastoid muscles but also resulted in a complete laceration of the left internal jugular vein. The trajectory of this injury, observed from anterior to posterior and slightly from inferior to superior view, was consistent with being self-inflicted by the victim. Additionally, two thoracic sharp-force injuries were noted, both involving the upper lobe of the left lung. Their trajectories, from anterior to posterior, superior to inferior, and slightly from lateral to medial view, were compatible with self-inflicted injuries by the victim. No defensive injuries were observed during the necropsy examination and blood toxicological examination was negative for all substances.

CONCLUSIONS: Based on the available information, it was concluded that the victim's death resulted from traumatic cervical and thoracic injuries, leading to significant hemorrhagic loss, consistent with cutting and stabbing trauma, constituting a violent cause of death. In the forensic report's conclusion, it was emphasized that, considering the characteristics of the injuries and the available information, there were no impediments to a suicidal manner of death.
This case report intends to highlight the forensic challenge in investigation of fatal stab wounds, namely the determination of the differential diagnosis between self-inflicted and nonself-inflicted stab wounds. In these cases, is necessary a rigorous analysis and interpretation of scene examination, autopsy findings, circumstantial information and victim's clinical data.

P01-019 | *Forensic Pathology*

Hemorrhagic Shock after Male Neonatal Circumcision: A Case Report

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Neonatal circumcision is a relatively common procedure worldwide with a low overall complication rate. Even if rare, complications can occur both during and after the procedure, and may result in infections, bleedings, hemorrhages and even death or SIDS.

Bleeding occurs most frequently after the fourth week of life and is related to the presence of an abundant venous vascularization of the penile shaft. Unlike adults, the blood loss rates suggestive for hemorrhagic shock are not defined in neonatal populations. Therefore, the diagnosis of the cause of death can be challenging from the forensic pathologist's point of view, especially when circumstantial information is missing.

We report the case of a full-term infant boy born via an urgent caesarean section and after a terminally complicated pregnancy. He underwent a "domestic" circumcision on 22nd day of life. The same day he was admitted to the emergency room in cardiac arrest and died despite resuscitation procedures. The autopsy findings were characterized by the presence of blood in the diaper and a circumferential laceration of the penile shaft, consistent with a recent circumcision. Diffuse organ pallor was macroscopically and microscopically demonstrated, consistently with a hemorrhagic shock. The reconstruction of the causal chain and the determination of its biological plausibility was only possible after the estimation of the circulating blood volume and of the blood loss, and by their association with the objective autoptic and histological findings.

CONCLUSIONS: The diagnosis of hemorrhagic shock can be difficult in the newborn and requires the estimation of lost blood volume. Moreover, due to the possibility of rare fatal complications, neonatal circumcision should be performed only in a controlled, medical environment.

P01-020 | *Forensic Pathology*

In a Country with a Growing Number of Older People: The Problem of Violent Deaths in Institutional Settings

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Italy is experiencing the growth in the number and proportion of older persons in population having one of the largest percentages of total population over 65 (>20%) compared to other countries. With the increasing of the older adult population, elder abuse is expected to become even more frequent in the health care system, requiring also for forensic practitioners the knowledge and the update of the research developments in this field.

Actually, forensic aspects of abuse of older people are largely undocumented and unexplored too.

The aim of this work is to investigate the issue of abuse of older people in healthcare facilities, considering a series of 15 cases of Italian old people (9 women and 6 men, from 66 to 92), died in violent manner from 2018 to 2023.

The cases have been retrospectively analyzed through post-mortem examination, considering data collected in vivo, including medical records, related pathophysiological evolution and healthcare management. In our forensic casuistry the deaths were caused by falls, followed by mechanical asphyxias, misdiagnoses, and mistreatments.

What emerged from our analysis is the urgency of facing the problem of the lack of surveillance and guardianship on the patient, as well as the need to identify the risk factors for abuse in institutional settings such as nursing homes and residential facilities.

Forensic medicine plays a role in shining a spotlight on the problem, that needs a multidisciplinary approach on the model of the Adult Protective Services in USA to prevent and manage the abuse of older people and prevent also the fatal outcome. Nevertheless, forensic research can contribute to the prevention of violent deaths by increasing the awareness of forensic practitioners and institutions as part of a global multifaceted response toward the protection of the rights of older persons.

P01-021 | *Forensic Pathology*

Hoarding: Buried Alive… Not Quite Alive

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Serial hoarding is a psychiatric disorder cataloged as obsessive-compulsive and often observed in people affected by other physical pathologies. People who suffer from that disorder have difficulty discarding or parting with possessions, regardless of their actual value. The difficulty in discarding possessions results in the accumulation of things that clutter active living areas and compromise the quality of life. We present a case series of hoarders found dead inside their apartments providing an examination protocol both, macroscopical and microscopical, to reach an accurate diagnosis of the cause of death. Hoarding is not rare in forensic practice and often becomes known at the time of death. In our series the action of the social services alone was ineffective, and all the deaths occurred in conditions of accumulation. The putrefactive state of the corpses makes it often difficult to establish the real cause of death. The proposed study reports all the inspections, carried out in the three years 2021-2023 by the Institute of Forensic Medicine of Foggia, concerning subjects known to be accumulators and who died in their own homes.

1st case: A 79-year-old male who did not have a diagnosis of any psychiatric disorder, and amassed lamps. He was found dead in the putrefaction stage (10-20 days).

2nd case: An 84-year-old female with non-psychiatric disorders. She was retired, and hoarded bags of garbage, and was found dead in the early putrefaction stage (3 days).3rd case: a 60-year-old male. He did not have psychiatric disorders and hoarded newspapers, and he was found in the putrefaction stage (5-10 days).4th case: an 80-year-old without pathologies. He was retired and he was found in the putrefaction stage (7-10 days). He collected plastic containers and bags.5th case: an 80-year-old male who had a mute medical condition. He hoarded papers, bags, furniture, and garbage, and he was found dead in the putrefaction stage (3 months).6th case: a 75-year-old woman who hoarded tetrapak wrappers. She was found in the putrefaction stage (7-10 days).7th case: a 62- year-old man, a postman found dead, in a putrefactive state (3-5 days), and a hoarder of postal letters.8th case: a 75-year-old man, found dead in a putrefactive state (3-5 days), cachectic, accumulator of filled garbage bags. In all cases, the subjects were Italian and lived alone. None of the deceased had a diagnosis of hoarding disorder and some of them had refused help from social services. The external examination was not sufficient to determine the cause of death due to the putrefactive phenomena affecting all the corpses and because the scene of the discovery was characterized by excessive accumulations of objects. In all these cases we recommend the application of an accurate immunohistochemistry panel to highlight evidence of hypoxia and to differentiate suicidal or confined spaces from natural causes of death.

P01-022 | *Forensic Pathology*

Unusual Complex Suicide or Disguised Homicide? – Case Report of a Death Involving a Firearm and Drowning

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INTRODUCTION: The manner of death in cases involving long-barrel shotgun wounds depends on several information, including the shooting distance and the projectile trajectory.
Drowning diagnosis remains a forensic challenge, since there are no pathogmonic findings and it remains exclusion diagnosis. Obtaining circumstantial information is a key step, along with necropsy and histology findings.

CASE REPORT: A 78 years-old male, was found inside a submersed car. During the external examination, a long-barrel shotgun projectile entry wound was found in the right lower hemithorax, with no exit wound. The shirt worn by the victim had an orifice compatible with the entrance wound on the body.
Radiographic examination showed rib fractures and multiple millimetric opacities compatible with multiple projectiles. Samples were collected using subungual hand swabs and STUBS.
In the internal examination, multiple spherical metallic projectiles were observed (lead pellets), with lesions to the soft tissues of the thorax, rib cage, diaphragm and liver, with bilateral haemothorax and hemoperitoneum. The lungs were hyperinflated, presenting oedema and a congestive parenchyma (confirmed in histopathological examination). The toxicologic study revealed antidepressant drugs in therapeutic levels.
According to the information provided by the police, the victim owned a rifle that was not found on site and there was no evidence of foul play. The wife's victim stated he liked to walk by the river side. Witnesses stated that they saw the victim driving the car into the river through an access ramp. The police inferred that the gun was thrown to the water and labelled the case as a suicide.
The victim's daughter told us the victim had a clinical follow-up in Psychiatry, not noticing recent mood changes; according to the latest clinical notes the victim suffered from depression, which was stabilized and had no suicidal thoughts. There was no suicide letter.
It was possible to define the projectile trajectory within the victim's body and the different findings pointed to a close range/contact shooting. The

death was attributed to the traumatic thoracoabdominal injuries associated with drowning.

CONCLUSIONS: Considering the case discrepancies - the stability of the psychiatric condition, absence of a firearm at the scene, the incompatibility between the type of gun owned by the victim and the multiple projectiles found - and that the combination of multiple self-harm methods (complex suicides) is uncommon, the manner of death wasn't determined.

This case mirrors the difficulties in establishing the manner of death in some cases, needing more information than the one first provided, which emphasizes the need of a team work with police forces in order to have better results in favour of justice.

P01-023 | *Forensic Pathology*

Determination of Post-Mortem Submersion Interval of Human Skeletal Remains: An Interdisciplinary Approach Based on the Study of the Life Cycle of Bivalve Mollusks

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The determination of post-mortem submersion interval (PMSI) is still a debated issue in forensic pathology. This is particularly true in case of human skeletal remains, due to the lack of soft tissues in which the cadaveric changes are more evident and thus mostly suitable for the PMSI estimation. Indeed, in case of bone remains, the tools for PMSI analysis are still very limited, if any.

This paper proposes an interdisciplinary approach based on the study of the life cycle of bivalve mollusks which has been applied to determine the PMSI of a skull retrieved in Lake Garda, Italy. The skull was incomplete, lacking maxilla, cranial vault and teeth.

The bone surface was almost entirely covered with bivalve mollusks, specifically where fissures and cavities were present (e.g. alveolar cavities, petrous parts of the temporal bones, nasal pits, orbital cavities, crista galli, etc). Mollusk shells morphological examination revealed analogous features of all the bivalves: pale color near the hinge, a rounded transition of the ventral and dorsal shell surfaces, convex ventral shell surface and, although difficult to observe in the shell remains, a coloration marked by white, brown and black shades. Shells' length ranged from a minimum of 4 mm to a maximum of 15 mm. The examination identified the shells as belonging to the species Dreissena bugensis. D. bugensis was identified for the first time in Lake Garda during the beginning of the year 2022. The mollusk, which is native of the Dnieper River of Ukraine, is one of the most aggressive invaders in freshwater ecosystems, now present in most of Western Europe countries. The large spread of this species is mainly due to its great flexibility in fluctuating environments and to the production of several free-swimming larvae (veligers) that favors swift dispersal. Under optimal growth conditions D. bugensis growth rate is estimated around 15-20 mm each year, reaching a maximum size of 30-40 mm.

Given the exclusive presence of D. bugensis on the skull surface, the estimated timing of the mollusk colonization of Lake Garda and the maximum size of the shell samples found on the human remain, the minimum PMSI of the skull was estimated to be between 6 months and 1 year.

In the present case, the combination of forensic pathological with hydrobiological knowledge proved to be of great value in PMSI evaluation. In addition, this approach could serve as a valuable tool for PMSI estimation in similar cases taking into consideration D. bugensis is widespread throughout Western Europe, as well as some areas in Eastern Europe and America and that its life cycle is well-known.

P01-024 | *Forensic Pathology*

The Unidentified Dead Recovered from Shipwrecks: A Glimpse Through the Experience of the Forensic Department of Monastir (2000-2023)

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INTRODUCTION: The flow of migration is continuing toward the European Continent, despite an increased number of people losing their lives or gone missing. Efforts are being made to study this phenomenon, as well as the impact of the use of the migratory route of Tunisia, leading to fatal humanitarian consequences.

This study is a first attempt to give a glimpse about the thanatological activity of the forensic department of Monastir related to dead bodies recovered from shipwrecks.

METHODOLOGY: The present study was undergone in the forensic department of Monastir in Tunisia, from 2000 to 2023. The Forensic department of Monastir covers the thanatological activity of the region of Monastir and Mahdia, situated both in the East Coast of Tunisia. Data were retrospectively collected including all unidentified casualties that had been recovered from shipwrecks. Data included epidemiological features related to the corpses (sex, state of the cadaver, year, age group, probable cause of death, estimated time from death to the recovery of the body)

RESULTS: Of a total of 129 casualties, 24 were females. A complete body/skeleton was present in 77.5% of the cases. The year 2023 accounted for most cases (N=52; 40.3%) followed by 2008 (N=24; 18.6%). An increase of the number of the cases was noticed after the 2011 revolution (81 cases). We were not able to estimate the age in 65 cases, while in 36 cases, the human remains were estimated to be in the 21–30 age group. Concerning the state of the body, 35 bodies were in an advanced state of decomposition, while 19 bodies were fresh. The cause of death has been attributed to drowning in 81 cases, while, in 03 cases, the death has been related to a heat stroke. Time between death and recovery of the body has been estimated to few months in 30.2% of the cases.

CONCLUSION: The pattern observed in this study was typical. More studies across the country are required to better analyze this phenomenon. Efforts should include, apart from the forensic departments, the competent authorities, and even international organizations in order to ensure a proper management of this humanitarian crisis.

P01-025 | *Forensic Pathology*

The Challenging Diagnosis of Fatal Anaphylactic Shock and the Role of Serum Tryptase: A Tentative Systematic Review

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INTRODUCTION: Anaphylaxis is a severe, life-threatening systemic hypersensitivity reaction characterised by a rapid onset usually, although not always, associated with skin and mucosal changes. An important role in the diagnosis of death is played by the detection of tryptase blood levels. However, its predictive ability remains controversial. The aim of this study is to investigate the difference in tryptase blood values between anaphylactic and non-anaphylactic deaths through a systematic review.

METHODS: A investigation for eligible studies was performed utilizing three databases (PubMed, ISI Web of Knowledge and Scopus). The

inclusion criteria were fulfilled if the detection of human serum tryptase in anaphylactic and non-anaphylactic deaths was mentioned. Only papers written in English language were reviewed (the English language filter was applied to the research), and no time restrictions were imposed as a filter (meaning all available scientific literature was included independently on how long ago it was published). Mean tryptase values, minimum and maximum tryptase values were extracted. Data were divided by type of death (anaphylactic and non-anaphylactic) and site of collection (central and peripheral blood). Post-mortem Interval was also recorded, when available. Tryptase values were converted in µg/L if expressed in other unity of measurement. Obtained data were submitted to statistical analysis with T-test and one-way Anova test. STATA Software/MP, Version 18 (StataCorporation, College Station, Texas, USA) was used for the statistical analyses.

RESULTS: The initial analysis resulted in 3062 relevant studies among all three databases. With the exclusion of 2849 papers following abstracts' screening, full texts of 213 articles were reviewed and 205 were excluded by full text analysis. Subsequently, 14 articles were included in the review. Finally, T-test was performed between the mean tryptase values of the subjects who died from anaphylactic shock and those who died from another cause, $t(14)=4.43$; $Pr(T>t)=0.0005$, and one-way Anova test was performed with maximum tryptase values relative to mean tryptase values in the anaphylactic and non-anaphylactic population. One-way ANOVA revealed more differences within groups than between groups.

DISCUSSION: Results are consistent with those reported in the available literature. In fact, T-Test showed a statistically significant difference in mean tryptase values between subjects who died of anaphylactic shock and subjects who died of another cause. However, the Anova test showed an overlap in maximum tryptase values between the two groups, anaphylactic and non-anaphylactic, especially when sampling is performed at the central site. This leads to the hypothesis that serum tryptase is sensitive but not specific. To overcome this possible discrepancy, the use of -omics sciences, particularly proteomics, could be useful.

CONCLUSION: The serum tryptase in post-mortem sampling could be sensitive but not specific, -omics sciences could overcome this obstacle, but more studies on this topic are needed.

P01-026 | *Forensic Pathology*

When the Doctors Kill Themselves: A Case of Multidrug Intoxication

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Suicide is a major social and health emergency. This is a complex phenomenon with many dimensions and that there also exist occupational risk factors for suicidal ideation and suicide in general that policymakers should consider. In this regard, among female physicians, the risk of committing suicide is higher than among the female population in general, in contrast to the general preponderance of the male gender among suicide victims. The higher risk observed among women has been associated with the weight the society assigns to women's role in the family, which may conflict with career aspirations and poor status integration within the profession. The genesis of these problems can partly be traced back to the over-legalisation of the medical profession and the increase in medical liability lawsuits, factors that may trigger feelings of frustration, professional devaluation, and high stress. This case presents autopsy and toxicological data concerning a suicide committed by a woman practising as a nephrologist and related to the simultaneous intake of six different drugs via two different routes (oral and parenteral). The woman, aged 55, was found lying supine on her bed. A peripheral venous access connected to an IV infusion kit containing 0.9% sodium chloride was found at the left elbow fossa. On the bedside table were a glass containing a liquid (apparently fruit juice) and a small bottle of water, which were collected for toxicological analysis. Several packages of drugs belonging to the benzodiazepine class were also present. A farewell letter written by the woman was found during the scene investigation. It was also reported to investigators that the woman had been suffering from severe depression for a long time. Toxicological investigations revealed the presence of Morphine, Fentanyl, Lorazepam, Alprazolam in the biological fluids and traces of Escitalopram and Granisetron.

Toxicological investigations performed on the non-biological fluid samples documented the presence of morphine and fentanyl. Concerning the morphine found in the infusion fluid, considering the concentration found in the residual amount inside the flacon, it can be calculated that approximately 200 mg morphine (corresponding to approximately 20 vials of 10 mg/ml) was originally added to the intact sodium chloride flacon (100 ml). Based on circumstantial, autopsy, and toxicological investigations, the death was classified as a suicide resulting from acute narcotism related to high quantities of opiates.

The case described appears paradigmatic concerning the general characteristics of suicides occurring in the context of the medical profession, where it is well documented that the risk of committing suicide is higher for doctors, and particularly for the female sex, than for the general population. The method used also reflects what is known about the greater propensity of this category to commit suicide using drugs at lethal dosages.

P01-027 | *Forensic Pathology*

Comprehensive Postmortem Analysis in Sudden Infant Death Shifts the Course of a Criminal Investigation, Absolving a Mother from Allegations of Manslaughtering her Infant Daughter

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The critical role of postmortem examinations and detailed collection of historical and circumstantial data is paramount in forensic investigations, especially in cases of sudden infant death. This report presents a sudden infant death case where integrating technical data led to a correct pathological and forensic classification, thereby altering the initial direction of the investigation, which started as a case of manslaughter.

A three-month-old infant was found deceased by her mother inside a traditional African baby carrier ("kitenge") following a bus journey. The mother reported that she avoided sitting during the bus ride to prevent compressing her daughter, who was carried on her back. She believed the child was alive throughout the journey, hearing faint cries. However, upon arrival, she discovered the baby unresponsive with nasal bleeding.

The child's medical history revealed an episode of hospitalization for bronchiolitis shortly after birth. Nasopharyngeal swabs, taken before the autopsy, tested positive for rhinovirus/enterovirus.

The autopsy only revealed an increase in lung weight and consistency, bilateral subpleural hemorrhagic areas, and multivisceral congestion. The histological examination of the lungs, revealed bilateral, weakly eosinophilic, often brownish granular, amorphous material, mixed with birefringent translucent globules in the lumens of bronchial and bronchiolar structures and alveolar spaces accompanied by intralveolar histiocytes with granular cytoplasm, occasional small lymphocytic aggregates, and focal endoalveolar hemorrhages.

Immunohistochemical analysis revealed beta-lactoglobulin in the gastric content and in the intrabronchial and intra-alveolar amorphous material, indicating artificial milk – this antibody reacts with bovine milk proteins

but not human milk. Anti-alpha-lactalbumin testing yielded inconclusive results due to nonspecific background staining.

The findings concluded that the infant's death resulted from acute respiratory failure due to aspiration of artificial milk into the airways and alveolar spaces following gastric content regurgitation. Milk aspiration, a known cause of sudden infant death, is often associated with gastroesophageal reflux, which can lead to central apnea and laryngospasm. In such cases, milk found in the airways could be linked to occasional reflux episodes or post-mortem during resuscitation efforts. However, the significant presence of milk in both proximal and distal airways, along with reactive macrophages, indicated pre-mortem aspiration as the primary cause of death.

The detection of granular amorphous material in the bronchi, bronchioles, and alveoli, observed bilaterally in multiple microscopic fields and in all examined inclusions, associated with macrophages and intralveolar edema, was a critical finding. These technical assessments identified regurgitation of food material as the cause of death, exonerating the mother from homicide charges. The impact of carrying the child in a "kitenge" on the back, its potential role in the delayed recognition or causation of milk inhalation, and any resulting legal responsibilities, are yet to be determined.

P01-028 | *Forensic Pathology*

Interdisciplinary Analysis of an Unusual Death Involving Fire, Car's Exhaust Fumes Inhalation and Ethanol Intoxication: A Complex or a Complicated Suicide?

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THE CASE: A charred body was found one might in a burned car parked on a gravel road in the country. DNA analysis confirmed that the victim was the owner of the car, a 61-year-old man, suffering from unspecified psychiatric disorders and with a history of previous suicide attempts. It was discovered that he was a smoker and that he had purchased a garden hose few days earlier. Fire investigations revealed partially burned fragments of the garden hose along the right side of the car, with one end inserted into what remained of the exhaust pipe and the other end near the right-side door and glass fragments inside the cabin, which could be associated with bottles of spirits. Moreover, it was established the fire would have likely started on the driver's seat. Post-mortem computed tomography excluded foreign metallic objects, whereas at autopsy signs of vital exposure to the fire, such as soot deposits in the airways and thermal damage to the respiratory mucosa, were observed, in absence of significant traumatic lesions. The degree of body thermal destruction corresponded to level 3 of Crow-Glassman scale. Toxicology highlighted a blood alcohol concentration (BAC) of 1.61 g/L and carboxyhaemoglobin saturation (COHb) of 45%.

CONSIDERATIONS: Autopsy findings and COHb levels were indicative of inhalation of combustion products as the cause of death of the victim, whereas the absence of traumatic injuries and the presence of the garden hose, in association with the psychiatric background of the man were suggestive of a suicide. However, due to presence of different types of injuries, it was necessary to determine whether the fire had been deliberately started or not, in order to classify the death as a complex (deliberately started fire) or a complicated (accidental fire) suicide. Detected BAC was suggestive of a condition of excitement, and in association with CO intoxication could result in a more impaired sensory response, judgement and reaction time and mental confusion. Therefore, it was plausible that the man connected the exhaust pipe to the cabin with the garden hose to suppress himself, and, under influence of ethanol, accidentally set the car on fire by splitting spirits on the driver's seat. The hypothesis of a complex suicide was unlikely, but it could not be ruled out beyond any reasonable doubt. Both complex and complicated suicides involving fire and occurring in motor vehicles are rare in the literature and this case shows how a clear differentiation between these two types of suicide is not always possible. On the other hand, this case highlights the importance of an interdisciplinary method in the determination of the cause and of the manner of death in the approach to charred bodies.

P01-029 | *Forensic Pathology*

Surveillance Fails... Suicides in Jails

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This study examines seven cases of suicide in jail in people with clinical risk factors for suicide, subjected to special control regimens. This study aims to identify the circumstances of suicides highlighting the possible measures to improve the prevention of suicides in jail.

According to the Italian penitentiary legislation, inmates who have clinical risk factors for suicide are subjected to special control regimes: "surveillance by sight", for prisoners classified as high suicide risk, "great surveillance" and "very great surveillance", adopted on medical advice in cases of inmates with psychic pathologies. In our study, we examine seven cases of inmates who committed suicide despite the adoption of surveillance. 1ST CASE: a 36-year-old Romanian male who had psychiatric disorders, subjected to a regime of surveillance by sight, having already attempted suicide; he hanged himself using shoelaces. 2ND CASE: a 46-year-old Italian male with psychiatric disorders, under surveillance by sight for having already attempted self-harm; he used a sheet to hang himself. 3RD CASE: a 20-year-old male Egyptian inmate who had psychiatric disorders for which he was subjected to a regime of very great surveillance, not having already attempted suicide; he hanged using a rudimentary rope. 4TH CASE: a 35-year-old Italian inmate with psychiatric problems who was subjected to great surveillance because of his psychiatric illness although in the past there were not documented suicide attempts; he used the drawstring of his trousers to hang himself. 5TH CASE: a 24-year-old male inmate. He had psychiatric disorders and was subjected to very great surveillance to having already attempted suicide; he hanged himself using a piece of shirt. 6TH CASE: a male from North Africa with psychiatric disorders who was under great surveillance for having already attempted self-harm; he used a sheet to hang himself. 7TH CASE: an Eritrean male drug addicted. He was subjected to very great surveillance and used a sheet to hang himself. In all seven cases on external examination, the only lesion is the sulcus on the skin while the hypostases are not typical of hanging because the corpses in a short while were placed supine on the floor to attempt resuscitation maneuvers. The autopsy showed, in correspondence with each sulcus, the presence of hemorrhage in the dermis, subcutaneous tissue, and the laceration of the fibers of the neck muscles. In these cases, surveillance, as an active control by the penitentiary police only, fails. To prevent suicides, it would be advantageous to frame the risk of self-harm by carrying out a medical screening of all inmates with a multidisciplinary approach. It would also be advisable to pay particular attention to the means used, to make them unavailable to prisoners.

The high rate of suicides in prisons highlights that the surveillance carried out by penitentiary police alone is not effective in preventing suicide.

P01-030 | *Forensic Pathology*

Fatal Airways Bleeding: When Histopathology Provides Crucial Evidence for Solving Medical Malpractice Cases

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Pulmonary haemorrhage is a potentially life-threatening condition characterized by bleeding from one of the vascular compartments. The primary source of massive bleeding (up to 90%) is bronchial circulation, commonly interested in invasive infections, vascular malformations, and traumas, including iatrogenic injuries. Less frequently, pulmonary vessels may be implicated, particularly in cases of lower blood flow pressure, as observed in left heart syndromes, elevated pulmonary hypertension, and vasculitis. Clinically, haemorrhages can manifest as blood expectoration with – or without – cough (i.e. haemoptysis) and/or epistaxis, mimicking bleeding from different sources such as gastrointestinal and nasopharyngeal tracts. Thus, without a clear clinical history, it may be challenging for clinicians to make the correct diagnosis. Furthermore, even when the underlying cause is identified (e.g., iatrogenic injury), prompt evaluation, stabilization, and proper patient care can pose difficulties. The potential adverse progression of the clinical course may arise concerns about the adopted medical treatment.

Herein, we present four cases of fatal pulmonary haemorrhages, in which the Judicial Authority questioned the work of healthcare professionals, ordering forensic autopsies. In each case, clinical, autopsy and histological data were analysed. The results shed light on events occurred prior to the patients' death. The cases regard:
1) a 13-year-old male, who experienced a first episode of mild haemoptysis, followed by inconclusive diagnostic assessment. Eight days later, a recurrence of a pulmonary haemorrhage resulted in the sudden death due to a two-stage rupture of an unknown arteriovenous vascular malformation;
2) a 37-year-old man with tuberculosis conducted to emergency department for blood expectoration. After an initial discharge, clinical relapse led to further hospitalization and an unexpected death. The cause of death was ascribed to the vascular impairment related to the progression of infection;
3) a 38-year-old man, with a history of cirrhosis who presented haemoptysis and subsequent cardiac arrest after a CT-guided thoracic biopsy of a lung nodule due to the perforation of a peritumoral artery;
4) A 76-year-old man, who suffered major injuries in a car accident, requiring multiple drainage tubes. One of the chest tubes was mistakenly placed in the lung parenchyma. After the withdrawal of the drain, the man became haemodynamically unstable and died due to massive bleeding from a misrecognised pulmonary angiomatoid lesion.

Our analysis underscores the uniqueness of the injuries reported, emphasizing the importance for forensic pathologists to perform in-depth and extensive histological examination of the lung, especially when medical liability is alleged. Concerning the presented cases, the evidence collected identified underlying diseases, such as the source of the haemorrhage in cases (1) and (2) or recognized potential concurrent causes to explain the chain of events leading to death in cases (3) and (4). This recognition is crucial for analysing the actions of the involved healthcare professionals.

P01-031 | *Forensic Pathology*

Playing with Air Guns: A Heartbreaking Incident

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Air guns are defined as guns that use the energy from compressed air or other gases such as compressed carbon dioxide to propel pellets, in contrast to firearms, which use the ignition of powder, through its gas expansion, to propel the projectile.

Air guns come often portrayed as tools with limited injury potential, usually involving skin wounds or soft tissue destruction as in eyeball shots, only being lethal when certain circumstances are met, such as point blank shots or homemade guns with above average energy transmission. This conception around air guns has led to a plethora of regulations among different countries, often leading to a high accessibility to these tools, thus a higher chance of accidents or misuse.

This case presents an incident in which a teenager was accidentally shot with an air rifle in the chest from several meters away when he opened a door with a target hung on it. The aforementioned air rifle displayed an energy that was below the threshold for weapon licensing, only requiring an identification for its acquisition.

After the autopsy it was proven that the pellet went through the T-Shirt, skin, traversed the third left rib, fracturing its anterior arc, punctured the superior lobe of the left lung and was stopped by the pericardium, rupturing the fibrous pericardium but not the serous pericardium, being hosted, undeformed, within that space. It was concluded that the great compliance of the pericardium allowed the pellet energy to be transferred to the left atrium, probably during diastole, leading to a 1 cm rupture on the left atrium and a 300 milliliter fatal cardiac tamponade.

The report showcases forensic imaging of the pellet trajectory and the injuries caused by the projectile and proves not only the lethal potential of air guns at a certain distance, but also the capability of pellets of penetrating though bone.

P01-032 | *Forensic Pathology*

Positional Asphyxia: A Complex, Sometimes Ambiguous Entity?

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Death from positional asphyxia is often an accidental event in which the position of the body prevents effective respiration. Its diagnosis is strictly based on circumstantial data, such as the original position of the body and of all its segments at the time of death. We present 4 unusual cases of positional asphyxia from our series of recent years, which present overlaps between different types of asphyxia.

An 83-year-old male farmer was found unresponsive, trapped in the highest and largest opening of the atomizer of a high-volume sprayer tank: his head and upper limbs were pending inside the tank, whereas his legs hanging down outside and the edge of the opening (diameter=40 cm), was pressing on his upper abdomen. The cause of death was attributed to a work accident due to an asphyxia in head-down position, with the pressure on the upper abdomen likely contributing to prevent breathing movements.

A 41-years-old man with a history of opioids abuse was found dead in a knee-chest position; the head was down on the floor with the face resting on a plastic bag. At autopsy, signs of congestion and petechial hemorrhages were observed, in absence of traumatic lesions. Non-fatal methadone levels were detected in the blood. The cause of death was determined as postural asphyxia, due to prolonged knee-chest position secondary to methadone intoxication. The head-down position and smothering from the plastic bag may have contributed to asphyxiation.

A 74 years old female was found in the kitchen, trapped inside a wooden cabinet used to store foods, with an opening on the superior surface. She was in a head-down position, with distal legs and feet outside and the chest pressed to the bottom of the cabinet. Congestion and cyanosis of the face were observed, in absence of signs of violence. The death was consistent with an accidental asphyxia in head-down position in association with hyperextension of the neck and chest immobilization.

A 73 years old female was found wedged between the legs of an overturned chair in a jack-knife position. At autopsy, pleural and

pericardial petechiae and some costal fractures were observed. No other relevant pathological findings were noted. Circumstantial and morphological evidences suggested an accidental asphyxia due to a jack-knife position and wedging: it was likely the woman sat on the chair and remained entrapped between the legs of the chair.

In all 4 cases, the victims were found in a position impeding breathing and from they were unable to extricate themselves, in association with other contributing factors. Given the fact that death in a head-down position is often considered a distinct entity from positional asphyxia, this series confirms the current issues in the classification of this peculiar type of death.

P01-033 | *Forensic Pathology*

Penetrating Lethal Wound of a Non-Lethal Bullet: A Case Report

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This study describes the case of a 34-year-old found dead in a wooded area close to Varese with gunshot wounds on his back. In the area, four "less than lethal" rubber ball casings were found.
At the present time, we have scarce literature about fatal lesions provoked by "non-lethal" type ammunition. The aim of our work was to investigate accident dynamics, involved weapon, ballistic trajectory analysis, bodily injury patterns and its clinical consequences and implications in the first Italian case of death caused by "non-lethal" projectiles.
Medical and forensic data relating to the deceased patient were collected.
A total body CT scan was performed to carry out an accurate description of path and location of the rubber ball within the body.
During the autopsy, a continuous circular solution, presenting a diameter of 1.8 cm, was highlighted on the right side of the back, lately identified as the entry hole of a single rubber ball. This solution continued with an intracorporeal passage 4 cm long reaching the X thoracic vertebral body. The rubber ball was found in the right pleural cavity, while a cylindrical plastic wad was found within the parenchyma of the right lung, which was then perforated. Moreover, two ecchymoses with a diameter of 0.8 cm each were found, one on the back and one on the right thigh, attributable to buckshots.
The worn jacket presented a circular tear on the back surface corresponding to the perforated skin wound, and three more tears which, as we established, were also related to buckshots.
In the Uboldo shooting range, ballistic firing tests were conducted on a pig carcass using the same weapon and ammunition to better understand its penetrating potential in biological tissues from different distances. Moreover, the buckshot spread at different shooting distances was calculated.
A total body CT was then performed on the pig carcass to describe the intracorporeal pathways reproduced during the experimental tests.
Sellier's formula was applied to evaluate the penetrative capacity of the projectile into skin, soft tissues and bones, in order to calculate the shooting distance.
Finally, additional ballistic tests were performed in an experimental artillery-range in Rome at distances of 6 meters and 12 meters in order to measure the projectile velocity decay using a chronograph and how long it takes for the wad to separate from the rubber ball.
Thanks to the data collected and their processing, it was possible to determine the distance from which the rubber ball was fired, sufficient to penetrate through the tissues, causing a chest wound and extensive lung damage resulting into death; we were also able to establish the shooting distance of the buckshot projectile.

P01-034 | *Forensic Pathology*

Fatal Road Traffic Accidents and Injuries: A Preliminary Study

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Road accidents are still a significant cause of fatalities worldwide. In Italy, accidents and injuries increased in 2022 compared to 2021, after the pandemic years.
A retrospective observational study was performed on a case series of 48 fatal road accidents examined by the Section of Forensic Medicine of Verona.
The case series was divided, according to the type of victims involved, into pedestrians, car drivers, car passengers, and motorbike drivers. The distribution of external and internal injuries was analysed for each of them.
The number and the mean age, in years, of the subjects in the respective groups were: 19 pedestrians (75.95), 10 car drivers (54), 5 car passengers (60.4) and 14 motorbike drivers (47.1). The external injuries examined were bruises/abrasions and lacerations, which were present in 100% and 68.8% of the cases, respectively.
In each group, the sites with the highest presence of external injuries are the head (77%), upper limbs (85.4%) and lower limbs (95.8%); trunk injuries are lower in pedestrians than in the other groups. Fractures are present in 95.8% of the subjects, of which 79.2% are rib fractures. In addition, organ or large vessel rupture are found in 26.3% of pedestrians, in contrast to the 65.5% seen in the other groups. Polytrauma was found in 77%, head trauma alone in 16.7% and chest trauma alone in 6.3 % of cases.
In 42.1% of the pedestrians, the death was delayed and turned out to be related to the pathophysiological consequence of the trauma. At the same time, no cases with large vessels and organs ruptured were found.
In the other groups, rupture of large vessels was observed in 27.6% of cases, and organ ruptures in 34.5%.
Toxicological examinations were carried out in 30 of them, with positive results in 43.3% of cases. Pedestrians' mean age and the delayed time of death (68.4% of cases) explain that in 42.1% of them, the death was related to the pathophysiological consequence of the accident.
As reported in the literature, pedestrians have external injuries mainly distributed over the head and limbs, with partial sparing of the trunk. However, the fractures are predominantly of the skull and ribs.
Organ and large vessel injuries, however, are the most common internal injuries in car and motorbike drivers, 70.8% of whom die immediately after the accident; the fatal injuries were large vessel and organ ruptures in 29.2% and 41.7%, respectively.
Although this is a preliminary study on a small case series and lacks statistical validation, and therefore, an increase in the number of cases is necessary, the preliminary results seem to provide a helpful tool for assessing injuries in complex fatal road traffic accidents.

P01-035 | *Forensic Pathology*

A Dead Body, a Tractor Accident and No Traumatic Lesions – A Case Report of a Rare Cause of Death after a Tractor Accident

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INTRODUCTION: Tractor accidents are common in Portugal and epidemiological studies reported 358 deaths and 330 serious injuries from 2013 to 2017, with an average of 5 deaths per month. These fatalities are mainly caused by multiple traumatic lesions, following the rollover of the vehicle.
We describe a fatal tractor accident without fatal traumatic lesions, associated to a rare form of asphyxia – traumatic asphyxia. Traumatic

asphyxia is caused by external compression of the thoracoabdominal region, impairing respiratory movements and the diagnosis is based on circumstantial data and exclusion of other causes of death.

METHODS AND RESULTS – CASE REPORT: A 21-year-old male was found dead after a tractor rollover, trapped under de vehicle. The postmortem examination showed: intense congestion and petechiae in the face, neck, upper thorax and upper limbs, extensive subconjunctival petechiae and multiple thoracic abrasions. Internal examination showed multivisceral congestion, serous membranes petechial hemorrhages and no traumatic lesions were found. Blood toxicological analysis was negative for ethanol and drug testing.
It was concluded that the death was due to traumatic asphyxia caused by thoracoabdominal compression by the tractor and the manner of death was ruled violent – accidental.

CONCLUSIONS: This case intends to demonstrate a rare cause of death after tractor accident (traumatic asphyxia), emphasizing crucial role of detailed circumstantial information/evidence and the need for a careful postmortem examination, in order to look for general signs of asphyxia (congestion and petechiae), which may be the only changes in these deaths.

P01-036 | *Forensic Pathology*

Clockwork Tangerine: An Unusual Case of Suicide by Chocking

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INTRODUCTION: In Italy, between 3500 and 4000 cases of suicide occur annually. Concerning suicides by mechanical asphyxiation, hanging is the most frequently employed method. Among other forms of asphyxiation, suicides by choking are extraordinary events, typically involving individuals suffering from severe and chronic psychiatric disorders. The case presented is distinctive due to the unique manner in which the victim carried out the suicide.

MATERIALS AND METHODS: A 34-year-old man, under treatment at a facility for psychiatric disorders and pathological dependencies in the Modena area, was discovered lifeless by his roommate, lying over the bathroom sink. No judicial inspection was required, as surveillance footage revealed the subject repeatedly handling and placing into his mouth an unspecified object, initially identified as a pill dispenser. To address various medico-legal issues, a comprehensive post-mortem investigation was ordered by the judicial authority, accompanied by chemical-toxicological and histological analyses. Concurrently, scrutiny was extended to the medical documentation related to the hospitalization and the audio-visual records from security cameras. The individual had long been known to local psychiatric services and the admission to the facility marked the continuation of diagnostic-therapeutic intervention for a recent episode of psychotic decompensation due to substance abuse, now in the phase of clinical stabilization. No signs of external traumatic injuries were observed during the autopsy. Attention was drawn to extensive postmortem lividity, sharply demarcating from the epistatic regions. During the autopsy, in addition to generic signs of acute asphyxiation (sub-serous petechiae, abnormal blood fluidity, multi-organ congestion), a whole tangerine, complete with peel, occluding the laryngeal inlet, was discovered.

RESULTS: The findings of the post-mortem investigations allowed the identification of the cause of death as acute mechanical asphyxiation due to choking, attributed to the presence of a tangerine obstructing the upper airways. Histological examinations of the lungs revealed acute pulmonary emphysema. Chemical-toxicological investigations in the blood confirmed therapeutic levels of psychotropic medications, consistent with the prescribed therapy.

CONCLUSIONS: The integration of autopsy findings with the medical history, circumstantial evidence, and notably, the examination of closed-circuit camera footage, allowed the classification of the subject's actions as voluntary and self-injurious. This situates the event within the domain of suicide by choking due to the presence of a whole tangerine obstructing the upper airways. This case draws attention to an extremely rare suicide method that should be considered from both a prevention perspective and the potential responsibilities of the psychiatrist.

P01-037 | *Forensic Pathology*

Sudden Cardiac Death in a Young Athlete: A Case of Congenital Coronary Anomaly and Hypertrophic Cardiomyopathy

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The aim of this presentation is to increase the awareness of congenital coronary anomalies and hypertrophic cardiomyopathy to aid in preventing such tragedies and further optimizing pre-participation screening protocols to ensure the safety and well-being of young athletes. This presentation will impact the forensic community by providing the grass anatomy and histopathological autopsy findings of a sudden cardiac death of a young athlete and highlight the importance of the knowledge of such anomalies and the need of a proper and complete heart examination in these cases.

Sudden cardiac death (SCD) in young athletes is a rare yet devastating event that poses a significant challenge to medical practitioners[1-2]. Anomalous Aortic Origin of a Coronary Artery (AAOCA) is a rare congenital condition where the coronary arteries originate from the wrong sinus or section of the aorta, leading to compromised blood flow due to the aberrant course of the arteries. We present a case of a 12-year-old male athlete who collapsed during a basketball game and succumbed to sudden cardiac arrest despite prompt resuscitation efforts. Forensic autopsy and histopathological examination revealed two contributing factors to the tragic event: a congenital coronary anomaly known as AAOCA and underlying hypertrophic cardiomyopathy.

In this case, both coronary arteries originated from a single ostium above the aortic cusps, resulting in acute angle and slit lumen between the aorta and pulmonary artery. During strenuous physical activity, the abnormal course of the coronary arteries led to their compression, leading to acute biventricular myocardial ischemia and cardiac arrest.

Additionally, histopathological examination revealed hypertrophic cardiomyopathy, a condition characterized by an enlarged left ventricle and thickened myocardium. The combination of AAOCA and hypertrophic cardiomyopathy significantly increased the risk of sudden cardiac death in this young athlete[4-5].

The presented case highlights the challenges in detecting these cardiac abnormalities in young athletes, as most cases remain asymptomatic until the fatal event. Pre-participation screening, including stress electrocardiogram and spirometry, has proven effective in identifying certain cardiac conditions; however, AAOCA and hypertrophic cardiomyopathy may go undetected without specific diagnostic tests such as coronary angio-CT and cardiac MRI, which are usually reserved for cases with clinical or electrocardiographic abnormalities[4-5].

Ultimately, sudden cardiac death in young athletes remains a complex issue, and identifying potential risk factors through comprehensive medical and forensic assessments is crucial.

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P01-038 | *Forensic Pathology*

Aorto-Esophageal Fistula: A Rare Case of Massive Digestive Hemorrhage from Gunshot Wound

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Bleeding from the digestive tract due to aorto-esophageal fistulas are rare conditions with a high mortality rate. The aorto-esophageal fistula from a gunshot wound to the chest affecting the aorta and esophagus with massive digestive bleeding and consequent acute hemorrhagic shock represents a fatal and rare circumstance of death. The case that came to our attention concerns a nineteen-year-old young man who died quickly from an aorto-esophageal fistula caused by a gunshot wound to the chest; the shot was fired by a third person with a Derringer type gun.

A computed tomography was first performed, which highlighted a hole in the sternal manubrium at a level corresponding to the fourth dorsal vertebra, as well as a metallic foreign body in the left paravertebral site at the level of the eighth dorsal vertebra.

During external examination, an ellipsoidal skin hole was found in the jugular site. Autoptic findings confirmed a hole in the sternal manubrium and a metallic foreign body at the level of the left pulmonary hilum. Furthermore, the perforating wound of the thoracic aorta was found and, in correspondence to this, another one on the esophagus, with abundant blood staining of the esophageal wall and blood repletion of the stomach, with associated signs of pulmonary blood aspiration.

The cause of death was identified in a single bullet thoracic gunshot wound fired from a subject placed in front of the victim, at a distance greater than 40 cm, resulting in the perforation of the aorta and esophagus, resulting in an acute aorto-esophageal fistula and massive bleeding within the esophagus and stomach (associated with pulmonary blood inhalation), and subsequent acute hemorrhagic shock. The wide communication created between the aorta and the esophagus, between a district with high pressure and a low pressure one, allowed profuse bleeding with rapid volume depletion and consequent shock, also causing asphyxial suffering which contributed to death. The case, despite the obvious pathophysiological aspects, is singular for the methods of production of the aorto-esophageal fistula, caused by an acute and spatially concentrated, exclusive traumatic factor, and also because it is a very rare occurrence in forensic literature.

P01-039 | *Forensic Pathology*

A New Trend in Intentional Sodium Nitrite Ingestion as a Method of Suicide in the Region of Central Macedonia, Northern Greece

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Sodium nitrite is a food additive, used mainly as a preservative in food, as well as an antimicrobial agent in meat and fish industries, that can be easily found from various websites on the internet. Exposure to nitrite - containing toxic salts is a recognized cause of acquired methemoglobinemia (MetHb). The ingestion of sodium nitrite (NaNO2) or sodium nitrate (NaNO3), causing MetHb, is an uncommon and recently identified method of suicide, with the first reported case in the literature occurring in New Zealand in 2010. In fatal methemoglobinemia cases due to nitrite containing salts ingestion, which is similar to carbon monoxide poisoning, low levels of oxygen in the blood are responsible for 'asphyctic' findings: brown-gray-red-purple lividity on the body, cyanosis of the extremities and lips, intense scleral congestion and intense polyvisceral congestion with Tardieu petechiae. In 2023, we identified three cases of intentional toxic sodium nitrite ingestion in the region of Central Macedonia, Northern Greece. Particularly, in this work we present 3 cases of sudden death of individuals with toxic salt ingestion, occurring in Thessaloniki and Chalkidiki within a six-month period in 2023. In all cases, police inquiry in the houses of the deceased revealed the presence of a yellowish powder, which was found to be nitrite salt. Screening techniques were used in order to detect high levels of MetHb, whilst autopsy revealed the characteristic grey-purple lividity upon the body. The diagnosis was established combining postmortem blood testing for methemoglobin saturation and/or autopsy findings in combination with findings from police inquiry. In two cases, toxicological analysis confirmed high levels of methemoglobin, however in the third case, methemoglobin detection was not possible, due to hemolysis of the blood sample. In the third case, the findings of police inquiry in combination with the autopsy findings in the morgue attributed to the cause of death.

P01-040 | *Forensic Pathology*

External Causes of Death in Younger than 18 Years Old in Portugal in the Last 10 Years – A Retrospective Analysis

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According to The United Nations Convention on the Rights of the Child (1989), "a child means every human being below the age of eighteen years unless under the law applicable to the child, majority is attained earlier."

In this age group, it is not possible to overlook the importance of violent causes of death, in particular accidental deaths. Children are a prime target for accidents, not only because of their size and fragility, but also because they do not distinguish and/or value dangerous situations.

Suicides in pediatric age are less common, since, in most cases, the child does not have a well-defined notion of death as being an irreversible event until adolescence. Therefore, the rate of this type of death increases with age.

Child homicide cases are relatively rare and are mainly caused by parents or known people. Infants are the main targets of childhood murder, due to either traumatic lesions (e.g. Shaken Baby Syndrome) or neglect.

Our goal is to characterize and assess the evolution of external causes of death in individuals 17 years old or younger, in the last 10 years (2014 to 2023), in Portugal, using data from autopsy reports carried out at Instituto Nacional de Medicina Legal e Ciências Forenses in which the manner of death was classified as violent (accidental, suicidal, homicidal or with undetermined intent).

This study focuses on the characteristics of the victim, the cause, and the manner of death, and aims to uncover the potential trends or patterns of these variables throughout this decade.

P01-041 | *Forensic Pathology*

Homicide-Suicide as Domestic Violence: A Case Report

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The focus is on the unnatural death is forensic pathology including criminal death. One special field is the murder-suicide or homicide-suicide. The literature is underpresented from this point of view and has a relatively rare occurrence worldwide mainly with male perpetrators and female victims. The authors report a case about a special type of homicide-suicide which is so called intimate partner homicide (femicide)-suicide in which the victim was a 42-year-old woman with

more than 55 incised- (cuts, stabs etc.) and blunt force injuries with external examination. The resuscitation was unsuccessful by the paramedics. Not one of the wounds was incompatible with life, some of them had life threatening condition and numerous self-defence type of wound were observed. Not so far from the crime scene the 48-year-old perpetrator's hanging corpse was found on a high voltage electric pylon who previously committed the suicide, talked to one of his daughters from his first marriage and gave her money to his funeral and asserted he would not have gone to prison again.

P01-042 | *Forensic Pathology*

Accidental Deaths due to Electrocution in a Domestic Environment – An Analysis of Two Forensic Cases

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Electricity-related fatalities are usually accidental, in both a domestic and industrial environment. In these cases, the primary cause of death is cardiac dysrhythmia, most commonly by ventricular fibrillation. Less often, the passage of a current may lead to respiratory failure from spasm of the intercostal muscles and diaphragm.

In Portugal, domestic electricity supply is at a pressure of 220V (volts) and a frequency of 50Hz (hertz). Nowadays, high demand for domestic electricity exposes more people to electric appliances and to electric current itself, thus increasing the risk of injury, considering some individuals may not be aware of the risks associated with the use of these devices.

In this work, the authors discuss two cases of accidental deaths due to electrocution in a domestic environment related to lack of safety in the use of electrical cabling and accessories.

The first case concerns a 2-year-old child found dead at home with electrical marks in both hands and a stripped socket on a nearby wall.

The second case involves a 50-year-old woman, reportedly in cardiac arrest in the bathroom, with a strong burning smell at the scene. The victim was suspected to have leaned against one of the many unauthorized electrical pulls present in the area, after taking a shower.

Although deaths due to electrocution in a domestic setting are increasingly rare and often result from either faulty equipment or a lack of understanding of the potential dangers involved, many of them are preventable. Strategies for decreasing cases of electrocution should concentrate on ensuring safe domestic environments with properly installed and maintained electrical devices.

P01-043 | *Forensic Pathology*

Renal Vein Rupture with Massive Hemorethroperitoneum in Patient Affected by Uterine Sarcoma

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BACKGROUND: Uterine sarcoma can rarely lead to fatal vascular complications. The authors report the case of an 84-year-old woman found dead into her home. Since the woman lived alone and had no family members, no health information could be achieved. An autopsy was performed to determine the cause of death. The external examination showed no external signs of injury. Upon dissection, a massive hemoretroperitoneum extending to the left renal lodge was found, with an undamaged abdominal aortic aneurysm. The uterus was completely subverted by multiple masses of stone consistency, with an overall weight of 2450 g and the largest measuring 15 x 11 x 9 cm. Macroscopic exploration of the vascular system showed the integrity of the vessel walls of major venous and arterial tree. Therefore, the ruptured of a peripheral branch of the left renal vein was suspected to be the source of the massive retroperitoneum bleeding.

MATERIALS AND METHODS: The main viscera and the renal and aortic vascular tree were subjected to histopathological investigations, employing post-fixation techniques, while the neoplastic mass underwent prolonged decalcification in 14% HCl for approximately 4 months. Once decalcification was completed, serial sections were prepared on which stains were carried out for the elastic fibers (Weigert's Resorcin-Fuchsin), Masson's Trichrome according to Goldner and Giemsa.

RESULTS: The microscopic examination highlighted a connective tissue neoplasm with large calcified and sclerotic areas, with histological morphology referable to smooth muscle proliferation. The residual cellular areas located at the margins of the calcified zone showed high cellularity and marked cellular atypia, with a low mitotic index. These morphological elements were consistent with a diagnosis of plurinodular leiomyosarcoma with a low mitotic index. An acute hemorrhagic infiltrate was found in the left renal vein, infiltrating and dissociating the muscle wall. Fragmented and irregular elastic fibers were incorporated into the hemorrhagic infiltrate.

CONCLUSIONS: The investigations clarified the etiopathogenetic mechanism conducting to the subject's death: a massive hemoretroperitoneum due to compression caused by uterine leiomyosarcoma, that led to the rupture of a peripheral branch of the left renal vein without tumor invasion of the vessels. The case was considered of interest because of the very advanced stage of the cancer, associated to a rare and lethal vascular complication. Moreover, these features are likely related to a situation of neglected and untreated disease during life, demonstrating that such scenarios are still possible today, despite the increased importance of prevention campaigns.

P01-044 | *Forensic Pathology*

"Trapped" - Positional and Traumatic Asphyxia as Cause of Death: Case Report

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INTRODUCTION: Positional asphyxia is caused by an unusual position of the body that interferes with breathing/pulmonary ventilation. This position may be total/partial body inversion, hyper-flexed head or jack-knife position for an extended period of time. The victim may not be able to get out of this position, whether due to being trapped in restricted spaces, having traumatic injuries/natural pathology or being intoxicated (alcohol or drugs). Traumatic asphyxia is characterized by respiratory movements restriction caused by external pressure of considerable weight on the chest or abdomen.
Fatalities from these types of asphyxia are rare (only 0.03% of autopsies performed in a 6-year period in a European forensic center) and are mostly accidental.

CASE REPORT: A 60-year-old male with chronic alcohol abuse was found in a vacant lot, lying face down, perpendicular to a concrete wall, with the head, part of the trunk, and upper limbs in a pit. Judicial inspection found no signs of foul play.
The postmortem examination showed, in the external examination, livor mortis on the anterior and superior parts of the body and petechial hemorrhage on the anterior surface of the neck, trunk and upper limbs. In the internal examination was found hemorrhage on the inner surface of the scalp (frontoparietal region); hemorrhage in the soft tissues of the anterior chest wall and a fracture of the 5th cervical vertebra, with hemorrhage around the spinal cord. Blood toxicological examination ethanol concentration of 2.75 ± 0.35 g/L and the histopathological examination did not show any relevant alterations.
It was concluded that the death was possibly due to positional and traumatic asphyxiation in a victim trapped in an inverted position in a

restricted space, that may have impaired movements due to the cervical trauma and alcohol intoxication. The manner of death was ruled violent – accidental.

CONCLUSIONS: With this case report the authors intend to demonstrate the diagnostic challenge of these two rare forms of asphyxiation and to emphasize the crucial role of proper scene investigation, detailed circumstantial information/evidence and accurate documentation of external and internal findings (mainly nonspecific asphyxiation signs) in the postmortem examination.

P01-045 | *Forensic Pathology*

An Unusual Case of Firearm-Related Death due to an Atypical Ricochet: Forensic Implications

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This is a case of a 64-year-old cattle breeder who collapsed suddenly while he and his co-worker were in the process of killing a calf using a shotgun inside their cattle ranch. Police investigation of the scene and examination of the shotgun were performed prior to postmortem examination. It was reported that a shotgun wound was inflicted on the anterior right thoracic wall when a bullet penetrated the calf's skull and deflected off a wire mesh-type fence attached to a brick wall.

At autopsy, an elliptical wound, 1.5X0.7cm, on the right mammary region was observed, with bruised margins and with no firearm residues on the surrounding skin or clothes. An exit wound was not detected, thus it was alleged to be a shotgun entrance wound. A metal particle of cylindrical shape, measuring 1.3X0.3cm, was found in the right lung accompanied by massive hemothorax. No other remarkable findings, other than the particle's path inside the body, were observed during autopsy. Toxicological analysis for alcohol and drugs of abuse was performed in peripheral blood and urine specimens with negative results.

The metal item was initially considered to be an atypical, deformed projectile and a ballistic analysis followed. Unexpectedly, the ballistics report revealed that the assumed projectile was an unspecified metal particle that did not correspond to any typical firearm projectile. A second visit to the scene by the police authority revealed that the atypical metal item turned out to match a segment of the wire-mesh fence.

This case demonstrates that firearm shots may trigger fatal injuries inflicted by items other than projectiles. Cooperation between forensic medical examiners and the police authorities is crucial, even in cases of projectile-related deaths initially considered as obvious, especially when ricochets and atypical wounds are involved, with a view to reconstructing the circumstances of the incidence and determining the manner of death.

P01-046 | *Forensic Pathology*

A Particular Case of Traumatic Asphyxia from Sharp Force Injuries

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A 40-year-old man was found dead behind a box in a warehouse, with multiple cut injuries to his forearms, wrists and neck. The body was found in a small pool of blood (30x20 cm). The analysis of the crime scene highlighted the presence of traces of blood on the floor and on the wall in a corner of the warehouse located approximately 20 meters from the place where the body was found. On the floor, near these traces of blood, was found a fragment of a cutter blade. It was not possible the blood pattern analysis due to the passage of two teams of rescuers. A cutter with a handle length of 13 cm and an exposed blade of 2.5 cm was found near the body. On external examination of the corpse there were multiple superficial cut injuries to the neck with an oblique course, directed upwards and to the left; a deep cut injury to the neck with exposure of the larynx and the vascular nerve bundle of the neck; multiple hesitation injuries to the forearms, two deep cut injuries to the left wrist and three deep cut injuries to the right wrist.

At full autopsy, careful examination of the neck highlighted a complete section of the larynx immediately above the thyroid cartilage, the thyroid cartilage and the thyroid were intact, there were no signs of lesions of the vascular nerve bundle of the neck. The airways were filled with blood, and the lungs had blood and red foam inside the main bronchi. The lungs were enlarged, hyperexpanded, and full of hemorrhagic petechiae. Toxicological tests excluded states of acute intoxication.

The difficulties in identifying the causes of death in cases of stab wounds to the neck with injuries to the airways and in the absence of identified injuries of major vessels are known in the international literature. In cases of suspected homicide, establishing the pathophysiological mechanism of the cause of death is also important to hypothesize the median survival time of the subject and the possibility of autonomous mobility of the subject.

In this case, the event could be reconstructed using the company's surveillance cameras. The absence of defensive injuries, the site and type of injuries, and the negative toxicological test allowed the event to be traced back to suicide. After repeated injuries to his forearms and neck, the subject was able to independently get to the place where he was found. The cause of death identified through careful external examination and autopsy was suicide with injury to the airways and asphyxia due to aspiration of blood material.

P01-047 | *Forensic Pathology*

Rhabdomyolysis with Mild Exercise and Methemoglobinemia with Unknown Etiology in Same Patient: Case Report

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INTRODUCTION AND AIM: Rhabdomyolysis is the breakdown of skeletal muscle tissue which results in the release of chemical substance in muscle such as myoglobin, creatinine kinase and potassium. Its etiology has been associated with direct trauma, strenuous exercise, infections, and toxins that may damage the muscle tissue. Rhabdomyolysis has a risk of acute kidney injury due to increase in myoglobin, and cardiac arrythmias related to hyperkalemia. Even though it has a triad of myalgia, weakness and darkening of urine; only minority of patients have the triad during the presentation. Methemoglobin is a form of hemoglobin that contains iron in its oxidized rather than its reduced state and therefore cannot bind oxygen. Increase of methemoglobin results in methemoglobinemia which is usually caused by exposure to substances such as nitrite containing compounds and some drugs (e.g. nitroglycerin, nitric oxide, sulfonamides, lidocaine). In methemoglobinemia, pharmaceutical triggers must be assessed; and methemoglobin levels must be reduced by methylene blue or sometimes with exchange transfusion. In this presentation, it's aimed to present a case who developed rhabdomyolysis after mild exercise and then methemoglobinemia was added to the clinical picture.

CASE: A 26-year-old male patient developed leg pain during his first training session in the military. Initially treated for myalgia, the patient was referred to the hospital the next day with symptoms of vomiting and darkening of urine color. Blood test results showed high creatine kinase (24000 U/L), urea (90 mg/dl) and creatinine (5 mg/dl). Based on the test results, he was diagnosed with rhabdomyolysis and acute renal failure and was hospitalized. During his treatment, the patient showed no improvement in symptoms. Despite hemodialysis, creatinine and urea levels were slightly increased. In 5th day of hospitalization patient additionally developed methemoglobinemia (%54,2). The patient continued to receive treatment in the intensive care unit but passed away at 7th day of hospitalization.

DISCUSSION-CONCLUSION: Although intense exercise is considered a risk factor for rhabdomyolysis, genetic predisposition, metabolic

disorders, lifestyle, and dietary changes can also lead to the development of rhabdomyolysis even with exercise that is not considered intense. In our case, the methemoglobinemia that developed could be related to drugs used during the patient's treatment, such as paracetamol or metoclopramide, which are less commonly reported in the literature. Patient didn't receive any other drug that could cause methemoglobinemia. Methemoglobinemia that developed in this case was considered a complication of the treatment. Therefore, it was decided that there was a causal link between death and the exercise performed during military service.

P01-048 | *Forensic Pathology*

Fatal Pulmonary Barium Sulphate Micro-Embolization due to Erroneous Vaginal Application of Contrast Medium

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An 82-year-old woman suffering from cholelithiasis entered the hospital to undergo a colon enema to investigate a recurrent abdominal pain unresponsive to pharmacological therapy.
Having performed a preliminary X-ray, the specialist proceeded to position the probe under radioscopic guidance and subsequently introduced the contrast medium - Barium Sulphate.
The doctor immediately noticed the opacification of the venous vessels of the pelvic district and the absence of intestinal opacification, with the patient's simultaneous loss of consciousness and the start of CPR maneuvers, which ended with woman's subsequent death.
A judicial autopsy was requested in relation to the hypothesis of possible medical liability.
We then proceeded with instrumental tests on the body which highlighted the presence of the spread of the contrast medium at the level of the right heart chambers, in the right branch of the pulmonary artery, in the hilar and parahilar pulmonary sites bilaterally, in the intrahepatic site and in the suprahepatic vessels, as well as at the vulvo-vaginal and rectal level.
At the autopsy examination, when the cardiac peduncle was cut, the leakage of corpuscular material in suspension to the fluid blood and the presence of whitish particles at the epicardial level were observed and histologically confirmed by the finding of amorphous greyish material, while at the pulmonary level, the large vessels presented whitish deposits that were histologically identified as areoles containing greyish-black amorphous material with a foamy appearance, ubiquitously occupying the pulmonary vessels, especially of small caliber ones, obstructing them completely.
At the same time, corpuscles of whitish material in the inferior vena cava were found and could be removed by hydro-cleansing.
Upon opening the vaginal canal, two specular lacerative complexes were discovered on the lateral walls, approximately 1 cm deep, surrounded by whitish discolored areas, equally overlain by amorphous material.
This material was also found in the histological analysis of the renal parenchyma and in the myocardial tissue, an element suggestive of diffusion of the substance into the systemic circulation.
Complementary electron microscopy analyzes were performed on the vaginal tissue taken during the autopsy, which confirmed the abundant presence of Sulfur (S) and Barium (Ba), both on the vaginal surface and in the layers immediately underneath.
Therefore, the cause of death was identified as acute myocardial and respiratory failure following widespread embolization of the barium contrast medium, insoluble and present in the form of micro-ionized particles, due to incorrect positioning of the probe in the vaginal orifice.
This occurrence is very rare in forensic pathology and is considered a completely exceptional event in the clinical setting.

P01-049 | *Forensic Pathology*

Vehicle Assisted Ligature Decapitation

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Decapitation is an uncommon event, mostly associated with accidental blast injuries or traffic accidents.[1] Vehicle assisted ligature decapitation is a rare phenomenon which can, in extreme situations, lead to a complete decapitation of the victim. In these cases, the decapitation skin edges may present similar characteristics to an incisive wound, with regular and linear margins, leading local authorities to suspect a homicidal manner of death.[2]

A 49-year-old male, was discovered inside an abandoned industrial complex, inside his vehicle, on the driver's side, with complete decapitation. The trunk of the car was open. Behind this area, on the ground, the victim's head was found. About 40 meters behind the car, a nylon rope was securely attached to a metal fixture on the wall, with a closed loop on its other extremity (containing human tissue). A brief examination of the body revealed, lesions on the anterior part of the neck, compatible with incisive wounds. After examining the scene, the local authorities confirmed the car had travelled from the ligature site to its current location, in a linear and downward path. Victims' belongings, alongside a handwritten note, were found on the same industrial complex. Family members reported a prior diagnosis of depression, with recent clinical deterioration.

Medico-Legal autopsy, performed two days after the scene examination, found that the cervical injuries, had blood infiltration and were globally irregular, except for their anterior part, were they were linear. All internal cervical structures were lacerated. An incisive wound was also found on the anterior side of the left wrist, involving only tendons and muscles.

Toxicological screening of central blood sample, revealed the presence of antidepressant drugs in the therapeutic range and Paracetamol (42 765 ng/mL).

After considering all scene examination and necropsy findings, the cause of death was associated with the traumatic cervical injuries, in the context of vehicle ligature assisted decapitation. Manner of death was classified as suicidal. This report highlights the significance of an adequate crime scene investigation for a correct establishment of the event circumstances and manner of death classification.

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P01-050 | *Forensic Pathology*

Vehicle-Assisted Strangulation Suicide: Case Report of an Unusual Decapitation

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Complete or incomplete decapitation as a consequence of a suicidal event represents a rare occurrence in forensic practice, more often referable to

a dual mechanism of hanging and to throw himself from a considerable height. An unusual case of suicide by strangulation with complete decapitation mediated by the use of a vehicle came to the attention of the S.C. Medicina Legale, ASL Sassari.

In the forecourt of a transport company, inside a car, a lifeless subject was found, seated on the driving seat and buckled by the safety belt, decapitated; the head was found out behind the right front seat; his lower limbs appeared extended with his left foot resting on the brake pedal. During the inspection activities, upon inspection of the car, the partial opening of the left front window and the presence of profuse blood stains were detected. In the square where the incident occurred, the presence of a motorized crane was discovered, located at the rear and at a distance of 25-30 meters from the car; a nylon rope was found underneath the industrial vehicle, with one end tied to a metal handle of the vehicle, at the opposite end there was a completely tight noose. During the postmortem examination, the complete section of the neck was objectiveised, the cephalic and cervical section planes were characterized by abraded and infiltrated skin margins on the cervical side (the haemorrhagic infiltration on the cephalic side is less evident), as well as a jagged section of the internal structures, with the presence of fibrous laciniae. Autopsy findings showed no other lesions or pathological conditions. The investigation and inspection activities, together with the necropsy findings, made it possible to detect, as lethal means, a decapitation by assisted strangulation with a motor vehicle in the context of a suicidal dynamic, i.e. the clear section of the neck by a tightening device (rope noose) applied to the neck itself and fixed to a fixed point (motorized crane) and tensioned by starting a car driven by the subject. The case shows a traumatic mechanism of particular unusualness and complexity: the causal mechanisms of such a rare injury expresses a particular self-aggression of the subject in the context of the "hard suicide method", and underlines the importance of the concordance of the data from the careful inspection activity and the autopsy findings to determine the method of occurrence and classify the occurrence as suicide, accidental event or homicide.

P01-051 | *Forensic Odontology*

Evaluation of Four Criteria in Assessing Third Molar Maturity for Age Estimation in Koreans

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Third molar maturity is one of the major criteria for estimating human age. This study aimed to determine the most suitable third molar maturity criteria for age estimation in Koreans. The correlation between chronological age and the Demirjian, Koehler, Liversidge, and Thevissen criteria was evaluated using 900 panoramic radiographs of patients aged 15–23 years. The four criteria were applied separately to measure third molar maturity on the same radiograph. The concordance rates between third molars within the same jaw and between jaws were calculated and tested using a paired t-test. Regression was performed to observe the relationship between age and the evaluated stages for each tested criterion. The Demirjian standard showed the lowest root mean square error (1.29 years for males, 1.30 years for females) and highest adjusted R^2 (0.753 for males, 0.739 for females) values; however, the differences of the values derived from other criteria were minute. In addition, the symmetry (within the same jaw) and asymmetry (between the upper and lower jaws) of third molar development, which was confirmed in previous Korean studies, was observed only in the Demirjian and Liversidge criteria. Based on the results, we can conclude that all four tested criteria are suitable for age estimation in Koreans. However, the Demirjian and Liversidge criteria can be recommended from the perspective of accurate reflection of the developmental patterns. Further research is necessary to determine whether the results of this study are consistently observed in other populations.

P01-052 | *Forensic Pathology*

Fatal Electric Scooter Accident

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INTRODUCTION: Electric scooters have experienced tremendous popularity in just a few years; however, the potential dangers associated with their use become apparent without exercising caution. The purpose of this case report is to highlight the potential hazards of this increasingly utilized motorized device. In this report, we present an incident involving an electric scooter, where the victim sustained severe injuries and ultimately succumbed despite extensive medical intervention. The injured man was admitted to the hospital and underwent neurosurgery due to a significant subdural haematoma.

MATERIALS AND METHODS: The 43 years-old man received hospital care for a duration of nine days, and the autopsy was conducted two days following his passing. We provided samples for histological examination. However, due to the extended hospitalization period, no toxicological examination was performed.

RESULTS: The autopsy revealed a subdural haematoma, brain contusions, subarachnoid haemorrhage, on the right-side rib fractures and fracture of the clavicle, and a fracture of the lateral process of the first thoracic vertebra. Additionally, a fatty liver and a low degree of generalised atherosclerosis affecting the coronaries were observed. As a consequence of bed rest, focal bronchopneumonia developed.

CONCLUSION: Some European countries already regulate the use of electric scooters, particularly concerning the speed limit and the age at which they can be driven. Currently, there is no specific regulation on the use of these vehicles in Hungary, and regulations vary from country to country in the EU as the Highway Code falls under the jurisdiction of individual member states.
A study by Paulino et al. (2022) described a lethal head injury along with other serious injuries to the extremities and thorax resulting from a frontal collision with a car at low speed. To prioritise safety, the use of a helmet is highly recommended, especially considering cases like the present one where an accident without collision with another vehicle can still lead to lethal head injuries. Only self-protective clothing, tools (such as a helmet), and speed limit regulations can prevent lethal or serious injuries in cases where there is no interference with other traffic participants. A certain level of harmonisation of electric scooter use among member states can promote transparency and establish clear regulatory rules for all EU citizens.

P01-053 | *Forensic Pathology*

Causes of Sudden Cardiac Death in the Mediterranean area. Results from a Recapta Study (Catalonia, Spain)

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INTRODUCTION: Sudden cardiac death (SCD) is a devastating complication of many forms of heart disease. It is a public health problem that may account for 15–20% of all deaths. The importance of interdisciplinary work in the approach to SCD has been highlighted, with forensic medicine playing a determining role.

OBJECTIVE: The aim is to study the incidence and causes of SCD in the Mediterranean area.

METHODS: Prospective registry of out-of-hospital cardiac arrests (OHCA) with multiple sources of information performed in an area of 611,908 inhabitants from April 2014 to April 2017 (The Clinical and Pathological Registry of Tarragona (ReCaPTa). ReCaPTa is to study incidence and aetiology of Sudden Cardiac Death in the Tarragona region (Catalonia, Spain). SCD was defined as an unexpected OHCA without an obvious prehospital extra cardiac cause occurring within the first hour of symptom onset or seen in good conditions in the last 24 hours. Causes were collected after complete forensic autopsy including toxicological analysis, histopathological study and genetic analysis or after hospital assessment and investigation of the survivors.

RESULTS: A total of 639 cases of SCD were collected by ReCaPTa registry, 238 (36,4%) were studied by autopsy. The total incidence was 34.8. per 100,000 inhabitants/year (49.9 in men, 20.4 in women). The mean age was 66.9 years (SD 15.6) with an age range of 0 to 95 years.
Of the total of 639 cases, 71% presented a cardiac cause. In the patients studied by forensic autopsy, 69% had a cardiac cause, 16% a non-cardiac cardiovascular cause, and 15% a non-cardiovascular cause. Chronic coronary artery disease (25%), acute coronary artery disease (21%) and cardiomyopathies (10%) were the most frequent causes. Only 34.3% had a background of previous heart disease. The heart weight was higher in SCD with cardiac cause (546.5 g) than cardiovascular-non cardiac cause (447.1 g) and non-cardiovascular cause (403.2 g).
The comparison of hospital causes of presumed SCD with causes obtained from forensic autopsies was: acute coronary disease (28%/18%), chronic coronary disease (24%/25%), cardiomyopathy (8%/11%), ventricular hypertrophy (8%/0,8%). Cardiovascular non-cardiac causes (acute aortic syndrome and pulmonary embolism) were higher in causes obtained from forensic autopsies (13% vs 4%).

CONCLUSIONS: The incidence of SCD is higher than previously described and its most frequent cause is chronic coronary artery disease. Inter-institutional and multidisciplinary collaboration between forensic sources and clinical sources must be promoted for the study of SCD.

P01-054 | *Forensic Odontology*

Bitemarks, 3D Scanner and Software Analysis: A Randomized Blinded Study to Validate the Three-Dimensional Bitemark Analysis

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INTRODUCTION: Bitemarks on the skin leave identifying features that may be useful in identifying the perpetrator.
To date, the analysis of bitemarks is mainly based on photographic finds and on the visual comparison with the teeth of the hypothetically responsible person. However, bitemarks also retain three-dimensional characteristics detectable with a 3D scanner.
In this study, an innovative method of bitemark analysis, using a three-dimensional scanner and some software, will be introduced, enabling a quantitative comparison of bitemarks and their corresponding human dentitions.

MATERIALS AND METHODS: Complete plaster models (human dentitions) of adult subjects were used to make experimental bitemarks on dentistry wax. All materials were individually scanned with the iTero® 3D scanner and reworked with MeshMixer software. The first investigator compared each bitemark with the dentition that produced it and with the one of a different subject, randomly assigned, in the CloudCompare software, producing an evaluation form with bitemark and dentition images, the analyses executed by the software and the values obtained from CloudToCloudDistance.
A randomized blinded study was performed: three observers (forensic odontologist, forensic scientist and medical student) assigned the degree of compatibility between the bitemark and the dentition for all the comparisons (those of corresponding dentitions and bitemarks and those of not-corresponding dentitions and bitemarks).

RESULTS: The results of the study were encouraging. The three researchers were able to successfully exclude the subjects who had not left the bitemark. The rate of correct classification was strong and misclassification was rare. It was also possible to appreciate a difference between the three observers, on the basis of experience in forensic field. Three-dimensional bitemark analysis with software can be a useful tool in the identification (and especially in the exclusion) of a suspected offender.

P01-055 | *Forensic Imaging*

Accuracy of Hemothorax Volume Estimation by Postmortem Computed Tomography

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INTRODUCTION: The estimation of hemothorax volume via postmortem CT scan (PMCT) remains subject to limitations, which can result in misinterpretation and inaccuracy. Thus, this study aimed to explore the accuracy of PMCT in estimating hemothorax volume in comparison to standard autopsy.

METHODS: This study involved the examination of 40 deceased individuals who had passed away as a result of injuries and had undergone both PMCT and standard autopsy. The data gathered from both methods were analyzed statistically to determine the accuracy of PMCT in estimating hemothorax compared to autopsy.

RESULTS: The accuracy of diagnosing positive hemothorax was found to be 0.98 and 0.85 for the left and right sides, respectively. The relationship between hemothorax volume estimates obtained through PMCT and those detected through autopsy was significant, with a correlation coefficient of 0.859 and 0.794 for the left and right sides, respectively ($p = 0.000$, Spearman's rank correlation coefficient). However, the mean absolute percent error (MAPE) was found to be relatively high, with values of 62.03%, 76.25%, and 68.96% for the left-side, right-side, and total MAPE, respectively. Paired t-tests did not reveal any significant differences between the PMCT and autopsy methods.

CONCLUSION: Based on PMCT, the estimation of hemothorax volume is generally consistent with the values obtained through autopsy, and thus, it can serve as a valuable aid in the diagnosis of hemothorax. Nevertheless, it is important to exercise caution when utilizing these results, given the notable discrepancies that still exist.

P01-056 | *Forensic Imaging*

Optical Coherence Tomography of the Ocular Surface in Forensic Pathology: Preliminary Data and Potential Practical Applications

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INTRODUCTION: Optical coherence tomography (OCT), traditionally used in ophthalmology, has recently been applied experimentally in forensic science. Its applications extend to coronary pathology, latent fingerprint analysis, entomological larva studies, and forensic ophthalmology.

MATERIALS AND METHODS: We examined 26 cadavers (52 eyes) at our center, divided evenly between warm (April-October) and cold months (November-March). Each corpse was initially observed (PMI 2-4h), with one eye mechanically held open and the other closed using adhesive tape. OCT scans in 'corneal mode' were conducted every two hours over 48

hours. Causes of death included sepsis (6 cases), tumor pathology (8), heart failure (8), hanging (2), and acute hemorrhagic shock (2).

RESULTS: Initially, all cadaver eyes were closed, except for those who died from hanging and hemorrhagic shock, where scleral spots were noted. OCT imaging linked these spots to an open eye and choroidal detachment. Observation revealed a macroscopic difference in corneal transparency: the closed eye was more transparent, the open eye less so due to initial tear film drying.

In the closed eyes, corneal thickness increased progressively from 553 (553±54 μm) to over 1000 μm in 24 hours. In contrast, open eyes showed a progressive thinning of the tissue to 274 (274± 36μ) microns with increased tear film density.

The morphological analysis confirmed the presence of signs given by the undulation of the posterior cornea (Nioi Napoli sign), which is a typical 'sawtooth' pattern created by the difference between the dehydrated area and the edematous area of the corneal stroma. By 36 hours, 69.23% (18/26) of the cases showed initial eyeball deformation. After 48 hours, deformations and thickness changes exceeded the measurement range of the instrument, rendering further measurements unreliable.

DISCUSSION: This study corroborates our preliminary research on scleral spots and their correlation with choroidal detachment in certain death types. This correlation is significant for differential diagnoses in determining the cause of death. The corneal study highlights different biological responses between open and closed eyes. Known from the outset, pachymetric and morphological studies (hydration-dehydration processes affecting reflectivity) facilitate estimating the postmortem interval (PMI) in the early postmortem hours. The study also confirms that, after 36 hours, corneal opacity in all cases results from tissue swelling or drying, with altered collagen fiber arrangement, possibly linked to tear film drying on the ocular surface.

CONCLUSIONS: OCT observation of the ocular surface provides valuable insights into specific death types, the eye's initial closure state, and PMI estimation. The study's primary limitation is the small sample size, which should be expanded for more definitive conclusions.

P01-057 | *Forensic Imaging*

Augmented Reality Visualization for Postmortem Analysis of a Traffic Accident: Clarification of Injury Mechanism Through PMCT-Based Antemortem Posture Reconstruction

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BACKGROUND: In forensic medicine, postmortem computed tomography (PMCT) has proven to be a very helpful tool that complements conventional dissection. PMCT combined with augmented reality (AR), offers a novel approach to analyzing injury mechanisms and reconstructing crime scenes with precision. Here we report a case in which AR visualization using PMCT-based antemortem posture recreation was useful for demonstrating the mechanism of injury and recreating the scene.

CASE PRESENTATION: A man in his 80s was found lying at the roadside and later confirmed dead at a hospital. Subsequent investigation suggested that the deceased might have been struck by a car. Inspection of the suspect vehicle revealed a bent at the left front bumper, and the lower part of the left front light was found to be covered with the deceased's hair and sebum. PMCT and autopsy findings suggested that the deceased may have been struck by the vehicle from the right side first, given the severe damage to the right side of the body, including abrasions, the right chest bruising, and multiple fractures of the right ribs.

To clarify the mechanism of injury, a 3D model of the bones arranged in three postures, including standing, prone and crouching patterns created from PMCT data, was fitted to a car of the same model as the suspect vehicle using AR. This revealed that the lower part of the left frontal light, where the victim's hair and sebum had been found, matched the location of the skull fracture if the victim had been in a crouching posture. Moreover, in this posture, the location of the right rib fracture coincided with the left front part of the car. Therefore, the deceased was most likely initially struck by the car from the right side when in a crouching position.

DISCUSSION AND CONCLUSION: Sometimes, the positional relationship between the deceased and the wounding instrument can be explained by 2D information such as drawings or sketches, which are often difficult for non-medical scientists to understand. In the present case, AR visualization using PMCT-based antemortem posture reconstruction was able to reveal the mechanism of injury more accurately than drawings or a person of similar physique because it was difficult to reproduce the antemortem posture including joint movements in this way. This method has considerable potential for conveying information to non-medical personnel, such as in court cases, so that they can share the same visualization or view, leading to common recognition of circumstances related to an accident among forensic pathologists and non-medical individuals. Thus, AR visualization using PMCT-based antemortem posture reconstruction may facilitate detailed simulation of the injury mechanism and reconstruction of the scene.

P01-058 | *Forensic Imaging*

The Use of the Circular Birefringence Polarization-Phase Tomography Method for the Diagnosis of the Time of Formation of Hematomas of Traumatic and Non-Traumatic Origin in the Human Brain

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Quite often, in the case of an existing hemorrhage into the substance of the human brain (HB), even in the absence of external damage to the soft tissues of the head, there is a suspicion of a violent injury by an outside hand. Taking into account the increase in cases of ischemic brain infarction (IBI) and hemorrhages of traumatic (HTG) and non-traumatic genesis (HNG), in particular at a young age, accurate differential diagnosis of their age is a priority area of forensic science and practice to exclude crimes against human life and health.

The purpose of the work: to develop forensic medical criteria for differential diagnosis of the age of formation of HTG, IBI and HNG using the method of differential Müller-matrix mapping of phase anisotropy of circular birefringence (PA CB).

MATERIAL AND METHODS: Native sections of HB from 83 cadavers were taken in case of death from: ischemic heart disease - 20 native sections (group 1 - control); HTG - 22 sections (group 2), IBI - 21 sections (group 3), HNG - 20 sections (group 4). The measurement of the values of the distribution of the coordinate parameters of the polarization at the points of the microscopic images was carried out at the location of the standard Stokes polarimeter.

RESULTS: necrotic changes (destruction) of optically active protein complexes of nerve tissue is manifested in a decrease in the absolute values and the range of their dispersion of the magnitude of CB with an increase in the time of hemorrhage formation. At the same time, there are opposite trends in the change of statistical moments of the 1st–4th orders depending on the growth of the time of hemorrhage formation: reduction of the mean value (SM1) and variance (SM2) of CB fluctuation maps; asymmetry (SM3) and kurtosis (SM4) of CB value distributions, on the contrary, increase.

The range of time linear changes in the values of the statistical moments of the 1st - 4th orders, which characterize the fluctuation maps of the circular birefringence of the histological sections of the brains of the deceased from all groups, is 72 hours.

CONCLUSIONS: The accuracy of determining the age of formation of hemorrhages by the method of polarization-phase tomography of fluctuation maps of circular birefringence is 50 min ± 10 min.

KEYWORDS: Forensic Medicine, Age of Hemorrhage, Hemorrhages of Traumatic Genesis, Mueller's Matrix Mapping, Circular Birefringence

P01-059 | *Forensic Anthropology*

Practical Application of Identification Methods Based on Metric and Descriptive Hand Characteristics

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Forensic personal identification is a key issue for forensic anthropologists in cases involving the identification of living persons as well as cadavers and human remains of unknown identity.

The increasing use of mobile phones, cameras, and surveillance makes it necessary to identify living persons from footage and photographs. In some cases, standard methods of identification from such evidence, i.e. the assessment of facial morphological elements, are not possible, necessitating the need to find new methods that would enable personal identification from the available evidence.

It is rare for the perpetrators of most crimes to film or photograph themselves in the act of committing an offense, yet it is a frequent feature in crimes that involve sexual abuse.

The perpetrator is usually sufficiently forensically aware not to include their face in the image, but other parts of the body are visible, e.g. feet, legs, genitals, and abdomen. The most frequent feature of this particular category of evidence is the hands.

The hand, next to the face, is the most well-known and visible part of the body, making it often visible on video surveillance footage and sex crime footage.

This study will provide the results of research into the feasibility of using hands for human identification, including an analysis of the degree of reliability and repeatability associated with the proposed methods.

P01-060 | *Forensic Humanitarian Action*

Sequelae of Conflict-related Sexual Violence on Survivors: The Perspective of Two Systematic Reviews

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BACKGROUND: Conflict-related sexual violence (CRSV) is a form of gender-based violence and a violation of human rights. We conducted two systematic reviews (1) to analyze the qualitative evidence reported in peer reviewed scientific literature published in the last ten years and focusing on the negative consequences of conflict-related sexual violence on survivors' physical, psychological, and social dimensions of health and (2) to summarize the knowledge on the forensic medical examination (FME) of victims of CRSV in the same study period.

METHODS: A literature search was conducted on January 13, 2023, and on April 3rd, 2023, on three different databases. The search strings combined blocks of terms related to sexual violence and conflict, and in the second review FME. Information regarding the main characteristics and design of the study, survivors and their experience, CRSV, and FME was collected. In the first review, the negative consequences on the physical, psychological, and social dimension of victims were extracted following the Biopsychosocial model of health, while in the second information pertained the different phases of FME.

RESULTS: Considering CRSV, 23 articles met inclusion criteria, with 18 of them reporting negative repercussions on physical health, all of them highlighting adverse psychological outcomes, and 21 disclosing unfavorable social consequences. The outcomes described in more studies were sexual and reproductive health issues, manifestations of symptoms attributable to post-traumatic stress disorder, and stigma. Barriers to access to care were emerging findings. Our analysis highlighted that CRSV takes place in an enabling environment. The level and the modalities of violence, employed by a variety of stakeholders, created a chain of brutality in conflict-affected settings, on the move, and in the host countries.
Concerning the second review, 17 articles met inclusion criteria. The majority underlined physical (e.g., nonsexual) sequelae and were conducted in the host country of survivors who fled from conflict. Physician's opinion on the consistency of the findings and protection outcomes were rarely reported.

CONCLUSION: The first review highlighted the importance of qualitative evidence in understanding the negative outcomes of conflict-related sexual violence on survivors. Conflict-related sexual violence is a sexual and reproductive health issue and a violation of human rights. Sexuality education is needed, challenging gender norms and roles and encompassing gender-based violence. Gender-inclusive protocols and services need to be implemented to address the specific needs of all victims. Governments should translate health policies into concrete action targeting survivors. The second review emphasized the limited attention given in literature to FME of CRSV and to CRSV-specific lesions, as well as the need for specialized training and expertise for professionals in this field.

P01-061 | *Forensic Humanitarian Action*

Jamal Khashoggi Murder in the Context of Forensic Sciences, Necropolitics and Thanatopolitics

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Within the scope of forensic sciences, the clarification of the case and the judicial process in mass and individual deaths are sometimes under the influence of various political mechanisms. The concepts of necropolitics and thanatopolitics are sociological terms used to explain this kind of political mechanisms, the relationship between death and political power, and bring pre- and post-death practices into discussion. Achille Mbembe's term "Necropolitics" is simply defined as the use of political power to determine who lives and who dies. As a form of sovereignty that includes the authority to decide on death, Necropolitics aims to maintain power and control over an individual, group, or population by instilling fear and terror through violence and death. Thanatopolitics, on the other hand, is related to pre-death (which is similar to Necropolitics) as well as post-death practices. Thanatopolitics either refers to the use of death and/or the threat of death as a political tool to mobilize populations or how the procedural management of dead bodies can be used to strengthen political power structures. In this study, the murder of Jamal Khashoggi was tried to be explained in the context of Forensic Sciences, Necropolitics and Thanatopolitics. Jamal Khashoggi, an opposition journalist known for his criticism of the Saudi government, was never heard from again after he went to the Consulate General of Saudi Arabia in Istanbul on October 2, 2018, and it was later claimed by the Saudi authorities that he died as a result of an accident. However, during the investigation process, it was proved that the incident was a case of murder. Saudi Arabian citizen Khashoggi's criticism of the Saudi government and the subsequent murder in the Saudi consulate in Istanbul demonstrates the potential intersection of political power and necropolitical practices. On the other hand, it has been possible to make sense of the international anger and condemnation mechanism following the murder of Khashoggi and to comment on the concepts of death, justice, and responsibility with the concept of Thanatopolitics. This study

reveals the functioning of Necropolitical and thanatopolitical mechanisms and serves as an important example case in terms of the absence of the body, the problematic nature of the crime scene investigation, and the conduct of the judicial process in two different countries.

KEYWORDS: murder, Jamal Khashoggi, forensic sciences, necropolitics, thanatopolitics.

P01-062 | *Forensic Humanitarian Action*

The Conspicuous Occurrence of Post Death Artefacts in a Case of Abrupt Demise at an Army Cantt: An Autopsy Based Case Report

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BACKGROUND: An unexpected death occurring in a span of 1 to 24 hours of onset of symptoms and without any known non-cardiac causes is known as Sudden death (SD) or sudden cardiac death (SCD). The incidence of sudden cardiac death (SCD) has been found to be steadily increasing all over the world and is one among the major public healthcare problem worldwide whereas knowing the cause of SCD is one among the very difficult and challenging task for the forensic personnel. We hereby report an unusual case of sudden death of a 28-year-old army official in a forest area of Army Cantt who was found dead sitting on a motorcycle with post-mortem artefact as face lying over the tank of bike with face resembling to have been eaten by an animal or insects and subsequently underwent post-mortem examination.

KEYWORDS: sudden death, post-mortem, artefact.

P01-063 | *Forensic Anthropology*

Important Findings Related to the Decomposition Pattern and Rate of Small-Sized Pig Cadavers in the Netherlands

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OBJECTIVE: On average three times a year, the remains of infants are found in the Netherlands. Knowledge on the decomposition pattern and rate of small-sized remains is therefore very important in order to be able to estimate the Post-Mortem Interval (PMI). Scoring models and PMI formulas for decomposition are based on the remains of adults and there is limited literature on small-sized human remains. Since estimating the time since death from decomposition stages is one of the, in the literature, proposed methods, gaining knowledge on the decomposition pattern and rate of non-adult bodies is important. This is also important because the pattern and rate of non-adult bodies may deviate from those observed in adults.

METHOD: To gain more knowledge on the decomposition pattern and rate of non-adult bodies, a decomposition study was conducted with small pig cadavers as a proxy. The main findings of the study were compared with the international literature to determine the similarities and discrepancies with decomposition studies in other contexts and whether the findings are specific to small cadavers and/or the Dutch context. Additionally, baselines on the decomposition rate of small-sized remains in the Dutch climate were created, based on the Total Body Score (TBS) and intrinsic variables. The findings of this study were also compared with this baseline, to explain noteworthy patterns and any deviations.

RESULTS: The results showed that there were findings, regarding the decomposition pattern and rate of small cadavers, specific for the Dutch context as well as for small cadavers. This is related to the variables weight, temperature, season, rainfall and entomology. Furthermore, the findings had an effect on the decomposition pattern and resulted in a higher or lower decomposition rate. The baseline results showed that season and weight have a strong influence on the decomposition process. Additionally, it was observed that accumulated degree-days (ADD) correlated stronger with the TBS than PMI, and that a logarithmic transformation improved the correlation, indicating an exponential relationship.

CONCLUSION: When estimating the PMI, the results related to the variables weight, temperature, season, rainfall and entomology must therefore be considered in order to avoid overestimation of the PMI. Follow-up research into the decomposition pattern and rate of small cadavers is recommended to gain more knowledge and insights and to ultimately be able to apply this in forensic practice and subsequently in the judicial system.

P01-064 | *Forensic Anthropology*

iForenLIBS as a Diagnostic Tool in Forensic Anthropology

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iForenLIBS is an advanced tool utilized for detecting gunshot residues (GSR) and determining shooting distances. It relies on Laser Induced Breakdown Spectroscopy (LIBS), a rapid chemical analysis technology that generates a micro-plasma on the sample surface through a short laser pulse. The case we present involves a skeletonized corpse with penetrating injuries in the skull and thoracic vertebra, resembling firearm projectile actions. However, the absence of secondary and tertiary fractures, along with other characteristics atypical for a gunshot trauma, raises the possibility of non-ballistic projectiles. To investigate, iForenLIBS was employed to detect characteristic GSR on the cranial diploe. Previously, and with the purpose of testing the methodology, we utilized known cases that had undergone skeletonization and soft tissue defleshing treatments, as well as exposure to various taphonomic conditions. This confirmed that despite all these factors, the laser was still capable of detecting GSR. In this case study, the results in the cranium showed no explosive primer or bullet particles. Similarly, the vertebra analysis revealed no GSR but indicated the presence of other metallic elements like aluminum. This ruled out firearm and non-ballistic projectile involvement, later confirmed by perpetrator statements. While gunshot wounds are typically recognizable, forensic anthropology encounters ongoing challenges, emphasizing the importance of remaining open to differential diagnoses. To our knowledge, there is no literature on iForenLIBS as a complementary tool in the analysis of gunshot residue in human bones or possible damage caused by non-firearms. This innovative approach broadens forensic anthropological analysis, particularly in determining the cause of bone trauma.

P01-065 | *Forensic Anthropology*

During the Battle or by Execution? Multiple Sharp Force Injuries on the Cervical Spine of Victims in a Medieval Battle Mass Grave

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The most significant losing battle in Hungarian history took place on 29 August 1526, near the city of Mohács. The heavy defeat of the Christian army and the death of the king opened free way for the Ottoman Empire to enter the kingdom. Centuries later, in the 1950s, trench digging for Cold War border fortifications accidentally unearthed mass graves thought to be linked to this battlefield. In the following two decades, a

total of 5 mass graves of irregular arrangement and varied shape were partially excavated, i.e. without the removal of the bones. Anthropological examination of the bones lying on the surfaces of the excavated skeleton masses revealed predominantly cranial injuries. On the basis of the results of archaeological and anthropological investigations, it was concluded that the victims of the defeated army, killed while fleeing on foot from the cavalry, were buried in these graves. Thus, in 1976, a national memorial was opened in this area as the final resting place of approximately 1000 martyrs. In view of the approaching 500th anniversary, a detailed archaeological and anthropological excavation of the skeletons of mass grave No. 3 began in 2020. The repetitive, in many cases only "minimally invasive", but certainly fatal incised type injuries to the neck and head, already observed on the field, raised questions about their occurrence during rapid movement, particularly in the context of flight or fight. Since the examination of bone injuries caused by sabre-blade is quite rare in today's forensic practice, their analysis requires a broad, interdisciplinary approach. Even using the most modern methods (micro-CT and digital stereomicroscope) of forensic investigation, the way these injuries were caused can only be clarified on the basis of historical data and the fencing methodology of the contemporary, oriental-type, highly curved swords. The excavation of the remains of more than 300 men, significantly more than previously estimated, was completed in 2022, and the examination of the injuries is still ongoing. The authors present typical combinations of injuries clearly indicative of execution.

P01-066 | *Forensic Anthropology*

Forensic Anthropology and Virtual 3D Reproduction of Multiple Burials in an Italian Archaeological Site

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In the forensic context, the study of the site where bone remains are discovered is of considerable importance to understand the dynamics of burial. The techniques used to obtain this information are linked to the methodology of studying human remains in the archaeological field. The study of taphonomy and types of burial not only has historical value but also represents excellent training for the forensic anthropologist. The archaeological context, in fact, is far from the influences linked to the knowledge of the modern world.

When working on modern remains there is a strong risk of being influenced by factors such as knowledge of possible daily life habits or causes of injuries or pathologies. The lack of information related to the historical context to which the remains belong allows to exercise deductive reasoning, based exclusively on the recovered evidence.

As an example of a taphonomic study, this study, which includes a multidisciplinary approach, shows the documentation and study practices of an archaeological site located in the Municipality of Mirandola (Emilia-Romagna, Italy).

During the excavation works planned as part of the post-earthquake restoration of the convent of S. Francesco, the portion of a late-medieval burial ground was discovered. The excavation brought to light burials dating back to 15th.

At approximately 1.5 m depth from the walking surface, 32 burials belonging to individuals aged between 0 and 45 were identified. These inhumations are buried into the ground and organized on several overlapping levels, separated by few centimeters of soil.

Each burial occupies a well-defined space that respects the other burials, maintaining the anatomical connection and presenting a lateral constriction effect attributable to the presence of a shroud.

To study the site, both forensic anthropology techniques and modern three-dimensional reproduction technologies were applied using 3D graphics software (ZBrush Pixologic®). Thanks to the virtual three-dimensional reproduction of the site, it was possible to recreate the layout of the burials.

An explorative molecular analysis was also conducted on a tooth specimen in order to try to determine some phenotypic traits of one individual found at the burial site. A panel of SNPs already developed and validated in the forensic context to derive external visible characteristics (EVCs) was applied. The possibility to obtain this type of information could be helpful for verifying the historical hypotheses, in case the study is extended to the other biological samples.

P01-067 | *Forensic Anthropology*

The Effect of Postmortem Damage on 3D-3D Superimposition for the Pair-Matching of Commingled Skeletal Remains: A Cautionary Note

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Incompleteness and fragmentation of skeletal remains considerably hamper reliable and accurate morphometric analyses, including the sorting of commingled skeletal remains. This issue possibly concerns the application of virtual methods for the pair-matching of 3D models of bilateral bones, as well. However, previous studies only partially addressed this topic, suggesting that more research was needed on how taphonomy affects the virtual pair-matching.

For this study, 144 innominate bones from 77 male individuals were selected from the CAL (Collezione Antropologica LABANOF) skeletal collection at the University of Milan. The bones presented different rates of preservation which was systematically quantified using the Anatomical Preservation Index (API) by Bello et al. (2006). Three API classes, between 100% and 50% of preserved bone, were identified. The models were acquired with the stereophotogrammetric device VECTRA M3 (Canfield Scientific, Inc., Fairfield, NJ) and edited on the Vectra Analysis Module (VAM, Canfield Scientific, Inc., Fairfield, NJ) to isolate the iliac region, being this the most preserved portion in the sample. For each API class, the left model was loaded on VAM, mirrored and superimposed on the right one. The point-to-point distance of each superimposition was then recorded in terms of Root-Mean-Square (RMS) value. Seventy-seven superimpositions between true-matches and 30 superimpositions between mismatches (ten for each API class) were performed. Statistical differences between RMS values of the three classes were investigated with a Mann-Whitney test ($p<0.05$). RMSmatches1 values ranged between 0.63 mm and 1.25 mm. RMS matches2 values ranged between 0.83 and 2.92 mm. RMSmatches3 ranged between 1.31 mm and 5.08 mm. A clear overlap between classes was observed, since the minimum RMS values of class 2 and 3 always fell in the minimum-maximum range of class 3. Statistical differences were found between RMS distance values of the classes in every comparison (class 2 vs 1; class 2 vs. 3; class 3 vs 1) with a p-value below the significance level ($p<0.001$). Statistical differences were found between RMS values of matches and mismatches within classes ($p<0.001$), although the p-value of class 2 was higher, but still significant ($p=0.00022$).

For the first time, this test systematically demonstrated that the RMS distance values of bones affected by postmortem damage differ according to the extent of the damage. Therefore, the 3D-3D pair-matching can be applied with confidence as long as the bones are unaffected by postmortem damage. Medium to considerable damage

intensively affect the performance of the 3D-3D pair-matching, leaving this issue unresolved for future studies.

P01-068 | *Forensic Anthropology*

Immunohistochemical Analysis for Determining the Vitality of Perimortem Trauma in Human Skeletal Remains

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Timing bone fractures is one of the main tasks of a forensic anthropologist, but still an uncertain diagnostic. A reliable distinction between perimortem trauma and postmortem damage is crucial since the former may allow conclusions on the circumstances of death. Even more problematic is the determination of vitality. While perimortem trauma is sustained around the time of death, not all that trauma may be related to the death event itself. Injuries sustained while the bone is still 'fresh' but after the death of the individual may be confused with injuries that precipitated the death itself, even if they are unrelated. This study explores the possibility of detecting signs of haemorrage in bone histological sections from traumatic death cases with diverse degree of taphonomy (body conservation status) and post-mortem interval (PMI). Analyzed bone sample includes recent cases from medicolegal autopsies (PMI < 1yr), cases from Spanish civil war mass graves (PMI > 80 yrs), and ancient archaeological bones (PMI >500 yrs). Anti-human glycophorin A (GPA) antibody and Haematoxylin-Eosin staining (H&E) are used in order to detect presence of RBC and sign of haemorrhagic extravasation indicative for the diagnosis of injury vitality. Our results show that immunohistochemical methods are useful to reach the diagnosis of vitality of bone trauma even in dry skeletal remains highly affected by taphonomy.

P01-069 | *Artificial Intelligence in Forensic Sciences*

Improving Deep Learning Based Segmentation of Scars Using Multi-View Images

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Deep learning-based scar segmentation from photographs allows automatic and contact free quantitative analysis of skin scars. Meanwhile, multi-view photographs are often taken to capture the 3D information of scars. In this study, we propose a two-stage deep learning based segmentation framework to delineate scars from surrounding skins, which utilizes multi-view images and obtains improved results over single-view based segmentation. In the first stage, a data augmentation method based on 3D reconstruction and view interpolation is proposed. The generated images are used in a semi-supervised setting to train a single-view segmentation network. In the second stage, a multi-view co-segmentation network (MVCSNet) is proposed to explore the mutual information between views and to further refine the segmentation. The multi-view feature interaction module (MVFI) uses the prior segmentation results from the first stage, calculates similarity between features from different views, and optimizes the features. The proposed method was tested on two multi-view image datasets containing linear scars and patchy scars, respectively. The results show that the proposed data augmentation method can improve the generalization of the model, especially for the dataset with small size. Comparative experiments show that the proposed MVCSNet outperforms some other deep learning-based segmentation or co-segmentation algorithms.

P01-070 | *Criminalistics*

The Role of Using Stereomicroscopy in Sequencing of Impact Patterns

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AIM: Impact pattern, which is among the most common types of bloodstain patterns, is the type of pattern that occurs as a result of energy transfer by direct application of another object to a bloody surface, and it is extremely important in terms of giving information about the characteristics such as the location and number of the impact. The sequencing of the impacts forming the patterns may gain importance in forensic medicine in some cases. The order in which the overlapping bloodstain patterns occur may carry valuable reconstructive information, but a formal method for performing this sequence has not yet been published, which is valid in all cases. In our study, it is aimed to determine whether the use of stereomicroscope can be benefited from in revealing which of the successive impact patterns is formed first.

MATERIALS AND METHODS: By applying a standard force with the same physical properties using a mechanical mechanism, twenty sets of double impact patterns were created on the paper surface, and the overlapping bloodstains in the region between the patterns were examined by a blind researcher who did not know which of the patterns in these sets had formed before, by using a stereomicroscope.

RESULTS: No overbinding to be evaluated was detected in one of the 20 pattern sets created. Our rater correctly identified 17 of the other 19 pattern sets. The rate of correct detection of the sequencing from the pattern sets that our rater researcher examined completely blindly was revealed to be 89.5%. Statistical significance was found in the analysis of the data obtained from the examination of twenty pairs of sets by the blinded researcher by using a stereomicroscope.

CONCLUSION: As a result of our study, it was revealed and suggested that the use of stereomicroscope could be useful in revealing which of the consecutive impact patterns occurred first.

P01-071 | *Clinical Forensic Medicine*

Assessment of Thermal Injuries due to Contact Burns: Summary of Two Forensic Cases

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The medical assessment of bodily harm within the scope of Criminal Law has, as a primary objective: to establish causation between the reported events by the examinee and the injuries or sequelae presented or documented at the date of the examination. In this report, we intend to report 2 forensic evaluations, executed at the Instituto Nacional de Medicina Legal e Ciências Forenses – Delegação do Sul (INMLCF-DS), in May 2023, where these patients presented with thermal burns by contact with an incandescent blade, that weren't observed in a clinical context, and assess the link of causality attributed.

Contact burns occur from direct contact with a high-temperature object. The most commonly associated objects with burn contact injuries are cigarettes, irons, hairdryers or domestic heaters. Burns usually have clear lines of demarcation on a larger or lesser degree in the shape of the object used.

These injuries can be found primarily on the limbs, back or trunk, are usually multiple, and can coexist with other injuries suspected of abuse. Burn injuries are characterized according to the depth of local tissue damage (in a scale of first to fourth degree burns, as per the traditional system), depending on the intensity of heat used and time of exposure.

These characteristics are determinant in the healing time or consolidation of injuries and in categorizing the offense to physical integrity as simple or serious, according to the Portuguese Penal Code (art.143 and 144).

The two examinees included in this report stated physical aggression with heated metal objects (a katana and a knife), resulting in bodily injury burn. Given that the acute phase of these injuries was not seen in a clinical setting, it was essential to carefully observe each injury in order to assess the causation in each case. In both cases, it was possible to observe individualized lesions, with well-defined edges - in healing phase – medically compatible with the interval elapsed since the date of the reported aggression – and in typical anatomical regions (limbs) in this type of event.

Thus, the examiners used theoretical knowledge about the typical characteristics of burn contact injuries in order to evaluate compliance with causation parameters « for drawing up the conclusions of each of the evaluations carried out.

P01-072 | *Clinical Forensic Medicine*

Traumatic Horner Syndrome – Two Clinical Forensic Medicine Case Reports

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INTRODUCTION: Horner Syndrome (HS) is a rare condition characterized by the triad of ipsilateral palpebral ptosis, miosis and hemifacial anhidrosis caused by oculosympathetic pathway interruption. This pathway comprises a three-neuron arc: central neuron arises from hypothalamus, descends uncrossed and ends at the spinal cord. Pre-ganglionic neuron exits by the ventral roots of C8-T2 spinal nerves and ascends in the cervical sympathetic chain to end in the superior cervical ganglion. Post-ganglionic neuron ascends within the carotid arteries to end in face sweat glands, superior tarsal muscle and iris dilator muscle. The most common cause of HS are thoracic tumors (lung and breast), and trauma, which include blunt and penetrating injuries to the head, neck, or thorax (such as stab or bullet wounds) represents only 4-13%.

METHODS AND RESULTS – CASE REPORTS: A 30-year-old male suffered stab wounds in the face, right side of the neck and abdominal region. We has admitted at the emergency room in hypovolemic shock and underwent surgery that identified right vertebral artery and right internal jugular vein lesions. He recovered well and was discharged after 8 days. A few days later he returned to the hospital with right arm pain and weakness and an electromyography showed a right brachial plexus lesion at C7-T1 spinal nerves. Five months later he was evaluated in our Institute for a Clinical Forensic Medicine examination, as part of the criminal proceeding. Physical examination revealed right-sided HS, face, neck and abdominal scars and a grade 4 right upper limb paralysis.
A 56-year-old male was attacked with blows to the head, face and neck. Fifteen days later, he was admitted in the emergency department complaining of head and neck pain since the assault. The only physical alteration was left-sided HS. Head and neck CT angiogram diagnosed a left internal carotid artery dissection. One year later he was evaluated in our Institute for a Clinical Forensic Medicine examination, as part of the criminal proceeding, and the only alterations were left-sided HS and trigeminal-neuralgia after carotid artery dissection.
In both cases, an expert report for criminal law proposes was sent to the court, with medicolegal conclusions.

CONCLUSIONS: HS is a rare condition and traumatic HS is even rarer. The first case is a preganglionic HS caused by a brachial plexus lesion after a penetrating neck injury and the second case is post-ganglionic HS caused by an internal carotid artery dissection after neck blunt trauma. Recognition of HS is fundamental, both in emergency departments, as it can be associated with life-threating head, neck or thoracic lesions and in the Clinical Forensic Medicine setting to correctly evaluate traumatic sequelae in expert report for the legal system.

P01-073 | *Clinical Forensic Medicine*

Valuation of Splenectomy Resulting from Criminal Aggression in Bodily Injury

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Splenectomy is a surgical procedure that consists of the total removal of the spleen, an essential organ in the immune response and the lack of which results in its reduced capacity to protect the individual against infections. The need from this surgery can arise as a result from abdominal trauma, as trauma to the spleen often originates considerable blood loss, resulting in death. These individuals are often assessed in forensic evaluations of biological/physical damage in a Penal setting.

The Portuguese Criminal Code contemplates two main forms of assault: simple and grievous (respectively contemplated in the 143rd and 144th articles of the Portuguese of Criminal Procedure). Forensic evaluations at the INMLCF have, as one of their main goals, to establish the likelihood of an injury being evaluated as simple or grievous based on the Criminal Code terms.

Simple and grievous assault can be considered based on a few different items: one of them being that the injury "Deprives him [the victim] of an important organ or limb" – the definition of "important organ" being yet a debate between experts in bodily injury. While the National Table of Damage Valuation (Tabela Nacional de Incapacidades) utilized in medical exams of Labour Law and Civil Law attributes stratified valuation into sequelae of splenectomy, in the criminal domain, there is no specified rule for the valuation of these cases. Thus, the authors of this article intend to debate the possible valuation on the spleen and consequentially, of traumatic asplenia, as a loss of important organ in exams of bodily injury contemplating criminal offenses.

Splenectomy leads to a reduced immune response capacity, requiring prophylaxis with vaccination - included in the Portuguese national vaccination plan - and a greater risk of developing serious infectious diseases that becomes higher as the individual gets older. The risk of sepsis caused by gram-negative microorganisms is documented as being approximately 50 times higher than that of the non-splenectomized population.

Some medical exams concerning this topic and completed in the southern delegation of the INMLCF were analyzed. In these, the existence of deprivation of an important organ was never considered, qualifying the physical offense as grievous.

There seems to be a lack of appreciation in the valuation of traumatic splenectomy, specifically in the criminal sphere where it is not usually qualified as "loss of important organ". Taking into account the medical implications - from the perspective of immunosuppression - documented by the lack of this organ, it is believed that a new approach to its valuation is necessary, specifically with consideration of splenectomy a grievous sequela in the criminal domain.

P01-074 | *Clinical Forensic Medicine*

Work Incapacity of Professional Football Players in Portugal

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INTRODUCTION: In Portugal, all workers are required to have occupational accident insurance including professional athletes. This group of workers depends particularly on their physical condition, which is why there is a significant focus on their recovery. Nevertheless, when permanent disability occurs, it should be established and compensated in the same way as for other workers.

OBJECTIVES: The authors will examine the current situation of athletes in Portugal to understand if this professional activity follows the usual patterns for establishing work-related disability.

METHODS: The labour laws in Portugal and the existing legal mechanisms for establishing permanent disability resulting from an accident at work are presented. Specific cases of international athletes and how their work-related disability was determined are discussed.

RESULTS: In Portugal, after the clinical discharge of workers with sequelae resulting from work accidents, disability is determined with the corresponding compensation. This process takes place within a maximum period of one year from the discharge. Additionally, there is a legal mechanism called Review, which allows the established disability to be reviewed every year, until the end of the worker's life to protect workers throughout their lives. Professional athletes, being especially dependent on their physical condition and having their financial market value associated with their performance, prefer to remain without disability throughout their careers. Therefore, this group of workers chooses to have their disabilities established after the end of their career as players, using the legal mechanism of Review.

CONCLUSIONS: The professionals involved in these disability assessments have faced ethical challenges with this model. There seems to be a paradigm in which professional athletes prefer not to have their disability determined immediately after discharge to avoid losing market value. Instead, they request the establishment of the disability after retiring from sports, using legal mechanisms to enjoy financial benefits.

P01-075 | *Clinical Forensic Medicine*

Plastic Surgery Malpractice Claims: What is the Main Reason?

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It is known that surgical interventions are the most common complaints against physicians in lawsuits in Europe and America. The department of plastic surgery differs from other surgical branches in that the surgeries performed are mostly not medically indispensable necessity and the surgical procedure is found to be successful mostly to the extent that it fully meets the patient's expectations. For this reason, in Turkey, as in many countries, cases of medical malpractice by plastic surgeons and dentists are legally evaluated under a separate article. In this study, it was aimed to investigate plastic surgery malpractice files to investigate whether every claim may be due to medical treatment and which factors caused these claims.

By examining 12 randomly selected plastic surgery files sent to Marmara University Faculty of Medicine, Department of Forensic Medicine by the courts in 2021-2022, the patient's demographic data (age, gender, etc.), the subject of complaint in the cases, whether consent was taken from patient, the therapeutic method of plastic surgery, post-surgical care by the surgeon were evaluated. The factors affecting malpractice in plastic surgery and the issue of medical error were discussed by examining the data on files.

In this study, 6 of our cases were female and 6 were male. The ages of our cases ranged between 27 and 73 years. The procedural type of our cases was 3 laser epilation, 1 myringoplasty (caused to facial paralysis), 1 gender reassignment surgery, 1 nasal aesthetics, 3 lifting and shaping with liposuction surgeries and also breast aesthetics, 1 treatment of decubitus wounds after intensive care, 1 hair transplantation surgery, 1 skull and ear shaping surgery. It was decided that 4 laser epilation and hair transplantation procedures were malpractice by unauthorized persons, and in a fatal case with gender reassignment surgery that a direct causality with medical practice could not be established. In other 7 cases with plastic surgery procedures, it was determined that there was no medical malpractice, but it was evaluated that complications developed after the surgery.

When we evaluate our cases, it has been established that patients applying for plastic surgery mostly have aesthetic concerns. However, all procedures to be performed by medical aesthetics should be carried out by authorized specialists. The patient's expectations and psychological situation should be investigated in detail before each procedure and the indication for surgery should be determined accordingly, the patient should be given detailed information about the complications that may develop after the surgery, the patient's consent must be obtained before surgery, and medical follow-up should be carried out by informing the patient at every stage after the surgery will reduce the number of these complaints.

P01-076 | *Clinical Forensic Medicine*

Nephrectomy, Cancer, Malpractice in a Case: Which Caused Death?

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Malpractice is the patient's harm due to inappropriate and unethical behavior, ignorance, indifference, carelessness, inexperience or incorrect diagnosis and/or treatment during the provision of healthcare services. Although legal regulations vary from country to country, health professionals may become criminally and legally liable within the framework of general definitions in relevant laws and in accordance with professional ethical rules. In this case with the allegation of malpractice, Clinical examination, diagnosis, and clinical process were evaluated together and discussed in a multidisciplinary manner.

A kidney transplantation was planned from a 53-year-old man to his 19-year-old daughter due to the development of end-stage renal failure. Since both kidney donors and recipients are first-degree relatives and there is blood group compatibility between them, kidney transplantation was not considered harmful. The donor patient received physical examination, blood and urine examinations, kidney function tests, Urology, Cardiology, Nephrology, Chest Diseases, Psychiatry consultations and any pathological finding were not detected except for a few small nodules in the lung. Finally, the kidney transplantation was performed from the male kidney donor patient to his daughter.

The kidney donor patient had acute bleeding from the mouth 3 months after the transplantation. In the examination of the kidney donor patient, many nodules compatible with metastases were seen in pancreatic tail, liver and bone in the PET and CT. A preliminary diagnosis of metastatic pancreas was made in the patient since the nodules previously detected in the lung were of similar shape and size, there was no mass compatible with the primary in the lung, and the CA 19-9 level was >. Oncology consultation was requested with the recommendation of general surgery. After the liver biopsy, a diagnosis of pancreatic malignant neoplasm was made. The patient died 8 months after nephrectomy due to pancreatic malignant neoplasm and its complications.

The patient, whose was the kidney recipient, had no problems in the first follow-up, and upon the increase in creatinine levels and the detection of metastatic cancer in her father, a biopsy was performed on the transplanted kidney. Since malignant infiltration compatible with pancreatic cancer metastasis was observed in the kidney biopsy pathology, the transplanted kidney of the female kidney recipient was removed by nephrectomy. CA 19-9 level was also found to be high in blood tests, and findings consistent with metastatic disease were found in the postoperation PET-CT scan of the female patient who was thought to have pancreatic cancer.

In malpractice claims, it is important to examine the entire forensic and medical file in detail, as well as evaluate the conditions of the medical environment where the medical intervention is performed and benefit from the developments in the relevant field in order to direct correctly the judicial process.

P01-077 | *Clinical Forensic Medicine*

Burns Following Cell Phone Explosion

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BACKGROUND AND AIMS: Various health hazards are associated with cell phone use, such as male infertility, damage to the auditory function, undesirable effects on medical devices and tumors. Between 2011 and 2020, annual cell phone-related injuries ranged from 3,389 to 7,320 cases. The most common injuries were lacerations and fall-related injuries. Burns are rare and are mainly attributed to technical issues, such as battery overload, manufacturing defects, incorrect use of the device and exposure to inappropriate conditions.

METHODS: We present a case report of a man who suffered burns following the explosion of his cell phone device. We illustrate the findings of the examination at the primary care unit, the findings of the medico-legal examination and the condition of the clothes and the cell phone following the explosion. We discuss the mechanism and the type of injuries and review the relevant literature.

RESULTS: A 51-year-old man suffered non-lethal burns on his limb, following the explosion of his cell phone which was placed in the rear pocket of his jeans. According to his testimony, there was no damage of the device or any other condition explaining the explosion. Following the incident, our patient attended the primary health unit and received appropriate medical treatment.
The medico-legal examination revealed two burns. These injuries were classified as 2nd grade (burn severity grading score). In addition, we inspected the respective damage in his clothes and the device.

DISCUSSION-CONCLUSIONS: Although cell phone related burns are not extremely rare, the available scientific literature is limited to 6 cases. Our case is the first ever reported in Greece. All the available data and documents from the clinical and the forensic investigation are reviewed, presented, and discussed.

P01-078 | *Clinical Forensic Medicine*

Clinical Forensics for Accident Dynamics Reconstruction: Can a Scar Prove Second Liability?

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Mr. X suddenly lost control of his motorcycle due to high speed, alcohol consumption and due to the wet road surface, colliding with it against the concrete divider. As a result of the collision, the driver impacted against the severed end of the iron railing running on the right edge of the road at the level of the abdomen, falling on the sidewalk afterwards. The vehicle independently proceeded its course until it came to a halt.

The injuries sustained were a large contused-lacerated external wound to the lower left abdominal quadrant, reaching the muscle fascias and forming a large hematoma, a displaced left hip and a fractured left femur.

At the forensic medical examination, a peculiar large circular abdominal scar in the left inferior quadrant with two linear components, one extending for about 8 cm towards the navel and the other 7 cm towards the left flank-back was observed.

Through examination of photographic evidence of the accident site and forensic medical evaluation the analysis of the manner and trajectory of the impact was made possible. This analysis supported the existence of a causal link between the accident and the injuries sustained; as a matter of fact, the left hip and femur fractures and the characteristics of the abdominal wound were consistent with photographic evidence of the accident site, which showed a fixed, rigid, sharp-edged iron railing. Especially the abdominal injury seemed justified by the high-speed collision of a body moving from right to left against an oval shaped obstacle with sharp edges.

Scientific literature shows that it is difficult to identify stereotypical circumstances that account for the relationship between the accident dynamics and the injuries sustained in every type of motorcycle accident. An accurate reconstruction of accident dynamics is fundamental both for the identification of the causal link and the correct attribution of relative liability.

In this specific case, the responsible parties are the motorcyclist and the company that should have provided proper maintenance of the railing. While it is often complex to attribute the correct share of damage to each responsible party, the peculiar abdominal scar made it possible to determine the amount of damage dependent on the non-replacement of the broken railing.

In conclusion, forensic medicine is sometimes capable of providing unambiguous answers when reconstructing accident dynamics and attributing specific liabilities. This case is peculiar for its abdominal injury but also paradoxical: if the impact had occurred against an intact railing, the extension of it could have compromised more of the integrity of the pelvis, the right lower limb or of the internal organs, all “safeguarded”, on the other hand, by the absence of the railing itself. A broken railing, at times, can save a life.

P01-079 | *Clinical Forensic Medicine*

The Profile of Clinical Forensic Medicine Cases Before, During and After the COVID-19 Pandemic in Prof Ngoerah General Hospital, Bali

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Covid-19 pandemic undeniably brought dramatic changes in every sector of our life, including the field of medicine, and talking about medicine, clinical forensic medicine is a part of one. With the social restriction plus the previously limited knowledge of the character of the virus, hospital visit became a terrifying activity. In this article we try to figure out its impact to the clinical forensic medicine sector in our hospital.

We reviewed the medical record for emergency ward visit in our hospital and narrowed it down to all patients seeking for clinical forensic medicine service before, during and after the pandemic within the relatively same period (± 2 years each). The clinical forensic medicine service was given to those who are victims of either physical abuse or sexual abuse, irrespective of sex, age, marital status, or sexual orientation.

The COVID-19 pandemic dramatically affected the clinical forensic medicine service visit in our hospital. Its number decreased significantly and even after 1.5 years the pandemic status was lifted, the number of visits has not even reached half of the number compared to pre-pandemic number, especially for sexual abuse case both in child and adult.

The reduced number of clinical forensic medicine service does not necessarily mean the abuse cases are declining, but it might mean victims of abuse did not seek for professional help for various reasons. It is our moral responsibility, besides our professional responsibility, to increase the awareness of the victim and community for not keep silent when they see or even become victims of abuse.

P01-080 | *Clinical Forensic Medicine*

Violence Against Police Officers – A Retrospective Review of Non-fatal Attacks During 2018-2022

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BACKGROUND AND AIMS: Violence against police officers constitutes a major problem in Greece, as well as worldwide. We currently present cases of police officers who were injured and underwent medico-legal examination by the Forensic Service of Thessaloniki, during a 5-year period (2018-2022).

METHODS: This is a retrospective review of cases. We present critical data about the cases and discuss the relevant literature.

RESULTS: Our study includes 109 cases. Most of them were recorded in 2018 (47,7%), followed by 2019 (20,4%). There was a marked decrease in the phenomenon during the covid pandemic. Almost all victims were male (99,1 %). The majority of them had no previous medical record (69,7%). In the majority of cases, the victims suffered a single (35,2%), or two (25,9%) injuries. More than 50% of the injured police officers were examined within 2 days from the incidence. The assailant was unknown in more the half of the cases and the incidence occurred during the officers' duty in 86% of the cases. The clinical forensic findings include abrasions (40 cases), ecchymoses (49 cases), edema (35 cases), bone fractures (6 cases), edema (35 cases) and burns (6 cases). A very interesting fact is the anatomical location of the injuries. The right hand is the most frequently injured part of the body (21,4%), followed by the face (19,4%), the left knee (13,3%) and the shoulders (14,3 %).

DISCUSSION-CONCLUSIONS: Attacks against police officers is an escalating problem in Greece. All the cases in our study were non-fatal attacks that took place either during the officers' duty, or when they were off duty.
This is the first time that data on non-fatal attacks against police officers in the region of Thessaloniki are reviewed, presented and discussed.

KEYWORDS: Clinical Forensic Medicine, Violence against police officers

P01-081 | *Clinical Forensic Medicine*

Sexual Abuse Against Minors – Retrospective Review of Cases during 2013-2022

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BACKGROUND AND AIMS: Sexual abuse against and between minors constitute a growing problem in Greece, especially following the covid pandemic. We currently review and present sexual abuse cases against minors, that underwent medicolegal examination at the Forensic Service of Thessaloniki, during a 10-year period (2013-2022).

METHODS: This is a retrospective review of cases. We present critical data about the cases and discuss the relevant literature.

RESULTS: Our study includes 374 reported cases. The most frequently encountered sexual act was vaginal penetration (23%), anal penetration (16%) and touching-kissing-folding (14,2%). These cases were examined following the legal accusation of the victim (34,5%) or the accusation of the family of the victim (29,4%). In 58,6% of the reported cases, the victims were able to recall and provide detailed information about the reported incident. The offender was a familiar person in over than 66% of the cases. Out of these, in 33% the offender was a member of the family, while in 21,9% he belonged to the circle of family friends. The 79,8 % of the reported assaults occurred in a place familiar to the victim (11%), in a place owned by the offender (9%) or in the outdoors (9%). A very interesting fact is that in over the half of the incidents there were no macroscopic clinical findings. Findings that were commonly encountered included injury to the hymen (51 cases), injury of the genitals (29 cases) and injury in the perianal region (29 cases). In 60 cases, DNA samples were obtained from the victims. In a very small number of the reported cases (<10%), the victims required and received medical treatment in a medical unit. One the most controversial findings is the fact that less than 10% of the cases underwent psychological assessment and evaluation.

DISCUSSION-CONCLUSIONS: Sexual abuse against minors constitutes a big problem, especially in the post-covid era. It is important to recognize and highlight the characteristics of these incidents. We have currently reviewed cases that underwent medicolegal examination during a 10year span, in the area of Thessaloniki and presented their characteristics. In 48,5% of cases, there was lack of findings and sexual assault couldn't be established.

KEYWORDS: Clinical Forensic Medicine, Sexual assault, Minors

P01-082 | *Clinical Forensic Medicine*

Non-Fatal Dog Bite Injuries – A Retrospective Review of Attacks During 2018-2022

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BACKGROUND AND AIMS: Dog bites account for tens of millions of injuries annually; the highest risk is among children (WHO, 2023). The treatment depends on the location and severity of the injury, the overall health condition of the victim and whether or not the dog is vaccinated (WHO, 2023). We currently present data on non-fatal bite injuries induced by dogs, which underwent medico-legal examination in the Forensic Service of Thessaloniki during a 5-year period (2018–2022).

METHODS: This is a retrospective review of cases. We present critical data about the cases and discuss the relevant literature.

RESULTS: Our study included 83 cases. Most attacks were reported in 2018 (31%), followed by 2019 (20,4%). Most victims were males (57,8 %), with no previous medical record (50,6%). In the majority of the cases, the victims suffered a single (36,1%), or two (22,8%) injuries. More than half of the reported cases were promptly examined by a forensic pathologist (in less than 4 days from the incidence). The medical examination included various findings, such as abrasions (in 50 cases), ecchymoses (in 37 cases), tooth imprints (in 46 cases), bone fractures (in 6 cases), edema (in 29 cases) and amputations (4 cases). A very interesting fact is the anatomical location of the injuries. The left hand is the most frequently injured part of the body (21,7%), followed by the right tibia (20,5%) and the right hand (19,3 %).

DISCUSSION-CONCLUSIONS: Dog bites constitute a common problem. In recent years, there has been an increasing number of incidences, due to the rise of dog adoptions and the presence of stray dogs in Greece. All the cases currently reviewed and presented were non-fatal injuries.
This is the first time that data on non-fatal dog bite injuries in the region of Thessaloniki are reviewed, presented and discussed.

P01-083 | *Clinical Forensic Medicine*

Stabilization in Bodily Harm Assessment of Incomplete Spinal Cord Injury

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The most serious injuries that can result from a traffic or workplace accident are those that affect the spinal cord. The international consensus reached on the AIS scale has developed a common language to define and stage traumatic spinal cord injury worldwide. Its clinical usefulness can be made profitable in the medico-legal assessment. AIS C, incomplete sensory and non-functional motor injuries present some degree of sensitivity and movement below the level of the injury that

extends to the sacrum but with a muscle balance of less than 3 in more than 50% of the key muscles tested.

OBJECTIVES: The aim of this study is: 1.- to follow up on the progress of the injury and to determine the optimal time to carry out a medico-legal assessment of the sequelae of AIS C patients. 2.- To analyze the peculiarities of each specific syndrome in relation to stabilization.

MATERIAL AND METHODS: This study presents a retrospective look at patients with AIS C traumatic spinal cord injury with a follow-up of at least 5 years after hospital discharge. Diagnosis and staging according to AIS classification are available in all cases, specifically extension at admission, at discharge, and scheduled annual follow-ups for up to 5 years. A protocolized diagnostic and therapeutic approach was followed in all cases. SPSS was used for statistical analysis.

RESULTS and DISCUSSION: Seventy-seven patients with AIS C lesions were included with the following diagnoses: Central cord syndrome: 29; Brown-Sequard (B-S): 12; conus medullaris: 6; cauda equina:6; and 24 patients without a specific defined syndrome. At hospital discharge, 3 cases with neurological worsening were identified in quadriplegic patients with a central cord lesion: one patient progressed to a complete AIS A and two to AIS B (complete sensory incomplete motor lesion). At discharge, 7 central cord lesions remained unchanged with AIS C, the remaining cases progressed to AIS D. All B-S were functional at discharge (AIS D or E). Half of conus medullaris lesions evolved into AIS D while all cauda equina remained AIS C. In patients without a defined syndrome one third remained as AIS C, another third progressed to AIS D, and the remaining cases evolved into AIS E. Stabilization of the injury was achieved one year after the injury in all cases. These results highlight the value of the AIS classification to establish the most appropriate moment to carry out a medico-legal assessment of sequelae.

CONCLUSIONS: Non-functional AIS C injuries attain their medico-legal stabilization one year after injury. From that date on, neurological improvements, if any, would not be relevant from a functional evaluation approach. Spinal hemisection (B-S) have a better functional prognosis; all are functional at discharge with no changes after one year of outpatient follow-up.

P01-084 | *Forensic Pathology*

Diatom Test Utility and Validation for Its Use on Clothing in Forensic Practice

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The diatom test is the tool with the greatest potential for the complex diagnosis of drowning. The incorporation of diatoms from the aquatic environment in which death occurs to the body and clothing of drowned individuals involves the transfer of information, which can be used to determine the place of death. Therefore, the diatom test can provide essential information with important medical and legal implications. For this reason, we established a procedure to evaluate its usefulness and validate its use in forensic practice. We studied the transfer of diatoms by submersion of clothing in the water of 4 reservoirs in Galicia (NW Spain) (Eume, Portodemouros, Barrié de la Maza, and As Conchas) at 5 different sites or spatial replicas within each reservoir, using three clothing items made of the most common types of fabric: t-shirt (cotton), pants (denim) and socks (nylon). In association with the submersion of these clothing items, one water sample was collected at each site within each reservoir to determine the spatial variability in diatom concentration and diversity in the reservoir. The results showed that, although transfer of diatoms was low due to their low concentrations in water, it was sufficient to be counted. I In addition, diatom species extracted from clothing were strongly consistent with those present in the water column in each reservoir. Cotton fabric showed a greater retention capacity for diatom frustules, although diatoms could be extracted from all fabric types. The statistical analyses demonstrated that there was a correspondence that allowed distinguishing the origin of the samples, although the ability to discriminate among sample origins is dependent on differences in diatom diversity in the water column among reservoirs. Based on this information, we can conclude that the diatom test can be applied to clothing to determine the place of death.

P01-085 | *Clinical Forensic Medicine*

Malpractice Claims Related to Complications of Cosmetic Augmentation Using AQUAfilling Gel: Literature Review and Case Report

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INTRODUCTION: Aqufilling® gel is a hydrophilic gel easily injected in cosmetic procedures, with possible serious complications observed over time. Although it is not approved in many countries, including Romania, this gel is still found in current medical practice and its use leads to malpractice claims.

MATERIAL AND METHODS: We present the case of a woman who experienced complications following gluteal augmentation with Aquafilling gel.

RESULTS: A 29-year-old woman presented to a private clinic for gluteal augmentation. The diagnosis of "gluteal dysmorphism" was formulated and Aquafilling substance injection was practiced in 2 stages, 7 months apart. The evolution was complicated by migration of the injected gel and repeated infections which resulted in surgical wound dehiscence with progressive evacuation of part of the gel. About 2 years after the intervention, the patient presented to another health care unit for altered general condition, fever, and an infected gluteal surgical wound. The patient was diagnosed with cellulitis post Aquafilling injection and was performed debridement and drainage, with subsequent favorable evolution.

DISCUSSION: Although the Aquafilling substance is available and easy to inject, complications over time can be difficult to manage, which advocates compliance with the ban on its use and a decrease in people's addressability in this regard.

P01-086 | *Clinical Forensic Medicine*

Fatal Pulmonary Embolism in a Healthy Woman due to Oral Contraceptives: A Case Report

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The lifetime incidence of venous thromboembolism for both men and women is estimated at 1‰. Oral contraceptives are known to cause increased thrombosis. Although the mortality is very low, some case reports have been reported, usually when other risk factors for thrombosis are present as well.

CASE DESCRIPTION: We present the case of an underaged nulligravid patient who arrived in an emergency unit for syncope. She had chest pains while breathing and headaches for two days, and also a history of taking oral contraceptives (Logest) for five weeks. In the emergency room she suffered two seizures, followed by hemodynamic and respiratory instability and several cardiac arrests. The chest CT scan showed the presence of contrast substance only at the level of inferior vena cava and its tributaries, and ground glass opacity in the right upper lobe. Short time after admission, the same day, after five hours, the woman developed severe bradycardia and cardiorespiratory arrest, unresponsive to resuscitation and died. The autopsy revealed total

obstruction of the pulmonary trunk with massive thrombosis of the intrapulmonary arteries.

DISCUSSION: This case highlights that even young women who are otherwise healthy may be at risk of pulmonary embolism when using low-dose formulations of combined oral contraceptives (COCs). COCs contain both estrogen and progestin hormones, and these hormones may contribute to an increased risk of blood clot formation.

P01-087 | *Child Abuse*

Injuries Evaluation in Suspect of Child Abuse: A Case Report

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The authors present a case report of a six years-old child from a dysfunctional family, who was transported to the hospital by heli-rescue in serious condition in suspected traffic accident.
The grandmother, who took care of him and his brother (four years-old), reported finding him injured while sitting in a courtyard near the house.
The emergency team found the child in a prone position on the back seats of the car.
In the hospital, rib and vertebral fractures, fractures of the left radius and ulna, a large splenic laceration and lung injuries with an associated left pneumothorax were diagnosed.
The Public Prosecutor asked a forensic expert to investigate the causes of the injuries and their compatibility with the referred circumstances, as reported by the relatives.
The examination revealed:
- extensive light pink abrasion from scratching in the center of the dorso-lumbar region;
- multiple, linear, reddish abrasions, parallel to each other, in the upper left hemi-dorsum;
- multiple figurative ecchymosis on the left buttock;
- purple-yellow ecchymosis of the left trochanteric region;
- purple-yellow ecchymosis in the center of the left buttock.
- purple-yellow ecchymotic complex in the left popliteal region;
- edema and altered anatomical profile of the left wrist with associated purplish ecchymosis and dark red abrasions.
At first, the different stage and body areas of the ecchymosis, suggested the hypothesis of child abuse.
This finding lead to address the law enforcement investigations to suspect a relative's liability.
The data crossing between forensic, clinical and investigation evidences allowed to reveal the sequences of the accident.
The child was transported in the rear seat of a car. During the trip, his entire body, excluding the lower limbs, was ejected from the vehicle and crawled on the road surface while he was hold by his grandmother to prevent the complete ejection from the car.
In fact, the curvilinear pattern of the scratching lesions was related to the scraping between the back skin and the lateral tyre sidewall during the rotational movement of the tyre.
Furthermore, the lateral hyperflexion movement of the back, during the partial ejection of the body from the vehicle and the impact with the tyre, caused multiple internal lesions for a high increase of endothoracic and intra-abdominal pressure.
Just after the investigative report, a relative confirmed this reconstruction.
Through the study of the characteristics of injuries and their evolution over time, the role of forensic medicine is to provide key clues to distinguish between accidental trauma, non-accidental trauma and abuse related injuries, especially in patients who cannot speak for themselves.

P01-088 | *Child Abuse*

High Kinetic Injuries in Infants – Regarding a Case

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The present case concerns a 4-month-old infant who was referred to MLO Entre Douro e Vouga by the Paediatric Emergency Department on the morning of 10-05-2023 for observation, after bruises were observed on the face and neck of the child. The infant had been hospitalized since April 14, 2023, for the resolution of a scabies condition and awaiting placement in a care institution. According to information provided by the Pediatric medical team, the child had been consistently missing routine appointments at the Health Center and Hospital, with the parents allegedly not complying with the prescribed medication following the scabies diagnosis. The family doctor had summoned the mother for a consultation and subsequently referred the infant to the emergency department after observing marked scabies lesions. The child had remained hospitalized in the Pediatric Department since then, undergoing treatment for the presented condition and awaiting placement in a care institution. In the early hours of 10-05, the nursing team was called by the child's father, who said the child was giving signs of pain in the left leg. The father also mentioned that when he briefly left the child unattended earlier in the evening, the child had placed the leg between the bed bars. During the examination of the body surface, bruises at different stages of evolution were identified on the face and neck, as well as papular lesions consistent with resolving scabies. The father expressed that several times the child, while moving in bed, would hit his face on the bars, even though they were covered with a blanket. A full-body X-ray study was conducted, revealing a fracture in the diaphysis of the left femur. The observed lesions on the face and neck showed bilateralism and different colorations, indicating they may have been produced at different times and by more than one traumatic event, suggesting a non-accidental manner of death. Femur fractures in infants are uncommon and, in the absence of pathologies that condition bone fragility, are generally caused by high kinetic energy trauma, such as falls or abrupt movements. Considering the age of the child, his weight and muscular strength, this finding is not compatible with the history reported by the child's father. Following clinical and expert examination, the child was referred to a temporary care home. An assessment of parental competencies by both parents was suggested to the Court.

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P01-089 | *Child Abuse*

Was it Only Accidental?

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INTRODUCTION: Trauma is the leading cause of injury and death in the pediatric population, being head trauma the most common form and maxillofacial trauma the least common. Pediatric trauma, involving the bones of the face, is associated with severe injury and disability. The management in this population is often more conservative because of potential growth impairment. The most common mechanisms of injury are motor vehicle collisions, physical aggression and falls. While fractures are among the most common injuries associated with child abuse, they may not be recognized as abusive until a comprehensive evaluation is completed, often prompted by other signs or subjective features.

CASE-REPORT: A 73 days old girl was evaluated on the emergency room with head trauma due to an history of an accidental fall on the floor at home, on the same day, her mother said the infant fell from the sofa and

there was a big plastic toy close to it, which she might have hit. Notice that her mother also said that, at that time, the infant doesn't have the ability to turn around when laying down. At the emergency room a right periorbital hematoma was described. CT-scans had shown a fracture of the frontal bone on its right side with an infraorbital hematoma leading to a ptosis of the right eye. The x-ray of the skeleton had shown no abnormalities. Some days later, the infant's mother was evaluated on the Nacional Institute of Legal Medicine and Forensic Sciences due to a domestic violence complaint and she ended up revealing that, in fact, the newborn had been hit with a kick on the face by her father – that kick would be directed to the infant's mother, hitting the infant by accident.

DISCUSSION AND CONCLUSIONS: This case-report highlights the necessity of an increased attention when we are dealing with injuries related to potential traumatic events in children, particularly in cases that the history of the event is poor, either due to children's age or because it was not a witnessed event. It also highlights the need to further investigate strange event histories, especially when they are not compatible with the lesions found in children.

P01-090 | *Child Abuse*

A Comprehensive Post-Mortem Investigation of a Particular Case of Child Abuse

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Child abuse syndrome refers to all types of abuse and neglect inflicted on a child by a parent or caregiver in circumstances other than accidents. Generally, child abuse is classified into four categories: physical, sexual, emotional, and neglect. The diagnosis is highly complex, either in live or post-mortem cases. Healthcare workers should be aware of cases of malnutrition and personal hygiene neglect. In addition, the occurrence of injuries in different developmental stages, polymorphic etiology, or coexisting in multiple body areas, sometimes with peculiar morphology or located in unusual sites, is highly suspicious of child abuse. In fatal cases, pre-autopsy radiological investigations complementary to the necroscopic examination can identify the variety and/or chronicity of injuries, evaluate the stage of healing, and confirm or exclude bone dysplasias. Most of the fatal cases are caused manually, and the usual mode of death is head injury.
We report herein a case of a 5-year-old girl found in full cardiac arrest in her house. Upon arrival at the emergency department, the girl was pronounced shortly. The day after, post-mortem total body CT scan and forensic autopsy, as well as biological samples for histopathological and genetic investigations, were carried out in order to investigate the time, cause, and manner of death.
Radiological investigations ruled out bone fractures. The external examination detected many injuries characterized by polymorphic features and multidistrict distribution related to external blunt force trauma, with an estimated time of production ranging from the day of emergency department arrival to 4-6 days before death. Additionally, two injuries related to ligature restraining located on both arms were identified. No injuries suggestive of sexual assault were detected. Forensic genetics investigations ruled out a sexual assault. Radiologic, autopsy and histopathological findings indicated that the cause of death was cardiorespiratory arrest due to manual strangulation.
In the last 50 years, an increasing number of child abuse studies has been reported in the literature, highlighting a growth in awareness within healthcare workers. This case underlines the complexity of forensic evaluation in suspected cases of fatal child abuse. Integrating different expertise is essential for assessing the cause and manner of death. Furthermore, a comprehensive evaluation of all the available data such as circumstantial information, medical history, crime scene investigation, post-mortem radiological findings, autopsy results, histological, toxicological, and genetic data, is of utmost importance in order to correctly identify actual child abuse cases.

P01-091 | *Artificial Intelligence in Forensic Sciences*

Artificial Intelligence Based Obstetric System (AIBOS) for the Delivery Room

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Medical professional liability and clinical safety are highly topical issues. In Spain, Obstetrics and Gynecology is the specialty with the highest risk in terms of severity and amount of professional liability claims and the second specialty in terms of incidence of claims.
The international scientific literature points to a major current medical-legal problem with regard to obstetric risk in relation to medical care at the time of childbirth.
Thus, international experience points to the subjectivity of current tests and the lack of adequate and useful monitoring of all the factors involved in such assistance as the main threat to medical assistance in childbirth, with the appearance of supervening complications with no clear direct correspondence with the data currently monitored.
Faced with this clinical safety problem, the AIBOS project aims to 1) analyse the clinical safety aspects of obstetric care and, in particular, of medical care during childbirth, 2) facilitate the monitoring of protocols and clinical guidelines for obstetric care, 3) improve the care provided, focusing on the prevention of obstetric complications, many of which are serious, through artificial intelligence-assisted monitoring that will allow the creation of algorithms that will help in clinical decision-making, 4) improve the traceability of the care process during pregnancy, childbirth and postpartum and 5) improve the patient experience in the obstetric field.
The AIBOS project aims to design and develop an advanced artificial intelligence tool to support decision making in Obstetrics and Gynecology.
The AIBOS project includes a technological phase, which will be carried out by EURECAT Technology Centre of Catalonia, a clinical care phase, which will be carried out by the Gynaecology and Obstetrics Service of the Hospital Sant Joan de Déu, while Meditecnologia, the technological and business development company owned by the College of Physicians of Barcelona, will be responsible for the coordination and promotion of the project, as well as the medico-legal audit. In addition, the Chair of Legal Medicine, Professional Liability and Clinical Safety of the University of Barcelona, linked to the Directorate of Quality and Clinical Safety of the Hospital Clínic de Barcelona, will advise all the above entities on clinical safety.
It is expected that the new tool will lead to a reduction in the number and impact of complaints, which in turn will lead to a significant improvement in clinical safety in maternal-fetal care.

P01-092 | *Bioethics & Medical Law*

Home Care, Ethical Expression and Legal References in an Italian Experience

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The demographic changes of the general population, with an increase in the "elderly" population and as a result legislative initiatives were promoted: the Project "Protection of the Health of the Elderly 1994-1996" with the activation of home care services. Law 328/2000, entitled "Framework law for the creation of the integrated system of interventions and social services", provides that the National Fund for social policies determines each year an economic quota explicitly allocated to the home support of non-self-sufficient elderly people. Furthermore, the Decree of the President of the Council of Ministers (DPCM) 14 February 2001 establishes that home care also makes use of social assistance services and family support, or by need, we move on to

a multidimensional diagnosis with the definition of a complete social-health care program. Finally, on 13 July 2021, Italy National Resistance and Resilience Plan was approved by the Council of Europe, with an investment "M6C1 I1.2 - Home as the first place of care and telemedicine" of 4,750,000,000 euros, divided as follows: € 2,970,000,000 for home care, € 280,000,000 for territorial operations centers (COT - with the function of coordinating the care of the person and connection between services and professionals involved in the different care settings), and € 1,500,000,000 for Telemedicine.

In this context, the Basilicata Region has activated two platforms: Pohema for telemedicine and InterRAI - Atlas for home care. Specifically, the Pohema platform allows for televisits and telemonitoring. The Interrai – Atlante platform, however, through a multidimensional assessment of the patient, allows for an individual estimate of health needs. Furthermore, this platform allows to extrapolate data that can open up new elements for reflection: prevention and home management of malnutrition, prevention of depletion of venous tissue and correct use of central and peripheral venous catheters, pain therapy and monitoring of the supply of drugs containing opioids, prevention and treatment of pressure ulcers. In this last case, it also allows a mapping of the territory, for example: an area in which these lesions heal more slowly than others, activating alerts on the process, with consequent analysis and identification of any corrective tools. In this framework, forensic medicine and risk management provide control over the processes in order to evaluate informed consents, the risks associated, any related complaints, the management of privacy.

This project is perfectly in line with the WHO which believes that the home is the elective place of care for the non-self-sufficient person, disabled or with chronic degenerative diseases, and responds not only to the principle of "primum non nocere", but above all to a principle of equity in access to safe care.

P01-093 | *Bioethics & Medical Law*

Best Interest: A Delicate Balance when it Comes to Consent to the Treatment of Minors. Commentary on the Art. 3 of Law 219/2017

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Throughout history, the importance of the participation of children, particularly adolescents, in decision-making on issues that concern them has been progressively recognized in youth health strategies and the documents of some medical societies. According to the FRA (European Union Agency for Fundamental Rights), the age at which children can consent to medical treatment, including diagnosis and surgery, without parental consent in 2017 is 14–16, in 11 countries; 18 years in 10 countries, including Italy; and Depends on maturity in 7 countries.

However, as highlighted in the Council of Europe Strategic Action Plan on Human Rights and Biomedical Technologies (2020-2025), there is uncertainty about how to address the increased recognition of minors' decision-making capacity and therefore find the right balance between children's protection and autonomy, parents' rights and responsibilities, as well as health needs and the opinion of health professionals.

International precedents were represented by the articles. 6 and 12 of the United Nations Convention on the Rights of the Child (UNCRC) of 1989, article 6 of the Convention on Human Rights and Biomedicine issued by the Council of Europe Convention on Human Rights and Biomedicine.

In Italy Law 219/2017 represented a turning point in Italy, as for the first time a state law defined the methods and contents of information and subsequent collection of informed consent, systematizing a topic previously left to jurisprudential guidelines. The only antecedent was recognizable in the legislation on abortion. Article 3 of the aforementioned law establishes: "1. The minor person ... has the right to have his or her understanding and decision-making abilities enhanced ... He or she must receive information on choices relating to his or her health in a manner suited to his or her abilities in order to be able to express his or her will. 2. Informed consent to the medical treatment of the minor is expressed or refused by those exercising parental responsibility or by the guardian, taking into account the wishes of the minor, concerning his age and level of maturity, and to protect health. psychophysical and life of the minor with full respect for his dignity... 5. If ... the legal representative of the minor refuses the proposed treatments and the doctor instead believes that these are appropriate and necessary, the decision is remitted to the guardianship judge upon appeal by the legal representative of the person concerned or the doctor or the legal representative of the healthcare facility".

The aim of this analysis is to offer a reflection, through some sentences, on the state of the art in Italy, from the moment of the introduction of the law to today, in the field of informed consent of minors.

P01-094 | *Bioethics & Medical Law*

Is it Still Time for SWA? Experience Across Safety of Clinical Process, HCW Health and Patient Engagement

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BACKGROUND: Many years have passed since Frankel et al.[1] introduced the definition of SWAs (Safety Walk Arounds) as "visits" to various hospital facilities to question staff about adverse events or "near misses". As time passed, the essentially qualitative approach had turned to a structuring semi-quantitative/quantitative method to make the experiences measurable and comparable both for evaluations between different structures and within the same structure over different moments. Furthermore, in 2021, this implementation was enriched with the possibility of also measuring the well-being of healthcare personnel and analyzing processes with optimal results. In this context, the project aims to recover this tool, known for risk assessment, renew it, and evaluate its possible effectiveness.

MATERIALS AND METHODS: A teamwork was built. It was composed of a physician from the hospital management, a legal medicine expert, a selected external expert in clinical risk management, nursing staff of the healthcare facility, a pharmacist, an occupational doctor, a psychologist expert in burnout assessment, a patient representative. The group's work was divided into different phases: 1. Defining what to measure and developing forms to systematize the different experiences; 2. Identify the Operational Units most susceptible to the pilot project experience; 3. introduce the experience to the healthcare professionals working within them, measuring their previous experiences; 4. Proceed to SWA; 5. Collect PREMs (Patient Reported Experience Measures); 5. Feedback and discussion with healthcare personnel.

RESULTS AND DISCUSSION: The experience of the SWA has demonstrated how it is still a useful tool for collecting a variety of information, an object of interest for clinical governance, certainly including patient satisfaction. In fact, the integration of data coming from the classic conduct of the SWA, from clinical meetings, interviews with doctors on the perceived quality of work, and surveys on patients' experiences has allowed us to focus not only on those moments of difficulty but has also of the virtuous moments, which are unconsciously implemented by healthcare personnel, as well as the centrality of the person in the treatment process. Patient surveys could be used routinely in practice, with the results as part of quality scorecards along with safety and cost indicators, according to WHO Strategic Objective 4 of Global Patient Safety Action Plan 2021-2030.

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P01-095 | *Bioethics & Medical Law*

Post-Operative Sepsis and Italian Medical Law: A Methodological Approach to Improve Safety of Care and Reduce Hospital Litigation

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Italian law No. 24/2017 recognizes the safety of care as a right for any individual who accesses a healthcare facility, and establishes that this right must be guaranteed through the implementation of activities aimed at preventing clinical risk, which all healthcare personnel are required to participate in. The primary objectives of health care safety and quality programs include the prevention of healthcare-associated infections (HAIs). This global problem makes every hospital facility vulnerable to risk and requires solid monitoring and prevention strategies to reduce its incidence, to ensure both patient safety and reduce costs related to the management of the infection and to hospital litigation. The latter aspect has a great importance in view of the statement n. 6386/2023 of the Italian Court of Cassation on this topic, which analytically specifies the burdens of proof on healthcare facilities to demonstrate the non-preventability of this event, making defense in court challenging. The most fearful complication of HAIs is sepsis, which is the leading cause of postoperative mortality in surgical patients.

In this perspective, this pilot project aims to provide a methodological approach to analyze and improve the quality of care in postsurgical septic cases, through the combined use of two clinical risk management tools: the Patient Safety Indicator 13 and the clinical audit.

Medical records of patients admitted from January 2016 to December 2022 at a Department of Cardiovascular Anesthesia and Intensive Care of an Italian Hospital were selected by applying the criteria set out in the PSI 13 Technical Specifications Sheet to the diagnosis codes of the main and secondary procedures present in the hospital discharge forms. The selected medical records were subjected to an independent review by two examiners to exclude false positives. After the selection process, a clinical audit aimed at verifying healthcare workers' adherence to existing guidelines was conducted. A total of 29 medical records were identified by applying PSI 13. After the review process, 24 of them were found to be false positives cases. 5 medical records underwent the clinical audit, at the end of which a substantial adherence to the bundles for the early identification and treatment of the septic patient was pointed out.

The present study highlighted a bias related to the coding of diagnoses set out in the hospital discharge form, revealing the need to train healthcare workers on this topic, as a proper compilation has twofold value: epidemiological surveillance and screening. However, the use of PSI 13 constituted an appropriate starting point for the clinical audit designed to analyze healthcare workers' performance,

This presentation will impact forensic science community by providing an operational methodology to the clinical risk management team helpful to enhance quality of care in the context of HAIs.

P01-096 | *Bioethics & Medical Law*

Professional Liability in Catalonia (Spain) by Specialty from 1986 to 2023

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The epidemic of complaints and/or litigation, both in and out of court, for cases of alleged "malpractice" has increased particularly dramatically in Europe, although these trends cannot be generalised. Analyses derived from medical liability claims are a well-known but under-utilised source for correcting errors and improving patient safety. Knowledge of claims data by specialty and its dissemination to specialists has been identified as a necessity to improve the quality of patient care and reduce the rate of adverse events and the number of professional liability claims.

The Professional Liability Service of the Council of Medical Associations of Catalonia (CCMC) manages the majority of professional liability policies in Catalonia (more than 26,500 doctors) and has recorded all claims against insured professionals since 1986. The CCMC database was used to identify claims by related specialty from 1 January 1986 to 31 December 2023. A total of 11,092 claims were identified between 1986 and 2023. From 1986 to 2004, 5310 complaints were registered, with an increasing trend (r2=0.515), while from 2005 to 2023, 5,782 complaints were registered, with a decreasing trend (r2=0.358).

A more detailed analysis of the period from 2000 to 2023 shows a reversal of the routes of initiation of complaints, from mostly criminal to mostly extrajudicial. Likewise, from 2000 to 2023, the 4 most claimed specialties are Orthopaedic Surgery and Traumatology, Gynecology and Obstetrics, Plastic Surgery and General Surgery, which account for 54.5% of all claims, followed by Ophthalmology, General Medicine, Anesthesiology, Oral and Maxillofacial Surgery, Urology and Neurosurgery as the 10 most claimed specialties (77.7% of the total).

In this period, professional liability was resolved (by judgement or out-of-court settlement) in 26.8% (33.7% in civil proceedings, 23.48% in out-of-court proceedings and 12.22% in criminal proceedings), with different percentages depending on the specialty. In professional liability cases, the average compensation amount was 67,627 euros, also with variations depending on the medical specialty.

The analysis of the claims rate in the CCMC shows a downward trend in the number of claims in recent years, as well as a favorable scenario in terms of the increase in out-of-court claims and the containment of the average compensation, which demonstrates the good health of the Catalan medical professional liability scenario.

P01-097 | *Bioethics & Medical Law*

Professional Liability in Urology in Catalonia (Spain) from 1986 to 2023

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The Professional Liability Service of the Council of Medical Associations of Catalonia (CCMC) manages the majority of professional liability policies in Catalonia (more than 26,500 doctors) and has been recording all claims against insured professionals since 1986.

Between 1986 and 2023 11,092 claims were identified, of which 288 (2.6%) related to the specialty of Urology, which showed that this specialty has a relatively medium risk of claims, in accordance with previous analysis (currently the ninth most sought-after specialty in our environment). Furthermore, analyses of the annual number of cases during this period showed a stable trend.

In terms of procedures, 37% of complaints were out-of-court, 32% were civil and 31% were criminal. The main reason for complaint (each complaint may have more than one cause of action) was error in surgical practice (31.7%), followed by the existence of sequelae (21.7%) and error or delay in diagnosis (15.8%).

Regarding the existence of professional liability in the cases registered, either by sentence or out-of-court settlement, of the 178 cases closed (55.27%) in the period 1986-2023, professional liability was assumed in 29.8% of the cases (n=53), with an uneven distribution according to the procedure: 18.3% in criminal proceedings, 42.9% in civil proceedings and 30.4% in out-of-court proceedings.

The stability of the claim rate in Urology over the period studied by the CCMC, the current rate of out-of-court claims and the relatively low rate of compensation show that Urology is a specialty with a medium risk of professional liability in our scenario.

P01-098 | *Bioethics & Medical Law*

Violence against Physicians in Barcelona, Spain. Post-Incident and Gender-Based Violence Management

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The scientific community is concerned about the problem of violence in the health professions. These are violent situations that put health professionals at risk and can have a detrimental effect on the safety and health of individuals and the health system as a whole and require a comprehensive approach. Estimating the scale of the problem is complex because the vast majority of these incidents go unreported.

In the fight against attacks on health workers, a distinction can be made between 1) standardised, complete and responsive recording of all incidents, 2) prevention of incidents before they occur, 3) training of professionals in appropriate protective measures to minimise the harmful effects of incidents, and 4) post-incident management or response to violence against health workers.

In 2003, the College of Physicians of Barcelona launched a programme for the prevention of violence against doctors and produced a manual for the prevention and management of cases of violence in the exercise of their profession. In 2004, a legal defence policy was established for doctors who have been assaulted in the course of their professional activities.

However, the definitive response to this helplessness was the creation of the Violence against Physicians Unit (VAPU) in 2010, with the aim of providing its members with a specific tool for post-incident management. Since then, the functions and services offered by the VAPU have included personal, legal and security advice and support for doctors who have been the victims of aggression, cooperation with institutions to effectively combat violence, coordination with work centres, the development of recommendations for professionals and centres, and the analysis of incidents, risk situations and the evolution of the problem. In 2021 and 2022, the VAPU dealt with 118 doctors. A survey revealed the characteristics of the attacked doctor, the aggression suffered and the assessment of the VAPU.

Professional Colleges are essential for the protection of their members, and post-incident management is particularly important, with personal support for the victim to ensure their full accompaniment and protection, as well as effective counselling to take the most appropriate decision regarding the actions to be taken in relation to the aggression suffered.

Finally, it is considered that the current reality of violence against doctors requires the availability of new post-incident resources, among which the resources for attention to gender violence stand out. Professionals are used to playing an important role in helping in cases of gender-based violence, but not when they are victims themselves. For this reason, the College of Physicians of Barcelona created the Comprehensive Care Unit for Gender Violence in 2021, in addition to the existing community mechanisms.

Poster Discussion Session 2

P02-001 | *SARS CoV2*

Histological Types of Lung Involvement in SARS-CoV-2 Infection Positive Deceased

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INTRODUCTION: The SARS-CoV-2 infection has a various symptomatic palette; depending on the disease severity, age and immune status of the patients, showing individual features, as well. The infection elicited by wild type virus starts with the dominance of upper airway symptoms. Afterwards, together with the descending infection, the bilateral, severe pneumonia is in the forefront of the clinical presentation. In the third stage ARDS, sepsis and multi-organ failure could worsen the natural course of the disease. The virus binds the cell surface ACE2 molecule with spike proteins, and the type 2 pneumocytes and the lung capillaries have the highest ACE2 density, therefore this feature could be in the background of the characteristic lung manifestation of the disease. The lung involvement is complicated by complement-mediated endothelitis and thrombosis of pulmonary microvessels.

MATERIALS AND METHODS: This research project was permitted by the Hungarian Medical Research Council under Permission No. BM/24187. This project aimed to analyse altogether 79 SARS-CoV-2 infection suspicious cases (with or without prior antigen testing) autopsied between December 2020 and September 2022 in our Department. Viewpoints of assessment were as follows: available patient history of chronic diseases and current infection, prior antigen test (if available), PCR testing results of autopsy lung samples, macroscopic autopsy findings, lung histology, role of SARS-CoV-2 infection in the causal chain of death.

RESULTS: The PCR test of autopsy lung samples proved the SARS-CoV-2 infection in 39 cases. In the majority of these cases, the available limited patient history consisted of airway symptoms, fatigue, fever within few days before death, and therapy was limited to symptomatic, if any. Hypertensive disease, diabetes mellitus, liver steatosis, coronary arteriosclerosis, excess body weight were the typical accompanying diseases. After the autopsy, in approximately 75% of these cases, SARS-CoV-2 infection was indicated as the main underlying disease leading to death. On the basis of histological analysis of lung autopsy samples, haemorrhagic, fibrinous, inflammatory cell abundant, interstitial and hyaline membrane disease subtypes of inflammation process could be established, with the mixed presence and dominance of these histological features. The thrombosis in pulmonary microvessels, and/or superinfection complicates the histological picture.

CONCLUSIONS: In the natural course of SARS-CoV-2 infection, the sudden onset of symptoms with fast deterioration of the patient's condition was not a rarity, mainly in the different risk groups (e.g. elderly with chronic diseases). Whether the patient died of COVID-19 (i.e. cause of death) or with it (i.e. accompanying disease) was always a central question, when filling in the medical death certificate. The PCR-based detection of SARS-CoV-2 presence in lung tissue, the histologically established COVID-19 lung involvement and the autopsy data about chronic diseases and conditions, proved to be of essential value in these evaluations.

P02-002 | *Perinatal Medicine & Deaths in Pregnancy*

Fetal Ultrasonography in Hungarian Court Cases: Viewpoints of Forensic Medical Expert Opinions

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INTRODUCTION: In the subspecialisation of prenatal diagnostics, foetal ultrasonography is still in the forefront. Due to the increasing burden of environmental and internal factors on pregnancies and the constantly rising average age of parents-to-be, the correct risk assessment and follow-up of the pregnancies are central issues. The proper foetal ultrasonography is regulated by guidelines and supported by the competency of the examiner. Due to the high expectations of the parents-to-be, a pregnancy with constantly negative ultrasonography findings yet with a newborn born with congenital anomalies steadily increases the number of initiated medical liability cases from year to year, in Hungary, as well.

MATERIALS AND METHODS: The Repository of the Hungarian Court Decisions (containing the anonymised decisions and judgements of the different hierarchical levels of the Hungarian jurisdiction) was searched for the term "foetal ultrasonography", from the time period available in the database (2005-2023). The cases were assessed according to the role

of foetal ultrasonography in the case, whether diagnostic error occurred or not, the actual guidelines and competence requirements in the time of the ultrasonography, type of the case, type and detection rate of the anomaly, responsibility of the health care providers, legal evaluation of the medical findings and documentation.

RESULTS: The search for "foetal ultrasonography" resulted altogether 467 items: 439 were from civil law, 18 from penal law, 5 from administrative law, 4 from work law and 1 from economic law cases. The mention of "foetal ultrasonography" in the transcript is related to the background description of the case in the work law cases (in cases with notice to quit, establishing the onset time of pregnancy) or in administrative law cases (social allowance questions) and penal law cases (infanticide). In one special case, stillbirth of preterm twins, the possibility of issuing death certificate was to be addressed by the forensic expert. The civil law cases mainly resulted with decisions of financial compensations for the parents, due to diagnostic error, incomplete findings documentation, lack of proper further screening, false interpretation of ultrasound findings and/ or improper risk assessment of pregnancy, altogether missing the potential decisive time point about the future of the pregnancy.

CONCLUSIONS: The main case questions debated, i.e. type of ultrasonography performed and needed (routine, screening, extended, aimed examination), accuracy of the risk assessment of the pregnancy, the information and explanation process for the parents-to-be, necessity of other screening methods (e.g. biochemical or genetic), the correctness of medical documentation, fullness of description of foetal anatomy, the compatibility between guidelines and practice, the level of training and competence of the examiners; already long exceeded the competence of the generalist type of forensic medical experts, so the help of ultrasound specialist is vital for the expert opinions submitted to courts.

P02-003 | *Perinatal Medicine & Deaths in Pregnancy*

Born Alive or Stillbirth? Differential Thanatological Diagnosis by Modular Tools for Visualization and Analysis of Pulmonary Histological Images. A Preliminary Study

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BACKGROUND: The question of whether an infant was born alive is a key-point in forensic cases, since it is related to the legal capacity achievement and the ownership of rights and duties. The scientific literature reflects the controversy surrounding the interpretation of employed techniques, mainly focused on the question "has the infant breathed?" to determine if he/she was born alive. However, all techniques which assess lungs' aeration should be used with caution due to the well-recognized limitations arising from the presence of gaseous decomposition and/or resuscitation efforts. Thus, mindful of the available postmortem approaches based on observations, dissections, and ancillary tests including advanced imaging and immunohistochemical studies, we propose a new forensic investigation technique to perform a differential tanatological diagnosis by modular tools for visualization and analysis of born alive/stillbirth infants' pulmonary histological images.

METHODS: Our study starts from the digitalization of optical microscopy lung sections' images collected from bodies of born alive/stillbirth infants. The digitization of images was carried out using NanoZoomer S60®, a "scanner" capable of capturing images in optical microscopy of organ sections. Subsequently, these data were processed through NDP.view2®, a new generation visualizer software able to provide multiple magnifications of the digitized slides, to rotate and scroll the images to analyze the areas of greatest interest, and to save the images in various formats (.jpeg, .tiff, .bmp). Finally, the images were analyzed by Gwyddion®, a free and open source modular software for visualization and analysis of data obtained by scanning microscopy (including all standard functions of statistical characterization, data leveling and correction, filtering or grain marking). The investigation has been performed in double blind by two pathologists with expertise in optical microscopy on: i) two cases of born alive infants dead because of intrapartum asphyxiation despite resuscitation efforts; ii) a case of a full-term fetus with endouterine death; iii) and a control case of a 20-day infant dead without medical assistance.

RESULTS: The two pathologists' analytical reports were drawn up to calculate the average values of the four variables of interest (i.e. numbers of grains, total projected area, mean grain area, and mean grain size). Overall, the two pathologists' observations converged and were consistent with the four cases' medical and tanatological data.

CONCLUSIONS: The tested modular tool for visualization and analysis of born alive/stillbirth infants' pulmonary histological images has proven to be reliable, reproducible, and with a high predictive value in the differential tanatological diagnosis of born alive/stillbirth infant cases. Although the study will have to be extended to a wider casuistry and should not be the unique test performed to determine whether an infant was born alive, the new suggested postmortem investigation may represent one more promising and high-performing arrow in the forensic pathologist's quiver.

P02-004 | *Perinatal Medicine & Deaths in Pregnancy*

Maternal and Pregnant-Related Deaths: A 31-Year Autopsy Study

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INTRODUCTION: According to the World Health Organization (WHO), maternal mortality encompasses the death of a woman occurring during pregnancy, childbirth, or within 42 days of delivery. Maternal death is a global concern and constitutes an important indicator of the quality of the health system.
The aim of this study is to delve into the epidemiological characteristics linked to maternal deaths and assess the portion of fatalities associated with reproductive events.

METHODOLOGY: This was a retrospective transversal study covering a period of 31 years, from January 1st, 1992 to December 31, 2023, including cases of maternal death collected in the department of Legal Medicine of the Farhat Hached University Hospital of Sousse, Tunisia.

RESULTS: During the study period, we gathered data on 39 cases of maternal mortality, all of which underwent a complete forensic autopsy. The age of the deceased ranged from 16 to 47 years, with an average age of 31.33 years. In terms of marital status, 28 of the deceased were married (72.7%), while 9 were single (27.3%). There was a slight predominance of rural women (52%). Regarding socioeconomic status, 57.6% of the cases presented unfavorable socioeconomic conditions. Most of the deceased (60.2%) had no known medical history. Maternal mortality involved 43% of primiparous women. Deaths occurred in the postpartum period in 30.3% of cases, in the third trimester in 30.3% of cases, in the first trimester in 21.1% of cases, and in the second trimester in 18.2% of cases.
Hemorrhagic events related to pregnancy accounted for 58.9% of the deaths. These included 7 cases of delivery hemorrhage, 6 cases of ruptured ectopic pregnancy, 3 cases of uterine rupture, 2 cases of toxemia gravidarum, 3 cases of hemorrhagic abortion, and 2 cases of retroplacental hematoma. Other causes of death included complications of general anesthesia (3 cases). Additionally, there were 7 cases of death from non-obstetric causes, including epilepsy, profound anemia, bilateral pulmonary infection (2 cases), cerebral hemorrhage, carbon monoxide intoxication, and necrotic-hemorrhagic pancreatitis.

CONCLUSION: Despite advancements in global maternal mortality rates over the past century, it remains a persistent issue affecting many

regions worldwide, including Tunisia. Our study revealed that a significant portion of morbidity is preventable. Establishing a sustainable healthcare policy is crucial in addressing and preventing maternal morbidity and mortality.

P02-005 | *Perinatal Medicine & Deaths in Pregnancy*

Forensic Implications of Sudden Unexpected Postnatal Collapse: A Case Study

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The term Sudden Unexpected Postnatal Collapse (SUPC) comprises all those Apparent Life-Threatening Events (ALTE) and Sudden Unexpected Early Neonatal Deaths (SUEND) that can occur in the early postnatal period, both in term and in pre-term babies. Risk factors for SUPC include primiparity, maternal fatigue or sedation, prone position, skin-to-skin practice, inadequate supervision of the mother and the newborn, and distraction.

While in up to 60% of cases post-mortem investigations reveal the presence of an underlying disease, such as infections, metabolic disturbances, congenital cardiomyopathies, pulmonary hypertension, or congenital adrenal insufficiency, the remaining cases have no apparent cause.

From a forensic perspective, the identification of the cause of death and the means that produced it is imperative, especially in the suspicion of either child abuse or medical malpractice; therefore, a complete post-mortem investigation is mandatory to achieve an optimal comprehension of the case "beyond a reasonable doubt".

A case of SUPC is hereby presented and analyzed to suggest an appropriate post-mortem approach.

A healthy 3150g boy was born at 39 weeks of gestation by an uneventful primiparous vaginal delivery, after a physiologic uncomplicated pregnancy. On the first day after birth, he was in good clinical conditions, except for signs of mild neonatal jaundice and some red macules as in toxic erythema. At 45h postnatal age during the night, while sleeping in his mother's bed, he was found motionless, cyanotic without breathing movements, and after 1 hour of resuscitative attempts with failure to restore spontaneous circulation, the infant was declared dead.

At autopsy, external examination only revealed signs of cyanosis. The internal airways were patent, with no signs of obstruction.

The organs appeared to be normal in size and conformation, with no evidence of malformations. Tardieu's spots on the pleural surface were detected. Histologically, the cardiac specimens were characterized by the presence of minimal subepicardial erythrocytic infiltrates, i.e., petechial hemorrhages which were not macroscopically evident. Sporadic intramyocardial hemorrhagic foci were also detected.

The microscopic alveolar structure was overall intact, aside from some areas of septal rupture with cellular debris inside the alveolar sacs. CD68 immunohistochemistry was performed and showed diffuse macrophage infiltrates in the alveoli. The cause of death was asphyxia due to SUPC, which probably occurred during lactation.

While the overlap between the two conditions, i.e. asphyxia and SUPC, could appear contradictory, it highlights the need for a new classification both from a clinical and a forensic point of view which should be based on the post-mortem findings. The forensic examination is crucial in the identification of the pathological features of the condition, together with a thorough analysis of the clinical signs and symptoms, in order to achieve a new definition of SUPC that encompasses all the possible presentations.

P02-006 | *Forensic Toxicology*

Needle Spiking Phenomenon in Catalunya (Spain) during 2022

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INTRODUCTION: Needle spiking phenomenon took place in Spain specially during summer 2022. Those incidents implied victims (predominantly in nightlife places) subjected to puncture wound, with subsequent symptoms that made suspect the inoculation of some toxic substance. The Instituto de Medicina Legal y Ciencias Forenses de Catalunya developed a protocol for Catalunya together with hospitals, police, and courts for the identification of victims, physical and psychopathological examination, early sampling (blood and urine) and toxicological analysis. The purpose of this study is to show the results obtained during the period of application of the protocol with a special focus on the toxicological findings.

MATERIAL AND METHODS: Descriptive and retrospective study of needle spiking cases occurred in Catalunya during 2022. Reviewed documentation: forensic physician reports, analysis requests and laboratory reports. Toxicological analyses were performed with chromatographic techniques (GC-MS-FID for ethanol, GC-MS and HPLC-MS/MS for drugs). Studied variables: epidemiological, physical and psychopathological examination results (presence of injuries and psychopathological symptoms) and toxicological (voluntary drug use, samples obtained and results).

RESULTS: The protocol included 62 cases, most of them in August (n=40); 81% were women, the average age was 20 (14-37 range). In the physical examination, 56% presented a lesion compatible with punction, with or without presence of other lesions; 16% had other lesions like erythema or ecchymosis, and in 26% of the cases no lesion was observed (2% no information). The most common psychopathological symptoms were vegetatives (63%), neurodepressants (26%) and amnesia (11%). The drug most voluntary consumed was alcohol, in 60% of the cases.

Samples for toxicological analysis were obtained in 59 cases; 43 of them had blood and urine. Due to the established protocol, sampling was early; 59% of the cases before 6h after the facts, 10% between 6h and 12h.

115 samples were analysed. Ethanol was the most detected substance; positive (>0,1 g/L) in 58% of the cases (57 of the 115 samples). The average of ethanol in blood was 0,74g/L (max= 3,34 g/L). Drugs of abuse were detected in 5% of the cases (cannabis ad cocaine); in 67% of them the consumption was voluntary. Psychopharmaceutic medications were detected in 7% of the cases (benzodiazepines and antidepressants SSRI); in 100% of them the consumption was voluntary or administrated as a treatment in the hospital.

CONCLUSIONS: The protocol development between different actors allowed the early sampling and very useful toxicological analyses for those cases.

70 % of toxicological results were coincident with the substances consumed and reported by victims; the other cases, detected substances were alcohol and cannabis, which administration way is not by punction. This protocol allowed for giving an answer to the social alarm situation created by needle spiking phenomenon and discarded the toxic administration by puncture.

P02-007 | *Forensic Toxicology*

A Rare Form of Fatal Intoxication, Yew Poisoning: Case Report

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INTRODUCTION: According to the annual report of the Hungarian National Centre for Public Health, fatal intoxications in 2021 were mainly caused by medicines and chemical compounds, 22% of the above cases were suicidal. Fatal plant-related intoxications are considered rare, especially yew poisoning. Taxus baccata, also known as yew, is an evergreen tree, which contains several toxic substances such as alkaloids. The most potent cardiotoxic alkaloid in yew is Taxine B, which is an antagonist of the cardiac sodium/calcium channels. We describe a case of a 24-year-old young man who suddenly died on a bus and the autopsy, together with the toxicological examination, confirmed yew poisoning.

MATERIALS AND METHODS: Medico-legal autopsy was performed three days after death. Samples were taken for histological examination, as well as blood and urine for alcohol analysis. In addition, stomach and liver samples were provided for toxicological examination.

RESULTS AND CONCLUSIONS: External examination showed only signs of resuscitation. During the autopsy, cerebral edema, pulmonary edema and green coloured plant debris in the stomach were observed. Histological examination showed moderate steatosis hepatis and circulatory disturbance of the kidneys due to shock. Alcohol analysis revealed very low blood alcohol concentration. Toxicological examination of the stomach content confirmed the presence of 3,5-dimethoxyphenol as a marker substance of yew ingestion. With the above case, we would like to draw attention to the fact that the possibility of poisoning should always be considered in the event of sudden death among young people, particularly in the absence of natural causes.

P02-008 | *Forensic Toxicology*

Drugs in Used Syringes Collected from Harm Reduction Centers in Estonia

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This overview presents the results of a survey investigating injected substances by chemically analyzing the residual content of used syringes. Syringes were first collected in the spring of 2021 by the harm reduction centers in Tallinn and Narva. In 2022 the survey was expanded and used syringes were collected from all the harm reduction services in Estonia.
The chemical analysis of drug residues in used syringes has also been successfully carried out by many other European cities coordinated by international project ESCAPE (European Syringe Collection and Analysis Project). Since 2021 Estonia contributes analysis results of used syringes from Tallinn to ESCAPE project.
The study was coordinated by the Institute for Health Development and the chemical analysis was performed by the Estonian Forensic Institute.
Based on the analysis results it can be stated that in addition to regional differences (Tallinn area, Narva and Eastern Estonia, ohter regions) there were also differences between harm reduction centers in the same region. Nevertheless, the predominant narcotic drug in syringes is amphetamine. About two-thirds of analysed syringes contained amphetamine either as single drug or combined with ohters, mostly with methamphetamine. Since 2021 there is remarkable increase in the number of syringes containing nitazenes. Nitazenes are extremely potent synthetic opioids with up to thousands fold more potent than morphine and by this mean are comparable to carfentanyl. Isotonitazene, being first nitazene in Estonian drug market, emerged first in 2019. Whereas in 2021 9% syringes contained nitazenes (isotonitazene), and in 2022 6% (isotonitazene, protonitazene, metonitazene), in 2023 already 29% out of all analyzed syringes contained nitazenes (protonitazene, metonitazene, N-desethyl-isotonitazene). This alarming trend corresponds to the fact that more than half drug related deaths in 2023 were caused by nitazenes abuse. Unlike nitazenes injection of cathinones (α-PVP, α-PHP) has been in decline. There is moderate decrease in methadone and buprenorphine (usually with naloxone) findings. Both buprenorphine and methadone are used in opioid substitution therapies and findings of these substances in used syringes points to the misuse of substitution therapy drugs. Yet 14% of used syringes in 2023 contained at least one of these opioids.
In summary the ongoing study started in 2021 has been justified itself. Advantages of syringe residue study are time-efficiency, relatively easy sampling and objectivity of chemical analysis. The study is an effective method of monitoring the drug market, providing a good overview of both the clients of harm reduction centers and regional differences in substance use. Reliable information about used substances is essential to provide relevant early warning to users as well as law enforcement, the medical system and harm reduction services.

P02-009 | *Forensic Toxicology*

Poisoning Death due to Paroxetine Overdose: A Case Report

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This case presents a fatality of a 22-year-old male, found dead in his room, with blood exiting his nose and dry bloodstains on his left wrist. Many empty and semi-empty packets of prescribed drugs were scattered on the desk and in the bin, close to the location of the body. Recently, he had been hospitalized for a panic crisis and was discharged one week prior to his body discovery. He was diagnosed with major depression and anxiety disorder. He had no history of suicide attempts in the past. There was a razor blade with a small amount of blood on it on the outer part of his desk. At autopsy, multiple (over 10), linear, superficial incisions, were observed on the inner surface of both his lower forearms and wrists (more on his left wrist), running obliquely and towards different directions, suggesting hesitation marks caused by a razor. On the internal examination, the urinary bladder was markedly distended. Organs showed autolytic changes, with no other macroscopic pathological lesions. The postmortem interval was speculated to be approximately 18-20 hours from the time of the scene investigation. Blood (from the left external iliac artery), urine, and gastric contents were sampled during the autopsy for toxicological analysis.
Screening for the presence of drugs of abuse in urine and blood was performed by immunoassays. Blood ethanol concentration was measured by an HS-GC-FID method. Screening for the presence of common drugs in the biological samples was performed by GC-MS. Quantification of the detected drugs and drugs of abuse was performed by a UHPLC-MS/MS method on a Dionex UHPLC system coupled to a Q-Trap 5500™ mass spectrometer operated in multiple reaction monitoring (MRM) mode and equipped with electrospray ionization (ESI) Turbo V Source operated in positive mode. The toxicological screening showed the presence of the antidepressant, selective serotonin reuptake inhibitor (SSRI) paroxetine in blood, urine, and gastric contents, and the presence of benzodiazepines in blood and urine. Neither alcohol nor illicit drugs were identified in the analyzed samples. The quantitative analysis showed paroxetine concentrations of 3.3 mg/L in blood and 1.58 mg/L in urine which are within the range of paroxetine concentrations reported for lethal cases.
The manner and cause of death in this case according to the autopsy, the scene investigation, the medical history, and the toxicological results was recorded as suicide and, mixed-drug intoxication due to the synergistic action of paroxetine and benzodiazepines, respectively.

P02-010 | *Forensic Toxicology*

An IMS Prototype for the Detection of Drugs of Abuse and their Precursors on the Crime Scene Investigation

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BACKGROUND AND AIM: Ion Mobility Spectrometry (IMS) has been proven to be a very effective analytical technique in security applications for the detection of explosives, chemical weapons and illicit drugs. This study focuses on a new IMS prototype, developed by MasaTech, and investigates its efficacy on the crime scene with chemical substances of toxicological interest within the scope of the RISEN project (Horizon 2020, Grant Agreement No 883116). The MasaTech prototype vaporizes chemical substances using a laser beam and can be applied on different types of surfaces. Vapours are transferred into the IMS module by a pump, where they are ionized and separated in the gas-phase, based on their size and mass over charge ratios. The analytical outputs considered in this study were the drift time, ion mobility, reduced mobility and collision cross-section.

METHODS: The effectiveness of the IMS prototype was established by analysing drugs of abuse and their precursors, where applicable: amphetamine, methamphetamine, cocaine, GHB, MDMA, heroin, alpha-phenylacetoacetamide (APAA), methyl 3-oxo-2-(3,4-methylenedioxyphenyl)butanoate (MAMDPA), methyl alpha-phenylacetoacetate (MAPA), 3,4-methylenedioxyphenylpropan-2-one (PMK) and benzyl methyl ketone (BMK). Low concentrations of chemicals were settled on different substrates, such as drywall, stainless steel, and ceramic to simulate realistic crime scenarios.

Chemometrics methods were employed for reliable data processing, analysis and forensic interpretation. The data analysis workflow involved various pre-processing steps of raw IMS plasmagrams, unsupervised and supervised pattern recognition techniques and model evaluation through Leave-P-Out cross-validation. Moreover, following the ENFSI guidelines, a complete validation of the method was carried out taking into account the repeatability, reproducibility, and sensitivity.

RESULTS: Method performance parameters obtained by the validation were evaluated as reliable and relevant for the criminal justice system. Therefore, the data obtained was treated with different classification models, such as Linear Discriminant Analysis (LDA), Partial Least Squares Discriminant Analysis (PLS-DA), Logistic Regression (LR) and Support Vector Machines (SVMs), in order to establish the relevance in comparison to conventional IMS technologies. The results highlighted the importance of the data pre-processing method employed to obtain an accurate classification. The PCA-LDA model, using the autoscaled plasmagrams, appears as the most effective classification model, showing satisfactory results for real implementation in forensic field applications.

CONCLUSION: Merit to its high sensitivity and ease of use, the instrument can be employed to detect latent traces on crime scenes, replacing the traditional time-consuming presumptive methods, such as spot tests. In conclusion, the IMS prototype developed by MasaTech, coupled with the chemometrics approach, presents a promising methodology for the detection of chemical substances of toxicological interest in the forensic field.

ACKNOWLEDGMENTS: Sander Oldenhof and Raoul Plessius for experimental setup and sample preparation.

KEYWORDS: IMS, chemometrics, drugs of abuse, precursor, crime scene investigation, toxicology

P02-011 | *Forensic Toxicology*

A GC-QEPAS Prototype for the Detection of Drug Precursors and Chemical Weapons in the Forensic Field: A Chemometrics Approach

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BACKGROUND AND AIM: GC-QEPAS, a compact gas sensor designed for real-time analysis of Volatile Organic Compounds (VOCs) and Semi-volatile Organic Compounds (SVOCs), has been developed by CREO and validated within the scope of the RISEN project (Horizon 2020, Grant Agreement No 883116). This study focuses on the detection of drug precursors and chemical weapons in the forensic field, to ensure the safety of operators. Compounds are transferred into the sensors by a pump and then concentrated employing two graphitized carbon sorbents (Carbograph 5TD and Carbograph 2TD). Thereafter, compounds are separated by a MEMS-based fast-GC and analysed by an IR sensor based on Quartz Enhanced Photoacoustic Spectroscopy (QEPAS).

METHODS: The effectiveness of the GC-QEPAS prototype was established by analysing drug precursors and chemical weapons simulants: safrole, benzyl methyl ketone (BMK), benzaldehyde, acetone, dimethyl-methylphosphonate (DMMP), di-propylene-glycol-methyl-ether (DPGME) and methyl salicylate. Following the ENFSI guidelines, a complete validation of the method was carried out considering the repeatability, reproducibility, and sensitivity.

A chemometrics approach was developed for robust data analysis and forensic interpretation.

The data analysis of QEPAS spectra workflow involved various pre-processing steps of raw data, unsupervised and supervised pattern recognition techniques, and model evaluation through Leave-P-Out cross-validation.

RESULTS: Analytical method performances obtained by the validation were evaluated as reliable and relevant for the criminal justice system. Therefore, the analytical data was treated with different classification models, such as Linear Discriminant Analysis (LDA), Quadratic Discriminant Analysis (QDA), Partial Least Squares Discriminant Analysis (PLS-DA), Logistic Regression (LR) and Support Vector Machines (SVMs), in order to establish the improvements in comparison to conventional hyphenate GC-spectroscopy instruments. The results highlighted the importance of the data pre-processing method employed to obtain an accurate classification. The PCA-LDA, PCA-QDA and PCA-LR, using the standard normal variate pre-processed spectra, appear as the most effective classification models, showing satisfactory results for real implementation in forensic field applications. In addition, SVM showed lower model accuracy than the beforementioned methods but appeared still adequate.

CONCLUSION: Merit to its high sensitivity and ease of use, the instrument can be employed to detect latent traces on crime scenes, such as drug precursors, and hazardous materials, such as chemical weapons to protect the health and safety of forensic personnel. In conclusion, the GC-QEPAS prototype developed by CREO, coupled with the chemometrics approach, presents a promising methodology for the detection of chemical substances of toxicological interest in the forensic field.

ACKNOWLEDGMENTS: Sander Oldenhof and Raoul Plessius for experimental setup and sample preparation.

KEYWORDS: Gas Chromatography, QEPAS, chemometrics, forensic, toxicology, crime scene investigation

P02-012 | *Forensic Toxicology*

Suicidal Death due to Organophosphorus Pesticide Ethoprophos Ingestion

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An interesting case of a 60-year-old man, who was found dead in his vehicle by his family, in a rural area of Epirus is reported herein. The decedent was found lying on the front passenger's seat. The scene investigation by the police authority did not reveal any suspicious circumstances, equipment, or containers. The death was considered as sudden, and the decedent was proceeded for postmortem investigation. Upon autopsy, no external injuries were observed. The decedent was wearing a T-shirt with saliva stains on the upper part. Internal examination revealed cerebral edema and pulmonary edema as the main pathological findings. Interestingly, approximately 10ml of watery contents in the stomach along with multiple black granules, of about 1.0mm diameter each, attached on the gastric mucosa, were observed. Peripheral blood specimens and gastric contents with the black granules were collected for toxicological analysis.

Screening for the presence of common drugs in the biological samples was performed by GC-MS. Blood samples, gastric contents, and the black granules, were pretreated and analyzed. Firstly, blood ethanol concentration, measured by an HS-GC-FID method and screening for the presence of drugs of abuse in blood was performed by immunoassays, both with negative results. Screening for the presence of common drugs was performed by GC-MS in blood in full scan mode. Secondly, a fraction of the black granules was isolated from the gastric content and extracted with methanol and subjected to GC-MS screening in full scan monitoring. The organophosphate ethoprophos was identified as the main component of the granules. Ethoprophos was also identified in blood with GC-MS in selected iron monitoring (SIM) mode. Then, an LC-MS/MS method was developed for the quantification of the substance in blood. Experiments were carried out by an Dionex HPLC system coupled to a Q-trap 5500+ equipped with electrospray ionization (ESI) Turbo V Source operated in multiple reaction monitoring (MRM) and in positive mode.

The toxicological results showed the organophosphorous pesticide ethoprophos as the only substance that could have contributed to death. In such cases, death occurs rapidly, as pesticides are highly toxic, even in low concentrations. In the present case, death was attributed to the intake of ethoprophos and the manner of death was reported as suicide.

P02-013 | *Forensic Pathology*

Portfolio Creation Project for Forensic Medicine Residents: Educational Necessity

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BACKGROUND AND AIMS: Currently, forensic medicine residents do not have a portfolio allowing the development of their knowledge and the evaluation of their learning during the course preceding the specialty exam.
This work aims to develop a portfolio for forensic medicine residents.

MATERIALS AND METHODS: To carry out this work, we based ourselves on an assessment of the current situation and a bibliographic search on the subject of medical pedagogy and portfolios.

RESULTS: The project we are proposing is a simple portfolio whose content includes 6 different sections: Preamble, the resident identification sheet and bibliographic summary, the commitment charter, the curriculum and internship periods, the targeted skills, monitoring of the learning process including the activities carried out, the account of critical situations as well as the valorization of work and continuing education.

CONCLUSION: Our portfolio project is part of an educational approach allowing better learning for our residents and a periodic and final evaluation. Firstly, we developed a hybrid non-selective portfolio in order to facilitate its application. In order to validate and develop the Portfolio, it seems essential to have it evaluated by users.

P02-014 | *Forensic Psychiatry*

Approaches to Psychiatric Genetics in Forensic Sciences

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INTRODUCTION: Current genetic research is focused on unraveling the impact of genetic variation on disease susceptibility and individual variations in various medical conditions. The aim is to pave the way for more effective treatments and preventive measures against a multitude of diseases.

RESULTS: While diseases like Cystic Fibrosis and Huntington's disease can be attributed to single gene mutations, a majority of psychiatric disorders—such as anxiety, alcoholism, substance abuse, schizophrenia, bipolar disorder, depression, and obsessive-compulsive disorder—result from the intricate interplay between genetic polymorphisms and environmental factors.
The burgeoning insights in psychiatric and behavioral genetics hold promise for improved prevention, diagnosis, and treatment of disorders. However, the incorporation of such findings as legal evidence in both criminal and civil cases raises significant ethical, legal, and social concerns. The uncertainty surrounding the role of behavioral genetic evidence in excusing and mitigating criminal behavior stems from the complex interaction between genotype and environmental factors, making it challenging to ascertain the impact of a specific allele on an individual defendant.

CONCLUSION: The integration of behavioral and psychiatric genetic data into judicial proceedings presents ongoing ethical dilemmas. Discussions center around the methods of data acquisition, standards for its acceptance, and the permissible purposes for which it should be admitted as evidence. The potential influence of such evidence on judicial outcomes in both criminal and civil cases introduces numerous medicolegal challenges. Prior to widespread adoption of neurobiological evidence in legal contexts, a comprehensive and systematic examination of the perceptions and potential impacts of these data is imperative.

P02-015 | *Forensic Psychiatry*

Psychiatric Medico-Legal Expertise of a Pedophile – Case Presentation

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According to DSM 5 TR™, pedophilia is defined as: the presence, for at least 6 months, of sexually arousing fantasies, intense and repeated sexual impulses or behaviors that lead to obtaining sexual arousal through sexual activity with one or more children of prepubertal age (generally aged 13 or younger). This paraphilic disorder can lead to the following crimes: rape, sexual assault, sexual intercourse with a minor,

sexual corruption of minors, recruitment of minors for sexual purposes, child pornography, harassment.

The authors present the case of a 51-year-old petty officer, military parachutist in reserve, married twice, but divorced, father of one son, investigated, for "child pornography" (after serving 2 years in prison for similar acts, the defendant possessed and stored in his computer, until the date of the home search, pornographic materials with minors, in his car trunk, the search team found two plastic dolls with the anthropomorphic features of pre-pubescent minors, with a cutout in the anal and genital area where a vagina and anus were artificially inserted, representing the genital organs of minor girls, as well as 9 pairs of small panties, a bathing suit, a body type blouse for girls aged 2-6 months, 3 pairs of tights for small girls) and, for three crimes of "harassment" (repeatedly followed, photographed and directly approached 3 minors, two 11-year-old girls and a boy of the same age, at the playground and at their homes).

Initially, the man refuses the psychiatric examination, both in front of the prosecutor and of the commission of medico-legal psychiatric expertise, coming in front of the commission with an arrest warrant. The procedure of involuntary hospitalization in a psychiatric hospital is initiated in order to perform a psychiatric examination.

The paper presents the stages of the medico-legal psychiatric examination: the file documents, the medico-legal psychiatric examinations carried out on the occasion of the previous conviction, the minutes of verification and analysis of the public content posted by the defendant on his Facebook account, the memos regarding the refusal to be examined and other relevant materials written by the man, premorbid personality data, elements of sociopsychogenesis (environment, family economic level, family, intrafamilial climate, intrafamilial affective relationships, educational route, professional route, workplace relations), psychiatric pathological personal antecedents, the medical data related to the admission in a psychiatry yard in order to perform a psychiatric examination.

It was concluded that the man presents: "Polymorphic personality disorder (narcissistic, antisocial, paranoid) (F61) and Pedophilia (F65.4)". He had the discernment preserved in relationship to the facts for which he is being investigated and presents a high potential of social danger and recidivism, the facts being committed in a state of post-conviction recidivism of the crime of child pornography in a continuous form.

P02-016 | *Forensic Psychiatry*

Suicide Note Analysis in a Case of a Possible and Undiagnosed Dissociative Identity Disorder: A Case Report

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Understand suicidal behaviour's is not easy and requires an interdisciplinary investigation, such as historical, autoptic and psychological. In this context, suicide notes might play a crucial role. Suicide notes are messages written by a person who intends to die by suicide and their content can be while sometimes incredibly accurate for the forensic investigation or can also be extremely confusing and conflicting leading to erroneous conclusions. In this sense, it is necessary that the forensic practitioners have appropriate skills in suicide notes interpretation. Moreover, the data that goes to the Forensic practitioners rarely reaches the physicians or those who work in research for a better management of psychological disorders, and why it is also important to share in the literature those cases.

The present case report on suicide notes analysis is complex, not easy to understand and extremely suggestive for a dissociative identity disorder (DID). Cases of DID are rarely reported in literature, especially in suicide field.

A forensic autopsy was ordered by the Prosecutor for a hanging case by an 51-years-old Italian woman. The Forensic pathologist received just little information about the woman's psychiatric history, namely the presence of psychological disorder that have not been properly identified and that the woman was under a psychopharmacological treatment.

On the death's scene, a suicide note was found, such as two more additional manuscripts referring to this note. Before the message of the two additional texts was the name of the deceased, followed by the numbers: Giulia 1 (fictional name) and Giulia 2.

The suicide notes contained messages of a consistent suicidal ideation, such as "...I'm too tired…

In full possession of my faculties, I delegate to my lawyers… I had to die…", as well as messages of anger towards the family and the Italian justice.

The other manuscript starts with this sentence: "Giulia 1 who wants to save Giulia 2: I have to say how I feel. I have to tell Giulia that the only person who has a chance to help her is Giulia".

Both of the handwritten messages express two clear different personalities: Giulia 1 (who want to save) and Giulia 2 (who want to commit suicide) in more the 3000 words arguing with each other from very different points of view.

In this case report we tried to analyze a suicidal case of a potentially DID, and we find that even though suicidal behaviors are difficult to track, suicide might be preventable. The literature highlights, indeed, how suicides are associated with psychiatric symptoms and/or personality disorders. Suicidal notes are relevant for the forensic investigation. Forensic data often provide general common motives to commit suicide and this might help in suicidal prevention.

P02-017 | *Forensic Pathology*

A Suicidal Hanging Complicated by an Incomplete Decapitation: Case Report

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BACKGROUND AND AIMS: Hanging is one of the most common means of suicide in the world. In Tunisia, it constitutes the most frequent suicide mode. Decapitation is a rare complication of hanging and can pose difficulties in its etiology and in the medico-legal form.

Materials and methods: We report a case of incomplete decapitation, secondary to suicidal hanging, autopsied in the department of forensic medicine of Nabeul in 2022.

RESULTS: It concerns a 73-year-old man, with a psychiatric history, who was found hanging by a rope attached to the railing of a balcony on the 2nd floor of his house. External examination of the body revealed a high, ecchymotic, oblique, incomplete cervical furrow, extending into the anterior cervical region through a deep wound. We also note the presence of a link forming a tight loop, around the neck, closed with a slip knot. The autopsy showed a section of the soft parts of the neck, the trachea and the vascular structures of the neck The osteocartilaginous apparatus of the larynx or the spine were not damaged.

CONCLUSION: Decapitation is a rare complication of suicidal hanging. The collection of bodies with a comparison of autopsy findings and investigation data as well as knowledge of the physiopathological and biomechanical mechanisms can guide the forensic doctor.

P02-018 | *Forensic Pathology*

Atypical Suicide with a .22 Rifle: Autopsy, CT and Experimental Findings

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Gunshot wounds are a common cause of death in forensic investigations, especially in countries without strict gun legislations. Firearm suicides are more common in America and Africa compared to Europe and Asia. Careful and meticulous collection of evidence at the scene in combination with the autopsy findings are necessary to reconstruct the circumstances of death and differentiate between homicides and suicides. Yet, oftentimes atypical signs can obscure the forensic investigation and create doubts on the actual manner of death.

This case presents the forensic investigation of a fatal gunshot wound to the head with a 0.22 rifle. Forensic investigation included death scene examination, external examination of the body, postmortem CT examination, full autopsy and toxicological analysis. Entry wound was located approximately 1 cm above the top of the left ear, 2 cm behind it and 19.2 cm from the midline. It had an ovoid shape with dimensions of 0.3 x 0.5 cm, with a thin abrasion rim measuring at its maximum width 0.1 cm at the 5 o'clock margin. No exit wound was found. No other injuries were noted on the body including defense wounds. A SYNBONE sphere filled with ballistic gelatine was used to simulate a contact gunshot wound to the head. The sphere was placed on a cork ring and was shot in direct contact with a 0.22 rifle. The bullet entered the "head" but did not exit it which is consistent with the scenario of our case. A CT scan of the SYNBONE was also acquired to showcase the trajectory and visualise the fragmentation patterns. It should be noted that the deceased was right-handed.

Although the wound characteristics, trajectory of the injury and the choice of weapon pointed towards foul play, a meticulous forensic investigation including crime scene analysis, postmortem CT scan, full autopsy and experimental simulation of the injury provided solid evidence to conclude that this was actually a case of an atypical suicide. This case illustrates how state of the art methodology and case management secured the appropriate evidence for any legal enquiry. Furthermore, it highlights the significancant role of a thorough death scene investigation and a context-based approach in the final case resolution.

P02-019 | *Forensic Pathology*

Nitrogen-Induced Suicide: Case Studies of Fatal Asphyxia in Enclosed Environments

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In the last decade, cases of death in confined spaces with inert gas, some of which are suicides, have increased. Inert gases, predominantly helium or nitrogen, are utilized. Morphological diagnosis of this type of death poses challenges. We conduct a brief review of the literature on the issue and present two cases of nitrogen-inhalation suicide in tightly enclosed spaces – using a plastic bag for gas inhalation.

In one case, a man was found in the back seat of a car with a plastic bag over his head, tightly connected via a hose to a nitrogen bottle. In the second case, a man was discovered on his bed with a large plastic bag covering the upper half of his body and head, holding a nitrogen bottle in his hands. Circumstances from the scenes, crucial for diagnosis due to the lack of significant autopsy findings, are described and illustrated.

A significant limitation in these cases is the inability to conduct toxicological analysis to prove the nitrogen effects. Notably, all reviewed publications emphasize the challenges faced by forensic pathology and toxicology when nitrogen-induced asphyxia is suspected post-autopsy. Due to nonspecific morphological findings and limited toxicology data, determining death as solely due to nitrogen-induced asphyxiation is impossible via autopsy alone. Attempts to address this challenge include methods proposed by Giorgetti A, Pelletti G et al. to quantify excess nitrogen in post-mortem blood.

Emphasized is the importance of on-site investigation, encompassing circumstantial and environmental analysis of the crime scene, in suspected nitrogen inhalation-related deaths, which remains the primary source of evidence for determining the cause of death.

P02-020 | *Forensic Pathology*

Fat Embolism, a Clinically Underdiagnosed Consequence of Traumatic Injury

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Fat embolism (FE) and fat embolism syndrome (FES) are caused by the entry of fat droplets into the systemic circulation, affecting mainly the lungs and brain, usually due to traumatic injuries of long bones or fat tissue. It can be clinically undetectable or can manifest as respiratory distress, alteration of consciousness or petechial rash of mucous membranes and skin. The clinical diagnosis is based on the diagnostic criteria, ancillary studies, bronchoalveolar lavage and imaging studies. Early long bone fracture fixation is the gold standard preventive method; however, there is no specific treatment for FE or FES. The overall mortality ranges from 5 to 15% while the postmortem incidence can be up to 20%.

In our study 25 autopsy cases were selected where the patient had traumatic long bone fracture with or without surgical fixation. With the revision of medical data, autopsy report and fat staining of frozen slides of parenchymal organs six of the patients were histologically identified with FE.

The cause of death of three patients were directly associated with FE while the other three cases fat embolism was not clinically manifestated were regarded as a contributing factor to death. There were no significant differences amongst the FE group and non-FE group by virtue of sex, age, survival time.

Based on our findings it might be suspected that FE is underdiagnosed in the clinical practice.

P02-021 | *Forensic Pathology*

Left Ventricular False Tendons and Sudden Cardiac Death. Report of an Unusual Case

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Sudden death (SD) can be defined as the unexpected natural death of a healthy individual occurring within the first hour after the onset of symptoms or, if death is unwitnessed, within 24 h of the victim being seen in a healthy state.

In people younger than 35 yo, when the cause of SD is" cardiac" (sudden cardiac death—SCD), it is mainly due to cardiomyopathies and channelopathies.

Among the predictors of SCD, obesity (a well-established independent risk factor for cardiovascular diseases) has been found to increase arrhythmic risk (i.e., every 5-unit increment in BMI confers a 16% higher risk of SCD).

We herein describe an autoptic case of an obese 32-year-old woman (BMI of 49.9), who was discovered deceased in her bed at home.

Interestingly, at the heart examination, the presence of an abnormality in the whole tendon apparatus of the anterior mitral valve leaflet was observed.

Infarct an accessory tendon chord connecting the apex of the leaflet to the distal third of the antero-lateral papillary muscle was found in addition to an unusual retiform appearance ("web-like") of the whole mitral valve tendon apparatus.

At histological examination of the ventricular myocardium, foci of confluent interstitial and perivascular myocardiosclerosis, along with perivascular fibrosis of coronary intramyocardial were observed.

In absence of any other structural anatomical and histological finding, the cause of death was identified in a fatal arrhythmia due to the above-described tendons apparatus abnormality.

This case underscores the intricate interplay between the existence of left ventricular false tendons (LVFTs) and an elevated risk of ventricular tachycardia.

From a speculative point of view, an LVFT may induce mechanical stretch in the interventricular septum, leading to heightened automaticity and triggering premature ventricular beats or arrhythmias.

Comprehensive awareness of these structural anomalies and their morphological attributes is crucial for establishing correlations with potentially fatal arrhythmias and for formulating targeted preventive interventions.

P02-022 | *Forensic Pathology*

Suicide Mortality Trends in the Pleven Region of Bulgaria over Two Decades (2004-2023)

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The incidence and patterns of suicide fatalities fluctuate over time in response to multifaceted societal, economic, and environmental determinants. Presented below are data and visualizations elucidating some of the demographic characteristics of individuals who succumbed to suicide in the Pleven region of Bulgaria over a 20-year period (2004-2023), as recorded by the regional forensic medicine department. This analysis includes an examination of various suicide methods, aiming to delineate trends and disparities concerning gender and age.

These visual representations encapsulate information regarding the frequency of suicide occurrences, the age distribution at the time of death, and the evolution of suicide methods throughout the studied period, totaling 590 cases in a regional population that decreased from 310,000 to 226,000 over the years. Deeper scrutiny of the data reveals noteworthy shifts in the demographic profile of suicide victims over the two-decade span, with discernible variations observed across genders (predominantly males) and age cohorts. The main recorded methods include hanging, jumping from height, intoxication, firearm use, vehicle/railway incidents, drowning, burning, incised wounds, stabbing, and electrocution.

For instance, while the overall incidence of suicide exhibits fluctuations, and the numbers remain stable over the years for the region, detailed analysis unveils underlying patterns persisting over time. Such trends indicate a higher prevalence of suicide among specific age groups or an increase in suicide rates within particular demographics.

Detailed records delineating the leading suicide methods in different years allow for a nuanced examination of trends and shifts over time by gender and age. Understanding these shifts is pivotal for informing targeted prevention strategies and interventions aimed at reducing suicide rates.

This analytical scrutiny holds promise in identifying modifiable risk factors, such as the implementation of measures to curtail access to lethal means and mitigate the impact of socio-economic stressors. By identifying demographic trends and elucidating the correlates of suicide risk, forensic medicine departments can play a pivotal role in shaping public health initiatives and policies aimed at suicide prevention within the Pleven region and beyond.

P02-023 | *Forensic Pathology*

Animal Related Fatalities: A Case Series

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INTRODUCTION: Fatal animal attacks have been sporadically reported, and deaths usually result from unwitnessed attacks. It may be responsible for an array of potentially lethal injuries. In classifications in literature, deaths caused by animals are separated as venomous and non-venomous (traumatic). Another classification is made according to wild or domestic animals. Venomous animal attacks may lead to poisoning or death in the form of anaphylactic reaction following contact of the human body with animals such as bees, scorpions or snakes. In Tunisia, there are insufficient data on injuries and deaths associated with animals. The aim of this study is to analyze external examination and autopsy findings and explain the mechanisms of death.

METHODOLOGY: This was a case series of animal related deaths, which autopsies were performed in the department of Forensic Medicine of the Farhat Hached University Hospital of Sousse, Tunisia.

RESULTS: In this study, six cases were reported. The age of the deceased ranged from 02 to 20 years, with an average age of 13,4 years. A high predominance of male gender was noted (5 cases). Additionally, all cases were of rural origin, which explains the predominance of attacks by sheep observed in 4 cases. In three cases, although the sheep attack was described and witnessed, external examination and autopsy revealed no detectable external and internal traumatic lesions associated to polyvisceral congestion and alveolar oedema. Death was attributed to reflex inhibition due to traumatic cause. Another case of a 2-year-old girl who was hit by a sheep against a wall, an ecchymosis was found on the gastric wall with a petechial appearance of the gastric mucosa. given the location of the ecchymosis and the absence of any other autopsy findings, death was attributed to reflex inhibition. A case of a donkey bite was also reported, in a 10-year-old child, where death resulted from a craniofacial trauma. Last case was of a 17-year-old child who was allegedly the victim of a bee sting. On external examination, a punctiform erythema over the upper right eyelid with moderate edema was described. Regarding the autopsy finding, a laryngeal edema was noticed. Death was secondary to an anaphylactic shock.

CONCLUSION: The macroscopic findings in cases of animal attack may be extremely subtle, hence the necessity of having details about the animal exposure and the events leading to death occurrence. Forensic pathologists are required to determine the manner of death, all the more so as the responsibility of a third party (the animal owner) is at stake. There are no guidelines with regard to deaths related to encounters with animals. Consideration of the circumstances may be required, possibly necessitating a scene examination, in addition to full postmortem examination.

P02-024 | *Forensic Pathology*

Prevalence of Alcoholic Influence in Natural Death

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Alcohol consumption greatly influences morbidity and mortality and is often associated with unnatural death. As there are no current guidelines recommending measuring the blood alcohol concentration (BAC) in natural deaths in Hungary, knowledge of the influence of alcohol in natural death cases is limited. This study aimed to investigate the prevalence of alcoholic influence at the time of natural death, cause of death, as well as the distribution of age, gender, and contributory diseases.

Biological samples were obtained during the autopsies, performed in our Department in the years 2019-2023, of persons who died outside of health care institution (e.g. at home, public places). The sample comprised 100 cases, full autopsy report and previous medical history were considered. Blood and urine samples were analyzed by Head-Space Gas Chromatography. The BAC results were compared with the age and gender distribution as well as the cause of death.

23% of the cases was found to have elevated postmortem BAC, indicating alcohol consumption before death, of which most cases were recorded in men. The mean BAC of males was three times that of women. The most common causes of death were acute heart failure and diseases from the cardiac and circulatory death groups, but probably because of the small sample size of the study, no significant relationship between elevated BAC and cause of death was found.

There were three deaths which, were considered unnatural (hypothermia, aspiration, rib fracture due to fall) as the result of the post-mortem, and elevated BAC were regarded as a contributory factor.

Nonetheless, this study supports the findings of other studies regarding the association between alcohol use and cardiovascular diseases. Based on our findings, it is not necessary to conduct alcohol measurement in all pathological autopsies, however the possibility of unnatural death must be bear in mind. Examining biomarkers of chronic alcohol consumption would be the next step.

P02-025 | *Forensic Pathology*

Unconventional Drowning in Diesel Fuel Following a Traffic Accident: A Case Report

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INTRODUCTION: Drowning typically refers to a type of mechanical asphyxia that occurs when the respiratory tract is blocked by a fluid. Water is typically the primary cause of drowning and asphyxia, often resulting in the body being fully or partially submerged. While drowning can happen during a motor vehicle accident, it typically involves the vehicle being submerged or immersed in water. This case report, however, involves a motor vehicle accident that led to drowning, despite the vehicle not being submerged.

CASE: The body of a 17-year-old boy was brought to our morgue after he died in a single-sided traffic accident. According to the forensic documents and information obtained from the officials at the scene, the tractor the boy was driving had overturned, and the adolescent was found dead under the tractor, trapped by his legs.
During the external examination, widespread abrasions and numerous lacerations were observed on the lower extremities. However, significant traumatic lesions were not detected in the upper half of the body, pelvic region, or genital area. A pressure mark, presumed to be postmortem, was present in the left zygomatic area. The most notable point of interest was the dense, frothy content emanating from the adolescent's mouth, reminiscent of cases of drowning.

Consequent postmortem investigation of cranial cavity revealed no signs of trauma or other cause of death, aside from an apparent hyperemia of the brain tissue. The thoracic and gastrointestinal system organs removed according to Virchow's technique. The examination of the trachea revealed more of the same dense, frothy content, which was mixed with what was presumed to be gastric content further down the main bronchi. However, the main turning point in elucidating the cause of death was the collection of stomach contents for toxicological examination. It was observed that the stomach contents, when placed in a jar, separated into two layers after a while. Subsequently, it was noted that the content drawn from the main bronchi with a syringe exhibited the same phenomenon. Based on all these findings and after a final discussion with the crime scene investigation teams, it was concluded that the boy drowned in the fuel flowing from the damaged fuel tank while trapped beneath it.

DISCUSSION AND CONCLUSION: The reported case indicates the importance of systematic autopsy protocols, proper documentation of the crime scene and delivery of this report to the autopsy team before the postmortem investigation.

KEYWORDS: drowning, traffic accident, forensic pathology, autopsy

P02-026 | *Forensic Pathology*

WITHDRAWN

P02-027 | *Forensic Pathology*

Rare Case of Untreated Non-Hodgkin's Cervical Lymphoma Causing Death in a Young Woman Who Shunned Treatment

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INTRODUCTION: Non-Hodgkin lymphomas (NHLs) account for 90% of diagnosed lymphomas. They start from B lymphocytes (85–90% of cases) and from T and natural killer lymphocytes. The most common symptoms of NHL include indolent lymphadenopathy, weight loss >10%, fever and night sweats. The reported 5-year survival rate in the United States is 74%. This is related to the stage and type of tumour, as well as the success of the administered therapies. We present the case of a young woman who died from complications of advanced cervical lymphoma that had never been diagnosed or treated.

MATERIALS AND METHODS: A 34-year-old woman was found unresponsive in her bed at 5:00 a.m. Four months earlier, she had given birth to her second daughter without complications. About a month earlier, she had contacted SARS-CoV-2 infection. The husband reported that in recent months, a progressive swelling had appeared in the woman's neck. A forensic autopsy, including histological and toxicological exams, was performed.

RESULTS: On external examination, the subject was in poor general condition. A swelling in the right median and paramedian regions of the neck was hard in consistency, measured 20 cm × 20 cm × 11 cm, and was covered by ulcerated skin tissue. When cut, the cervical neoformation weighing 1,350 grams showed abundant necrotic material with a caseous appearance and widespread infiltration of the surrounding tissues. The larynx, trachea and oesophagus were severely deviated by the mass. Multiple lymph nodes were enlarged. The neoplasm was histologically NHL with small/medium sized non-cleaved cells, starting from the lateral cervical lymph nodes.

DISCUSSION: The cause of death was determined to be neoplastic cachexia due to advanced NHL, which started from the lateral cervical lymph nodes and subsequently extended to all the main structures in the neck, with total subversion of their normal architecture, given the exceptional dimensions of the mass. Subsequent judicial investigations clarified that the deceased had never been tested for this disease, probably for fear that the appropriate therapies might harm her

pregnancy. This exceptional rare case allowed us to observe the natural evolution of an untreated NHL that progressed to its extreme consequence and directly caused the death of a person.

P02-028 | *Forensic Pathology*

Traumatic Death in Elderly People: An Autopsy Study

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INTRODUCTION: Trauma affects people of all ages. In fact, the death rate from trauma is proportionally greater in the elderly. They are classified as those aged 65 years and more and they constitute a large and growing segment of our population. Trauma in the elderly poses special challenges. It is the fifth leading cause of death in patients over the age of 65. Physiologic changes impact morbidity and mortality. Geriatric patients often have disappointing outcomes. This retrospective study was undertaken to draw up an epidemiological profile of traumatic deaths in elderly subjects in Tunisia, to examine the factors associated with death in the traumatized elderly and derive predictors of fatal outcome.

METHODOLOGY: This was a 4-year retrospective study (January 1, 2019 to December 31, 2022) of fatal trauma in elderly subjects (> 65 years) autopsied or observed in the Forensic Medicine Department of Charles Nicolle Hospital in Tunis.

RESULTS: During the study period, there were 377 cases of traumatic death in elderly (> 65 years) autopsied or observed. Our trauma victims were predominantly male (75,3%). The age of the victims has an average of 75,8 ± 7,5 for both sexes. Traffic accidents are the leading cause of death from injury, representing 64,7%. Pedestrians are more likely to be involved in traffic accident with a rate of 52,2%. They tend to have accidents during daylight hours and close to home. Falls in the elderly usually occur on a level surface, approximately in 34,2% of cases, classified as the second cause of traumatic death in elderly people. It has been estimated that 63,4% of falls are caused by domestic accidents. Traumatic death occurs in 42,3% of cases on winter (December, January, February). The overall mortality from either the acute or delayed complications of trauma is nearly 27,4%. Complications are common to all trauma patients. Pulmonary complications are always the most frequent (58,8%). Immediate death post-trauma happens with a rate of 72,6%. The most prevalent cause of death related to trauma is severe head trauma, found in 79,2% of cases. Chest trauma is the second most prevalent cause of death (41,5%).

CONCLUSION: The elderly experience more complications; longer hospital stays and poorer outcomes than their younger counterparts. Further, they cannot respond to injury in the same way as young adults because of their diminished reserves. Each patient must be assessed meticulously, due to the changes associated with ageing.
At present, literature specifically related to elderly trauma is limited for health-care professionals; hence, further research into trauma in the elderly is required.

P02-029 | *Forensic Pathology*

WITHDRAWN

P02-030 | *Forensic Pathology*

Lethal Aspiration Cases in Csongrád-Csanád County, Hungary between 2018 and 2023

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Asphyxiation through aspiration is a fairly common cause of death. Determining the manner of death in such cases is a regular dilemma of the forensic experts. On one hand, the death can be considered as unnatural due to the accidental nature of the asphyxiation. On the other hand, there is an argument that the death can be considered as natural if the deceased had any underlying diseases (dementia, stroke, esophageal cancer, mental retardation due to perinatal hypoxia, etc.) that can cause aspiration.

In the Department of Forensic Medicine University of Szeged through retrospective data gathering between January of 2018 and December of 2023 we analysed cases where the cause of death was determined to be asphyxiation caused by aspiration in Csongrád-Csanád County, Hungary. Data were collected on the demographics, cause of death, underlying diseases, toxicology and the different risk factors in each case.

Our results show that more than two-third of the cases occurred in the elder population where the prevalence of the risk factors is more common. The other third of the cases occurred in accidental manner, small children or in young adults with severe underlying conditions.

Our aim is to discuss different factors that can help medical examiners/pathologists to determine whether the death is natural or unnatural.

P02-031 | *Forensic Pathology*

Macroscopic and Microscopic Findings from Autopsy in 41 Patients with COVID-19: Our Experience from Epirus and Thessaloniki

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AIM: The purpose of the present study is to describe the macroscopic and microscopic pathological findings in organs of patients who died from Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) or COVID-19 (according to World Health Organization).

MATERIALS AND METHODS: We examined 41 patients who were hospitalized for COVID-19 and died between the period 2020-2023. In accordance with guidelines personal protective equipment utilized by autopsy personal, the autopsies were performed with minor modifications to standard procedures. Tissue sections of the organs were placed in 10% neutral-buffered-formalin and allowed to fix for 5 to 10 days prior to histologic sampling. Hematoxylin-eosin staining was performed.

RESULTS: SARS-Cov-2 infection was confirmed postmortem by RT-PCR (Reverse Transcription Polymerase Chain Reaction) assay obtained from nasopharyngeal swabs and was positive an all the cases (100%). There were 20 cases from Thessaloniki and 21 cases from Epirus. Of these 27 (65.85%) were male and 14 (34.15%) were female, aged between 30-88 years (mean 59). The predominant clinical presentation is fever, cough, dyspnea, and myalgia. Thirty-six (87.80%) have comorbidity disease (diabetes mellitus type II, hypertension, coronary disease, myocardiopathy, lung cancer, brain tumor).
Macroscopic examination: Lungs: edema, congestion, at cut surface consolidation of lobes, red congested areas, embolism. Brain: petechial hemorrhage, punctate subarachnoid hemorrhage, infarcts, microinfarcts, edema. Heart: increased size and weight, hypertrophy. The myocardium appeared pale and flabby, myocardial ischemia. Liver: congestion, steatosis. Spleen: congestion. Kidneys: congestion.
Microscopic findings: Lungs: parenchymal multifocal damage with intra-alveolar exudative and proliferative inflammation with fibrine, hyaline membranes., organizing pneumonia with fibrosis and type II pneumocyte hyperplasia, vascular thrombi, inflammatory cells (granulocytes, macrophages, T-lymphocytes), superimposed bacterial bronchopneumonia. Brain: infarcts, focal ischemic necrosis, focal microhemorrhage, intravascular microthrombi. Heart: hypertrophy of myocytes, ischemia, myocarditis. Kidneys: microthrombi. Spleen: congestion, necrosis.

CONCLUSIONS: Our pathological findings of 41 autopsies from patients with COVID-19 infection, shows a multisystemic pathology, while the lungs findings are most significant of the other organs. Among the microscopic findings the most significant are diffuse alveolar damage, thrombotic microangiopathy, pneumonia and bronchopneumonia. However, widespread microangiopathy was observed in brain, heart, kidneys. Once again, the postmortem examination remains the gold standard for determine the cause of death.

P02-032 | *Forensic Pathology*

Firearm Fatalities: An 8-Year Study from the Eastern Region of Attica, Greece

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According to data provided by the Hellenic Police (relevant years 2016-2022), approximately 80 homicides per year occurred in Greece, with approximately half of them occurring it the Attica Metropolitan Region (AMR). Furthermore, from 2020 to 2022, 469 persons had committed suicide annually, 393 of which in the AMR (325 males and 68 females). Gunshot injuries was the second most frequent method of suicidal deaths during the period.

From 1st January 2016 to 31st December 2023, some 111 firearm fatalities were investigated in the Department of Forensic Medicine and Toxicology of National and Kapodistrian University of Athens. Our Department's jurisdiction covers the Eastern region of Attica, with almost one third of the population in AMR, and more than one tenth of the population in Greece. 76 of these fatalities concerned suicides (68.47%), and 35 homicides (31.53%).

Most victims were males (suicides: 97.37%, homicides: 85.71%). Only two women had chosen this method to commit suicide, compared to five homicides. Homicide victims were younger (mean: 41.9 years, range: 4-84 years), compared to suicide victims (mean: 64.1 years, range: 21-94 years). In suicides, most victims were Greeks (96.05%), in contrary to homicides, in which a notable 34.29% were foreigners. Most of the victims had committed suicide in their residence (71.05%), while homicides had occurred either in public places (42.86%), or inside victim's car (40.00%). Homicide perpetrators were relatives or acquaintances of victims in less than a quarter of the cases (22.86%).

Suicide victims used more frequently shotguns (71.05%), and small arms (pistols or revolvers) (25.00%). In three cases, usage of a rifle, an airgun, and a home-made gun was recorded. On the contrary, the most common firearms in homicides were small arms (51.43%), followed by rifles (37.14%), and shotguns (17.14%).

In less than one third of the suicide cases, the victim was previously diagnosed with a psychiatric disease (27.63%), a malignancy, a degenerative neurologic disease, or major cardiovascular diseases (28.95%). Only 17.11% of these victims had written a suicidal note, and solely 5.26% had attempted suicide in the past, using another method.

Most common anatomical region of gunshot wounds in suicides was the head/neck (84.21%), followed by the anterior surface of the trunk (14.47%). Concerning the entrance wound at the head/neck, victims had placed the gun at the anterior cervical region (30.26%), the temporal regions (25.00%), inside the oral cavity (22.37%), or the frontal region (6.58%).

Prescribed psychoactive drugs were more frequently detected in suicides (19.74%, compared to 8.57% in homicides), while alcohol and illegal substances were more commonly detected in homicides (25.71% and 11.43%, compared to 18.42% and 5.26%, respectively).

P02-033 | *Forensic Pathology*

Misuse of Performance-Enhancing Substances: A Case Report – Part 2: Forensic Pathology

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Anabolic androgenic steroids (AAS), misused to enhance athletic performance, have many side effects including cardiovascular toxicity, hypertension, and male infertility.

We describe a case of a 53-year-old male, non-professional weightlifter, chronic abuser of AAS, found dead in his car, just after a gym session. Autopsy showed no external lesions. Toxicological analysis on blood detected methylprednisolone (19 ng/ml), methandrostenolone (27 ng/ml), and sibutramine (29 ng/ml). Body hair analysis tested positive for sibutramine (80 pg/mg) and methandrostenolone (1.28 ng/mg).

Coronal slicing of the brain, in the right anterior frontal region, revealed an irregular hyperemic area of 2.5 x 2 x 1 cm, surrounded by a yellowish rim, and in continuity with the lateral ventricle, which contained hemorrhagic material. The heart weighed 560 g and in the left coronary, common trunk, a non-occluding atherosclerotic plaque (< 20% of the lumen) was observed. Histologically, in the brain, a small artero-venous malformation (MAV) was found in the subarachnoid space. In the adjacent cerebral cortex, close to the MAV, small arteries showed abnormal thickening of the wall, and the Alcian Blue stain showed myxoid degeneration in the intima and the media. This modification appeared similar to the intimomedial mucoid arterial degeneration (IMAD). The heart presented widespread fibrosis in all ventricles. In both testes, spermatogenesis was almost absent.

The effects of AAS on the vascular circulation include vasoconstriction and increased permeability of the hematoencephalic barrier. In addition, AAS are known to induce systemic hypertension. Anomalous vascular remodelling is also reported, although still debated. In our case, the MAV was high likely congenital, but the long-term assumption of methandrostenolone might have enhanced the combined effect of vascular vasoconstriction and systemic hypertension leading to its parenchymal rupture and further intraventricular hemorrhage. Even sibutramine can have a hypertensive effect, and in our case, the intracranial haemorrhage might have been the result of the synergic effect of the two substances, added to the recent intense physical effort in the gym.

P02-034 | *Forensic Pathology*

Deaths due to Intentional and Unintentional Drowning in Catalonia, Spain, 2019-2023

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INTRODUCTION: It is estimated that at least 372,000 fatal drownings occur each year worldwide, although it is known that there is an underestimation of the actual number of fatal and non-fatal drownings because mortality statistics do not usually reflect intentional drownings (suicides and homicides), those derived from natural disasters or those related to transportation. Access to forensic sources increases the quality of drowning mortality statistics, corrects underreporting and provides valuable information on other aspects such as sociodemographic variables.

OBJECTIVE: The objective of this work was to compare the main characteristics of intentional and unintentional drownings registered by the Institute of Legal Medicine and Forensic Sciences of Catalonia (IMLCFC) between 2019 and 2023.

METHODS: Retrospective observational study based on the IMLCFC registry of judicial deaths. The medical-legal etiology, aquatic environment, age, sex and date of death were analyzed.

RESULTS: The IMLCFC recorded 399 fatal drownings due to submersion during the 5 years studied (an annual mean of 80 cases), 335 (84.0%) unintentional or of undetermined intention and 64 (16.0%) intentional (60 suicides, 4 homicides). The highest annual number of drownings was recorded in 2023 (89 deaths, 21.9% intentional) and the lowest in 2021 (68 deaths, 17.2% intentional).
Compared with unintentional drownings or drownings of undetermined intention, intentional drownings had a higher mean age (63 years vs. 56 years), included a higher percentage of women (40.6% vs. 21.8%, p<0.005), and Spanish nationals (90.6% vs 59.4%, p<0.001). Among unintentional drownings or those of undetermined intention, those under 30 years of age represented 17.7% of cases compared to 7.8% among intentional drownings; while the percentage of people aged 75 years and older reached 27.8% in the first group and 40.6% in the second. Furthermore, among intentional drownings, higher percentages of deaths were observed from Monday to Friday (75.0% vs 68.4%, n.s.) and in the October-May period (48.4% vs 34.3%, p<0.05).

DISCUSSION: Compared to other fatal drownings, intentional drownings affect a greater proportion of women, people with Spanish nationality and people over 74 years of age and are somewhat less frequent during weekends and in the hottest months of the year.
These results are in accordance with different international studies in which it has been observed that fatal suicides due to drowning by submersion represent 2.05% to 8.61% of suicide mortality, and that they are associated with variables such as gender, age and substance use.

P02-035 | *Forensic Pathology*

Death of Foreign Nationals in Greece from 2021 to 2023. Our Experience with 341 Cases

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Greece is a popular destination for foreigners, both immigrants and tourists. Immigrants have been shown to experience lower mortality ("healthy migrant effect"); however, they are more likely to cope with challenging socio-economic conditions and thus they face excessive "avoidable" mortality especially from external causes. On the other hand, cardiovascular disease is the leading cause of death among tourists.
Aim of this study was to investigate characteristics of deceased foreigners who underwent autopsy. Cases examined during 2021-2023, by the Department of Forensic Medicine and Toxicology of the National and Kapodistrian University of Athens were included in our study sample. Countries of origin were ranked according to the Gross National Income per capita, based on the classification of United Nations and subsequent analysis was performed among the groups.
341 cases were included in our study, 245 (71.8%) male and 96 (28.2%) female. Mean age was 51.9 year, while 21 cases (6.2%) were underage. A contact person was available in only 129 (37.8%) cases. Regarding the status of residence, 255 (74.8%) resided permanently in Greece, 23 (6.7%) resided abroad, 29 (8.5%) were victims of a mass casualty incident (shipwreck) in the process of immigration and residence status was unknown in 34 (10%) of cases.
Manner of death was identified as homicide in 12 (3.5%) , as suicide in 13 (3.8%), as accident in 95 (27.9%), as natural in 144 (42.2%) and was undetermined in 12 (3.5%) cases. Overall, 120 (35.2%) cases were victims of a violent death. In 7 cases (2.1%) death was work related.
100 (29.3%) cases originated from an upper income country, 107 (31.4%) from an upper middle-income country, 102 (29.9%) from a lower middle-income country, and 15 (4.4%) from a lower income country, while country of origin was unknown in 17 (5%) cases. The most represented country in our study was Albania (17.6%).
The economic status of the country of origin appears to play a significant role on the age of death. Significant differences in the distribution of violent death among the groups were noted. Individuals from lower income countries appear more prone to die earlier (mean age 35.4 ± 20.15 years) and in 12 out of 15 cases (80%) they suffered a violent death. On the other hand, tourists tend to die more often from natural causes (69.6%).
In conclusion, it appears that our results are consistent with available literature as most foreign nationals who visit Greece (e.g. for vacation purposes) appear to die of natural causes and as low economic status of the country of origin for those who permanently live in Greece heavily impacts their life expectancy and their manner of death.

P02-036 | *Forensic Pathology*

Clinical Diagnoses vs Autopsy Findings in Intensive Care Unit Patient: A 10-Year-Study

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INTRODUCTION: Autopsy is an important quality assurance indicator and a tool to advance medical knowledge. The literature holds several studies comparing the accuracy of clinical diagnosis over the years and despite all the progress and new diagnostic resources available, errors in diagnosis still occur. The main purpose of this study is to compare the premortem clinical diagnoses and postmortem pathology findings in patients who died in the Intensive Care Unit and to analyze if there are discrepancies between them.

METHODS: We conducted a retrospective study carried out jointly at the Forensic Medicine and Intensive Care Unit of Ibn El Jazzar University Hospital, Kairouan, including all patients who died in the intensive care setting and whose bodies underwent a forensic autopsy from January 1st, 2009, to December 31st, 2018.

RESULTS: We collected 85 deceased patients. The mean age was 39.3 years, with extremes ranging from 1.5 to 81 years, and the sex ratio was 3.2. The autopsy rate among patients who died in the intensive care unit varied widely over the years, with extremes ranging from 12.18% (n=24) in 2013 to 0.79% (n=2) in 2018. Over the entire sample, good concordance was found, with a kappa test equal to 0.85. Pre-autopsy and autopsy diagnoses were concordant by anatomical system/region in 74 cases. The highest concordance was observed for general origin (p=0.65) and cerebral origin (p=0.58). According to etiology, pre-autopsy and autopsy diagnoses concurred in 76 cases, with the strongest matches for infectious etiologies (p=0.69) and hemorrhagic causes (p=0.61).

CONCLUSION: The autopsy still deserves a place among the diagnostic tools of modern medicine. Its future depends on informing the medical profession about its interests, limitations, indications, and procedures.

P02-037 | *Forensic Pathology*

Overview of Takotsubo Cardiomyopathy and Trigger Factors: About Two Autopsy Cases

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INTRODUCTION: Takotsubo cardiomyopathy is brought on by an extremely stressful physical or emotional event. Common triggers can

include the death of a loved one, a serious accident, a fierce argument, an unexpected loss, or a sudden illness. We report two cases of Takotsubo heart disease discovered antemortem that was confirmed postmortem.

CASE 1: The case involves a 43-year-old man with no history of cardiac disease, transferred to the Emergency Department after a loss of consciousness. The CT scan revealed a subarachnoid hemorrhage of an average abundance. The patient developed after stabilization chest pain followed by syncope, with a diffuse planning R wave and flattening T wave upon the electrocardiogram. The troponin I was raised at 3.45 µg/l. The diagnosis of Takotsubo was suspected. The patient passed away 2 weeks later, due to sudden neurological complications. The autopsy revealed cerebral edema and subarachnoid and intraventricular hemorrhage, with no signs of necrosis in the myocardium histology. The death was concluded as the consequence of subarachnoid hemorrhage complicating Takotsubo syndrome (TS).

CASE 2: The case involves a 32-year-old woman, 32 weeks pregnant, with no cardiac pathological history. The patient consulted the emergency for chest pain, associated with syncope and nausea. The anamnesis revealed the death of her relative because of a traffic accident one hour before the onset of symptoms. The electrocardiogram showed a minimal rise of the ST segment with a Q wave, a negative deep and not systematized T wave, and a lengthening of the QT segment. A rise of the troponin I and CPK were also noticed. The diagnosis of TS was retained. The patient died shortly after her admission. The cause of death was retained as an acute heart failure.

CONCLUSION: At autopsy, the diagnosis of TS is often difficult to establish, given its lack of distinctive macroscopic or microscopic findings. There are several anamnestic arguments, particularly antemortem, to support the diagnosis, including “physical” triggers factor and “emotional” triggers.

P02-038 | *Forensic Pathology*

Sudden Death due to Spontaneous Ruptured Splenic Artery Aneurysm in Pregnancy: About Two Autopsy Cases

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INTRODUCTION: Splenic artery aneurysms recognized during pregnancy, even asymptomatic, constitute a serious threat to the survival of the mother and fetus. They can be immediately fatal and diagnosed during autopsies.

Objective: We report three fatal cases of ruptured splenic artery aneurysm occurring in young pregnant women.

CASE REPORT:

Case 1: A 28-year-old woman, 28 weeks pregnant, presented to the emergency room with severe acute abdominal pain. She was in the last week of her third trimester. An obstetric emergency was ruled out and the patient was sent home. A few minutes later, the patient suffered a cardiopulmonary arrest followed by death.

Case 2: A 31-year-old woman, 26 weeks pregnant was found deceased in her bed in the morning.

Forensic autopsies were requested in both cases. the diagnosis of shock due to internal bleeding was made. Histological examination confirmed the splenic artery aneurysm in both cases.

CONCLUSION: Splenic artery ruptures were probably linked to vascular changes caused by pregnancy. The factors that appear to be the most likely causes of these structural changes are the hemodynamic and hormonal alterations of pregnancy. These hemodynamic stresses and hormonal changes peak during the third trimester.

The diagnosis of rupture of the splenic artery must be considered in any pregnant woman in the third trimester who presents to the emergency room with abdominal pain.

P02-039 | *Forensic Pathology*

Discordance between Clinical and Autopsy in Medical Intensive Care Patients: Fifteen-Year Outcomes at a Tertiary Hospital in Tunisia

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INTRODUCTION: Autopsy is a decisive tool to confirm or infirm the clinical diagnosis and to clarify the real etiology of death.

AIM: To study the typology of patients autopsied in a medical intensive care unit and to specify the rate of discordance between the pre- and post-diagnosis.

Methods: Retrospective study including deaths that occurred in the medical intensive care unit of the Farhat Hached University Hospital of Sousse between January 2008 and December 2022 and were the subject of a forensic autopsy. Data were collected from the patients' medical records and the final autopsy reports. The anatomopathological discordance was classified according to Goldman classification.

RESULTS: A total of 36 autopsies were included. The rate of death in intensive care unit was 19.1%. However, the autopsy rate was low at only 3.5% in 15 years with a decrease of more than 60%. The cause of death was determined by postmortem examination in 25% (n=9) of cases. Comparison
of autopsy findings with initial diagnoses revealed a discordance rate of 27.7% (n=10) and a diagnostic error rate of approximately 9%.
Autopsy discordance was mainly in neurological, vascular, digestive, and infectious pathologies. Regarding discrepancies, in eight cases they belonged to Goldman's Class, in one case to Class II and in one case to class III.

CONCLUSIONS: This study highlights the place of autopsy in assessing quality of care, detecting unexpected diagnose and raise awareness

P02-040 | *Forensic Pathology*

Fatal Falls from Height: Study of 141 Medicolegal Autopsy Cases in Sousse (Tunisia)

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INTRODUCTION: Falls from great heights constitute a violent trauma that can lead to death. This represents a suspicious death, leading to initiate legal proceedings with in particular the practice of an autopsy.

AIMS: To determine the features of victims of falls from height and relations between medico-legal form of the death, the height of the fall and the nature of traumatic injuries.

METHODS: A retrospective study about 141 cases of death after fall from great height. Data were collected at the Legal Medicine Department of the Farhat Hached University Hospital in Sousse (Tunisia) over a period of 14 years from 2007 to 2020.

RESULTS: The average age of the victims was 37±12.8 years with a sex ratio of 6.05. Half of them were day laborers. The majority had no history of psychiatric illness (91.5%). The majority of victims (41.8%) fell from a height of 3 to 6 meters. Regarding injuries, rib fractures (52.4) were predominant, especially on the right side followed by skull fractures (31.2%). A significant difference in the prevalence of rib cage lesions in the groups over 9 meters in height ($p<0.05$) was found. The lesions of the lower limbs were proportional to the increase in the height of the fall. Deaths were accidental in 80.8% and suicides in 13.5%.

CONCLUSION: In cases of high falls, a forensic autopsy is essential to make a complete evaluation of the injuries, to search a correlation between severity of injuries and height of the fall and finally to orientate towards the medico legal form of the fall.

P02-041 | *Forensic Pathology*

Multiple Head Gunshot Wounds in a Woman – Can We Rely on a Suicidal Manner of Death?

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INTRODUCTION: Suicide cases involving multiple gunshot wounds are an intriguing and complex phenomenon, with an incidence up to 5%, notably higher in males. Whether confined to a single area or distributed across different regions of the body (head and chest, mainly; neck and abdomen, less frequently), they often represent a challenging task for the Forensic Pathologist. The least common cases are the ones with multiple gunshots confined exclusively to the head. The plurality of injuries can be due to a spectrum of contributing factors such as anatomical misjudgments, flinching during the act, issues with ammunition or missing a vital organ. When talking specifically about the head, the ability to act after a gunshot can be due to the thickness of the cranial bones, the nature of the weapon (low fire power gun) and others like not reaching critical areas of the brain. The differential diagnosis between suicide and homicide is still a major forensic concern.

CASE REPORT: 36-year-old woman, facing undisclosed financial struggles. Despite no known history of suicidal ideation or attempts, she sends a message to her husband announcing her intent to commit suicide. She was found dead, in her house, with a 6.35mm revolver without brand or serial number, as well as a suicide letter next to her. Radiological examination revealed four firearm projectiles in her head, one in intracranial topography and three in extracranial topography. Forensic autopsy indicated no defensive injuries and the presence of four gunshot wounds in right temporal and parietal regions, compatible with gunshots from a revolver. During internal examination we found: many fractures of the skull and its base; penetration channel inside the brain, with tissue destruction and foci of contusion, starting in the right temporal lobe and ending in the left temporal lobe, where a metallic fragment was lodged, compatible with a deformed firearm projectile. Toxicological examination was negative for ethanol, drugs of abuse and medicinal substances. Collaboration with police forces, that performed the crime scene investigation, allowed us to understand that the weapon involved was a low fire power gun. It was concluded that the death was due to the traumatic cranio-meningo-encephalic injuries, compatible with penetrating wounds from the action of revolver firearm projectiles. This was classified as a violent death, with a suicidal manner of death.

CONCLUSIONS: This is a rare type of case – in addition to the injuries being confined to a single area (head), this was a female victim. This case report emphasizes the importance of the medico-legal autopsy, with an accurate postmortem documentation of the lesions. The correct interpretation of the manner of death can only be reached with a complete investigation, aggregating all the above mentioned, the complementary diagnostic tests and the available circumstantial data.

P02-042 | *Forensic Pathology*

Sudden Cardiac Death in Women: A Retrospective Study of 468 Cases

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Sudden cardiac death is considered to be the most common etiology of sudden death. It represents a major public health issue, affecting a heterogeneous population and occurring in a variety of circumstances.

The objectives of our work were to study the epidemiological profile and etiologies of sudden cardiac death in women, to describe their autopsy findings, and to compare these findings with the male profile.

We conducted a seven-year retrospective study at the Forensic Medicine Department of Charles Nicolle Hospital in Tunis, between January 2010 and December 2019, including all cases of sudden cardiac death in women whose autopsies were performed in our department.

We collected 468 cases of sudden cardiac death representing 20.3% of the total number of sudden deaths recorded during the study period. The average age was 57 years with a predominance of urban married women. These deaths occurred in the winter season in 30% of cases, during the weekend in 30.6% of cases with a morning peak. Atypical cardiac symptomatology characterized the female population in the majority of cases. The etiologies were dominated by ischemic pathology (42.3%), followed by hypertrophic heart disease (17.9%) and a dilated heart disease in 11.2%. The most frequent risk factors were smoking (90%) and high blood pressure (39.7%) followed by diabetes (28%). At autopsy, the left anterior descending coronary artery was the most affected vessel by atheroma (43%), especially in its proximal proportion. Recent myocardial necrosis was found in two-thirds of the cases, most often in the left ventricle free wall. Myocardial bridges and myocardial ruptures were rare, representing respectively 3.3% and 2.9% of cases.

Women are usually well known to be more protected than men in cardiac pathology, but their sudden death rate is still high and requires special attention, where the autopsy is not only the first and only opportunity to establish the cause but also the cornerstone of preventive action.

KEYWORDS: cardiac sudden death, autopsy, risk factors, etiologies, prevention.

P02-043 | *Forensic Pathology*

Findings in an Unusual Case of Suicide by Hanging: A Challenging Case Report

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INTRODUCTION: Hanging constitutes a form of violent asphyxial death, involving the passive suspension of a body by a ligature around the neck, secured to a fixed point, leading to compression of the neck. The pressure exerted on the neck results from the weight of the body. The lethal outcome may be influenced by various mechanisms, either individually or in combination, depending on the specific circumstances of each case. We aim to present the circumstances surrounding an unusual case of death by cervical compression and to explore various findings contributing to the diagnosis of the nature of the compression and the manner of death.

CASE PRESENTATION: A 59-year-old man, under psychiatric supervision and struggling with suicidal thoughts, was found lying face down on the roof of his residence. A rope, tightly stretched and knotted at one end, was fastened around his neck, and secured to the support of a satellite dish. External examination revealed an oblique furrow, running from posterior to anterior, bottom to top, and left to right, with increased depth and prominence on the right posterior side, forming a posterior loop. Autopsy findings indicated an asphyxial syndrome, multi-visceral congestion, hemorrhagic suffusion on the left thyrohyoid muscle and submandibular gland, and a hyoid bone fracture. Additionally, a fracture line on the anterior wall of the 4th cervical vertebra was observed, with no associated spinal cord injury. Toxicological analysis revealed the presence of alcohol in both blood (1.9 g/dL) and urine (1g/L). Histological examination confirmed hemorrhagic suffusion on the surface of the 4th cervical vertebra. The cause of death was attributed to

mechanical asphyxiation by hanging. Initially treated as a homicide, the case underwent differential diagnosis with consideration for suicide.

CONCLUSION: Despite the seemingly straightforward nature of a hanging-related death diagnosis, inherent challenges exist. A meticulous examination of the scene and a thorough post-mortem assessment, encompassing autopsy, histopathology, and toxicology findings, not only ruled out third-party involvement but also supported the hypothesis of an unusual case of suicide by hanging.

P02-044 | *Forensic Pathology*

Aortic Aneurysm: Is There a Post-Mortem Criteria?

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In cardiology and vascular surgery, there are fairly well-established parameters for defining the limits of normality of aortic dimensions and, above all, the limits for indicating when an aorta is defined as aneurysmatic and when it is indicated to proceed to surgery for its treatment.

But when, following an autopsy, we have to assess the correctness or otherwise of not indicating surgery in cases of ruptured aortic aneurysms, what is the correct circumference? Is the aortic circumference measured post-mortem the same as in life?

Analysis of our case history shows an important bias between the 'normal' values of the aorta in living people and the one we measured in the autopsy room.

This work will show the difficulty of arriving at certain, scientific post-mortem judgments, even when, in medicine, there are well-established parameters for living assessments.

P02-045 | *Forensic Pathology*

Cardiac Conduction System in Forensic Pathology: A Useful Ally in the Examination of the Heart

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Anomalies of the cardiac conduction system are responsible for 6-7% of sudden cardiac deaths, a percentage close to congenital coronary anomalies. Despite this, the cardiac conduction system is among the least investigated cardiac structures in forensic practice. In almost all autopsy reports, regardless of whether or not they concern cases of sudden cardiac death, it is not examined, and there are few articles on the subject in the forensic science literature. The reasons lie mainly in the difficulty of sampling, the high number of microscope slides to prepare, and the interpretation of the findings. Various reasons hinder a routine investigation. The first of the difficulties lies in the sampling, which must be carried out with precise landmarks, therefore it requires both particular expertise and more time. Sampling is also highly destructive, creating problems in preserving the anatomical integrity of the specimen. The second difficulty lies in histology because many strictly close sections are needed to identify such small structures within the heart walls. This high number increases both the costs and the time required to complete the autopsy report. Furthermore, the interpretation of the histopathologic findings is more dubious in the literature compared to other causes of death, and their signs often do not correlate with the abnormalities described for the conduction system, which is why it is not justifiable for further investigation. So, these signs remain tied to a diagnosis of exclusion. From a forensic pathology point of view, the presence of disruptions or pathologic abnormalities of the conduction system is a potential cause of death. In this sense, the study of the conduction system would be necessary in cases of professional responsibility in cardiac surgery interventions, especially in the implantation of prosthetic valves, which can create anatomical discontinuity of the conduction system within the septum.

Another example comes from cases in which death due to commotio or contusio cordis is suspected. Looking for signs of hemorrhage of the sub-aortic septum near the AV node and the bundle of His would better characterize these entities. In chronic drug abuse, abnormalities in small vessels (e.g. atrioventricular node artery) from intimal thickening and fibromuscular dysplasia, fat or fibrous cell nests, and inflammatory infiltration have been described too .Regarding sudden cardiac death, highly probable causes of death are AV node cystic tumor, Purkinje cell hamartoma, and sarcoidosis of the atrioventricular node. Discussed is the fibrosis of the right and left branches. The objective of this study is to describe the most relevant forensic aspects obtained from the study of this cardiac structure. We will then analyze the issues that prevent conduction system investigation from gaining traction in the forensic pathology community and being routinely performed in cases of sudden cardiac death, reviewing proposals for simplified sampling methods to facilitate routine application.

P02-046 | *Forensic Pathology*

A Comparative Study of the Injury Pattern Between Suicidal and Accidental Falls from Height in Northern Tunisia

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BACKGROUND: Falls from height are a common cause of morbidity and mortality. The aim of this study is to examine the characteristics of the victims, the circumstances of the fall and distribution of the injuries of accidental and suicidal falls from height.

MATERIALS AND METHODS: It was a retrospective cross-sectional study, based on autopsies performed over 16 years (January 2005 to December 2020). The recorded variables included demographic data of the victim, height of fall, death scene findings, length of hospital stay, autopsy findings, and toxicological results.

RESULTS: Of the 753 victims of fall from height, 607 were fallers and 146 were jumpers. We found that male victims were predominant in the accidental group (86.8% vs. 69.2%). The mean age at death was 43.6 ± 17.9 years. Suicidal falls occurred in a private house in the majority of cases (70.5%), while accidental falls occurred most frequently at workplace (43.8%). Suicidal falls were higher than accidental falls (10.4 ± 7.3m vs. 7.1 ± 5.7m). Injuries in the thorax, abdomen, pelvis, upper and lower extremities were more frequent in the suicidal falls group. Pelvic fractures were 2.1 times more likely to occur in the suicidal falls. Head injuries were more frequent in the accidental falls group. The survival delay was shorter in the suicidal falls group.

CONCLUSIONS: Our study highlights the differences in the profile of the victims and in the pattern of injuries caused by falls from height, depending on the victim's intention to fall.

P02-047 | *Forensic Pathology*

Domestic Accidental Death Among Children: A Twelve-Year Survey in the North of Tunisia (2011-2022)

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Although home is considered as the safest place for children, domestic accidents are frequent, sometimes leading to death. To prevent these incidents, a better knowledge of domestic accidental deaths' characteristics is helpful. The objective of this work was to analyze the

profile of victims and the circumstances of fatal domestic accidents among children and adolescents in the north of Tunisia.

We conducted a retrospective descriptive study over a period of 12 years (2011–2022) at the Department of Forensic Medicine of Charles Nicole Hospital in Tunis, Tunisia. All cases of domestic accidental deaths involving victims aged between 0 and 18 years old were collected.

Overall, there were 254 cases of domestic accidents deaths among children. The mean age of the victims was 5 years old (with extremes ranging between 0 and 18 years old). More than the half were boys (sex ratio = 1.46). When data about the rank in the family were available, we noticed that victims were the youngest (n = 71; 62.8%). Most of domestic accidents happened on Thursday and Saturday (respectively, n = 42; 17%; and n = 43; 17.4%), with the evening being the most likely time when these incidents occur (n = 62; 24.4%). Bedrooms and gardens were the principal places where the fatal accident took place (respectively, n = 69, 27.2%, and n = 62, 24.4%). 49.6% of children were playing when the domestic accident happened (n = 126). Concerning circumstances of death, the latter was declared immediately or within 24 hours of the accident in 84.6% of cases (n = 215) at home (n = 155; 61%). Mechanisms of death were multiple, with burns and falling from heights being the main circumstances of the fatal domestic accidents (respectively, n = 45; 20%; and n = 37; 16.4%).

In conclusion, this work highlights the characteristics of domestic accidental deaths among children. Often preventable, domestic threats should be cut to their minimum to enhance child safety.

KEYWORDS: domestic accident, children, death, north of Tunisia

P02-048 | *Forensic Pathology*

The Role of TSH, T3 and T4 on Post Mortem Interval Estimation in Different Death in Murine Subjects

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Post Mortem Interval estimation is one of the most important procedures in forensic field, an element that can be crucial to resolves medico-legal controversies, yet it remains one of the most difficult challenges for the pathologist, due to the high number variables implicated in the post mortem modification of the cadaver. In the past years, lots of efforts have been put in the research of a valid and reliable method and several chemical, biochemical and humoral markers have been tested, although none have proven to be so accurate and consistent in the results to meet the scientific criterions required in the courtroom.

In this wide, a great attention has been given to the biochemical changes of the endocrine system and their possibility to be used in PMI estimation. In particular, promising preliminary results came from the study of thyroidal hormones, although the results have been discordant to the date.

In our study, to explore the afore mentioned biochemical changes of TSH, T4 and T3 in a more systematic way, a hundred of rats have been sacrificed, previous bioethical committee consent, with 4 different suppression methods: cervical dislocation, CO_2 asphyxia, Ketamine overdose and Sodium Pentothal overdose. Samples of cardiac and peripheral blood of murine models were taken at different times till 48 hours post mortem. After separation of serum, ELISA test was carried out to assess levels of aforementioned hormones.

The aim of the study was, in the first place, to evaluate how the levels of TSH, T4 and T3 vary at 8, 16, 24 and 48 hours from death and assess the trend of their concentration in samples; after that, with this data, to ascertain if there were differences in the trends of the previous mentioned curves in comparison with different death causes.

First interpretation of the data collected shows encouraging results. Particularly interesting are the trends in TSH concentrations, at least in the first 8 hours from death, that seems to be related with early post mortem changes in the cadaver.

P02-049 | *Forensic Pathology*

Latent Foreign Body Aspiration Pneumonia as a Cause of Death in Cocaine Users Recently Affected by COVID-19

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The term foreign body aspiration refers to the complete or partial obstruction of a segment of the respiratory tract (epiglottis, larynx, trachea, bronchi) by an external object. The inhalation of foreign bodies is a health problem that mainly affects the paediatric population and certain categories of adult subjects. Among the adult population, elderly persons are the group most affected by this phenomenon, due to various risk factors, including dysphagia, the use of sedative or hypnotic drugs, sensory alterations, neurological diseases with impaired swallowing and the supine position for a too long period. The same characteristics entail a high risk for foreign body aspiration among populations such as drug addicts or people with neurological diseases.

The clinical presentation includes acute manifestations, such as cough, pneumothorax, pneumomediastinum, dyspnoea and acute respiratory failure, that can lead to death in the most severe cases. In adults, foreign body aspiration can also present asymptomatically or with chronic clinical manifestations, such as pneumonia, atelectasis, recurrent cough and pyelopneumothorax; for this reason, it can be diagnosed too late for proper treatment.

We report on a case regarding the death of a 39-year-old male who presented a history of previous drugs abuse, bronchial asthma with a mild respiratory obstructive deficit and recurrent upper respiratory problems due to a latent foreign body aspiration pneumonia.

The peculiar feature of the case is the long permanence of the object in the subject's organism, with mild and non-specific symptoms that, unfortunately, seriously compromised the health of lung tissue. The identification of the foreign body occurred only following complications of the orotracheal intubation procedure, necessary for an elective scheduled surgery (endoscopic nasal surgery for correction of nasal septum deviation and turbinate hypertrophy). It should be noted that 19 days before the surgery, the patient had tested positive for a molecular swab for SARS-CoV-2 research, and he had tested negative only 12 days before the scheduled surgery.

These data play a fundamental role in the assessment of the profiles of professional responsibility connected to the case in question because the medical literature has shown that a recent infection with the SARS-CoV-2 virus, even if a mild or moderate, is a relative contraindication to performing elective surgery due to the increased risk of complications, such as post-operative pneumonia, respiratory failure, pulmonary embolism and sepsis. We also highlight the importance of foreign body aspiration pneumonia in forensic evaluation of the cause of death, especially in presence of drugs abuse history.

P02-050 | *Forensic Pathology*

Determining the Cause of Death of a Subject Following a Prolonged Postmortem Interval as Drowning or Lethal Inhibitory Reflex from Violent Causes

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INTRODUCTION: Diagnosing the cause of death in subjects recovered from an aquatic environment after a prolonged postmortem interval represents a challenge for forensic pathologists. We present the case of a 78-year-old man found dead after a prolonged stay in fresh water. The

cause of death was determined using a combination of virtual and forensic autopsies, toxicological and histological tests, and a search for diatoms.

MATERIAL AND METHODS: A witness witnessed a fight between the victim and two other individuals near a riverbank. The clash ended with the man's body falling into the water. The police immediately intervened and arrested the two individuals. Despite assiduous searches, the body was removed from the river 16 days later.
The forensic autopsy was preceded by a full-body CT examination. A toxicological study was also conducted to measure ethanol and drugs of abuse and to search for diatoms in the lung, kidney, liver and brain. Histological exams were also performed.

RESULTS: An external examination indicated signs of prolonged permanence of the body in the water, lacerated and bruised wounds, and bruises on the skull and trunk. Cutting highlighted a haemorrhagic infiltrate of the skull's soft tissues, multiple rib fractures associated with contusions of the lung parenchyma, haemorrhagic infiltrate at the level of the muscles of the posterior wall of the trunk, and testicular hematoma. The CT examination excluded further fractures. The histological examination documented oedema, pulmonary congestion and interalveolar haemorrhagic extravasation. The search for diatoms in the internal organs was negative. The blood alcohol dosage was 0.7 g/L.

DISCUSSION: Given the results, acute ethanol intoxication and major trauma were excluded as causes of death. An arrhythmic death was also excluded. Considering the absence of typical signs at the external and internal examination levels and the negative result of the diatom test, the hypothesis of drowning was also excluded. A careful study of the lesions of the corpse allowed us to conclude that cause of death was an inhibitory reflex mechanism. This phenomenon is due to the nervous activation caused by mechanical stimulation, even mild, of particularly sensitive areas (the eyeballs, carotid sinus, epigastrium, labyrinth, pleura and oesophagus) that activate the parasympathetic nervous system with consequent reduction in the frequency of heartbeat until cardiac arrest occurs. This mechanism can be traced to various elements identified in the case of interest: the reiteration of the blows suffered by the victim in the reflexogenic areas, the impact of the victim's upper abdominal region with the water of the river, the contact of the body with cold water or all the causes established to date.

P02-051 | *Forensic Pathology*

CO_2 Intoxication: An Underestimated Occupational Risk in Geothermal Areas

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Carbon dioxide (CO_2) is an odorless, colorless gas that naturally occurs in the Earth's atmosphere, where its concentration ranges from 0,03% to 0,06% (vol/vol) or 0,2 to 0,4 (mmHg). High concentrations of CO_2 can lead to respiratory depression till death. Few cases of deaths due to CO_2 intoxication are reported in literature. They are mainly related to occupational deaths in closed environments, suicidal or accidental inhalation of dry ice sublimation and/or volcanic gases.

Aim of the study is to report the toxicological and autopsy findings of an occupational death occurred in enclosed environment in a volcanic area of Southern Italy. A 42 years-old man was found dead while carrying out maintenance tasks on a subterranean technical chamber under a manhole without any protective equipment. A coworker reported that the victim began to feel unwell shortly after descending into the manhole and he fell quickly unconscious suffering of myoclonic seizures. Despite the efforts to retrieve the man, he could not be rescued. The recovery was made by a team of the fire department equipped with oxygen masks and respirators.

At autopsy, multiple abrasions of the upper limbs and trunk were consistent with the involuntary muscle contractions reported. Signs of asphyxia death were represented by subpleural hemorrhages, pulmonary emphysema and edema along with lacerations of the alveolar walls and congestion of the visceral organs.

Sampling of gases were made at the death scene and at the autopsy. Air samples collected from the manhole showed from the top to bottom respectively a progressive decrease of O_2 levels (from 175.600 to 3.500 ppmv) and a gradual increase of CO_2 levels (from 103.100 to 937.700 ppmv). Gas-tight syringes were used to collect gaseous samples from airways. Quantitative analyses were performed using a special gas-inlet system with a vacuum to transfer the sample to a mass spectrometer. The biological samples in the trachea showed a low level of O_2 43,2 mmHg (n.v. 90 -110) and a high concentration of CO_2 125.100 ppmv (n.v. 30.000-40.000). Toxicological analysis of peripheral blood showed high concentrations of CO_2 164 mmHg (n.v. 35-45), CO-Hb 20% (n.v. < 1,7) and Met-Hb 44% (n.v. <1,0). The cause of death was assessed as acute hypoxia due to CO_2 intoxication, allowing the correlation between toxicological and pathological results with the levels of asphyxiating gas, measured on the death scene.

Despite regulations defining minimum safety conditions for underground workers in confined space, employers and employees fail to implement safe procedures. Oxygen full-face masks and respirators along with devices to detect volcanic gas emission are needed to reduce fatalities. This is strongly true in geothermal areas where the release of volcanic gases such as CO_2 can go through underground environments.

P02-052 | *Forensic Pathology*

Injury Patterns in Victims of Light Aircraft Crashes: A Warning to Improve Safety and Regulation

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Plane crashes are statistically infrequent, decreased over the years. However, they remain prevalent, particularly in the case of "light aircraft", weighing less than 2250 Kg. This category is subject to limited regulation and oversight by national and international laws. In 2022 in USA, 1.205 light aircraft crashes in total occurred among which 214 resulted fatal with 339 victims. In Europe, in the same year, 83% of all plane crashes were caused by light aircrafts with 112 victims among which 14 Italians related to 17 casualties occurred in Italy. Aim of this study is to report the main findings at death scene and autopsy related to a light aircraft accident occurred in Southern Italy with two casualties (a male and a female). The aircraft was destroyed, especially at the pilot's seat, with the propeller deformed, and the seat belts still in place. The woman was found dead outside the vehicle's compartment. The man was still within the cabin and transported to the hospital, where he died few days after. At autopsy, the woman showed subdural hemorrhage in the right temporo-parietal region, bilateral rib fractures, and diffuse lacerations to abdominal organs. The male showed subdural and subarachnoid hemorrhages at the left occipital region, multiple left ribs and vertebral fractures along with lacerations and contusions of the lungs, multiple contusions of the lower limbs. He underwent surgery due to a post-traumatic pseudoaneurysm at the aortic isthmus. Severe polytrauma to the head and thorax was the leading cause of death in both victims. Pattern of victims' injuries are consistent with a fall from great heights. Skeletal fractures were the result of a direct/indirect application of forces to bones, occurred during a significant impact on the ground. The sudden deceleration of the internal organs and their impact against hard skeletal structures caused shear forces that resulted in injuries of the soft tissues including the brain, the thoracic/abdominal organs, and the aorta. Traumatic pseudoaneurysm is also the effect of an increase of intra-abdominal pressure, which is transmitted to the chest. Both victims were not wearing helmets and no head traction or other signs caused by helmet were reported. Not all helicopter accidents are properly investigated and, as in this case, the results are not available, but the injury patterns can be considered to improve safety of passengers. The use of helmets and seat belts are recommended; however, most aircraft

crashes are caused by engineering malfunctions. A specific regulation for light aircrafts should be enforced. Light aircraft are not subject to Flight Data Monitoring (better known as "black box"). While a black box is mandatory for larger airplanes, there are no such requirements for light aircrafts, and only few are equipped with these on a voluntary basis.

P02-053 | *Forensic Pathology*

Tumors Found at Autopsy: A 30-Year Experience of the Department of Legal Medicine of Teaching Hospital of Monastir-Tunisia

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INTRODUCTION: Autopsy is a useful tool to diagnose a tumor and its extension, and to establish the link between a pre-existing tumor and sudden death.

AIMS: The aim of this study is to analyze the cases of tumors found at autopsy, to describe the epidemiological characteristics and discuss the causes of death.

METHODOLOGY: It is a retrospective descriptive study performed in the Department of Forensic and Legal Medicine in the Teaching Hospital Fattouma Bourguiba of Monastir, during a period of 30 years (1992-2022).

RESULTS: Our study showed 43 autopsy cases where a tumor was found. This consists of 0,46 % of all autopsy cases performed in this period. Among these cases, 80% were male with a sex ratio= 4. The mean age was 55 years with a maximum of 91 years and a minimum of 2 months. Victims had a past history of a diagnosed tumor in only 32 % of cases, of whom 92% did not have any metastasis diagnosed. In 68% of cases, patients had no past history, especially of cancer. We found that in 51% of cases the death happened after a sudden fainting. Prodromes were mainly made of headache, vomiting, fever, chest main and cough. We found a pulmonary tumor in 32% of cases, and a cerebral tumor in 18% of cases. These tumors presented metastasis in 56% of cases, that were local in 50% of cases. The most frequent metastasis was hepatic (37%). The mechanism of death was attributed to a complication of the tumor in 86% of cases, while in 14% of cases it was due to another mechanism, which was cardiac pathology in 83% of cases.

CONCLUSION: While most of malignancies can be diagnosed antemortem, some of them may remain asymptomatic and cause sudden death. Moreover, an underlying previously diagnosed cancer should not be always considered as the only possible cause of death.

P02-054 | *Forensic Pathology*

The Time of Death in Dutch Court: Using the Daubert Criteria to Evaluate Methods to Estimate the PMI Used in Court

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INTRODUCTION: When a capital crime is committed the post-mortem interval (PMI) is of particular importance in investigating a suspect's alibi in court. A forensic expert can use different methods to estimate the PMI. This research focuses on who is considered an expert in court and whether the methods used to estimate the PMI are reliable. As part of this study, the methods that can be used to estimate the PMI in court were subjected to the Daubert criteria.

METHOD: Two studies were performed, one concerning the Dutch jurisprudence of criminal case law and one literature study. Within the Dutch databank 'rechtspraak.nl' criminal law cases were searched using the following term: 'Tijdstip van overlijden' (Time of death, TOD) for the years 2010-2019.
The literature study was conducted to investigate if the methods used in court meet the Daubert criteria and focused on the following methods: livor, rigor and algor mortis, the body-cooling simulation, electrical and mechanical stimulation of muscles, biomarkers (specifically potassium), decomposition and entomology. The found articles were reviewed to establish if one or more of the Daubert criteria were met.

RESULTS: Ninety-four judicial cases were included and multiple experts and methods of estimating the PMI were found. Nine methods were assessed according to the Daubert criteria. Of all the methods, only algor mortis and entomology meet all of the Daubert criteria and are both nationally and internationally accepted.

CONCLUSION: In this study an effort was made to make judges more aware of the limitations and implications of application of methods that are used to estimate the post-mortem interval for TOD determination. This study shows that not all of these methods meet all of the Daubert criteria. A method must meet all the Daubert criteria before it can be deemed scientifically reliable and only scientifically reliable methods should be permissible in court. There by, the methods are only useful when applied by the right forensic expert and in the right manner. Unfortunately, this was not always the case.

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P02-055 | *Forensic Pathology*

Incorporation of Forensic Sources into the Mortality Statistical Reporting Circuit in Spain: Data from 52,477 deaths (2021-2022 years)

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INTRODUCTION: Mortality is one of the most important health indicators and one of the parameters used in the design and evaluation of health policies. The death statistics according to cause of death kept by the Spanish National Institute of Statistics (INE) aim to establish the mortality trends associated with gender, age, and geographical area, as well as how these evolve over time. In Spain the deaths with forensic examiners intervention (DFI) include deaths due to external causes and sudden deaths and usually account for 5-7% of all deaths.
Is known that death statistics according to cause of death with forensic examiners intervention is improvable and the best information source is forensic source. With the aim of improving the quality of statistics on DFI, since 2020, all Institutes of Legal Medicine and Forensic Sciences (ILMFS) in Spain incorporate the information directly into the INE through a specifically designed web application (IML-Web).

OBJECTIVE: To describe the results of improving the circuit of information of DFI reported by the ILMFS in Spain to the INE in the years 2021-2022.

METHODS: The data have been obtained from the public space created by the Ministry of the Presidency, Justice and Relations with the Courts (https://datos.justicia.es/defunciones-con-intervencion-judicial) where the data are accessible once they have been submitted by the INE.

RESULTS: In the study period, 52.477 DFI were reported (24.968 in 2021 and 27.509 in 2022). This is 71.9 deaths per day, with a mean age of 61 years (SD 18.1). Of all deaths in Spain, 5.73% are DIF, although there are important differences by sex, as this percentage is much higher in men (8.21%) than in women (1.56%). There was an increase between the year 2021 (5.54%) and the year 2022 (5.92%), which was associated with the increase in general mortality.

In the DIF, almost 3 out of 4 corresponded to men (72.9% compared to 27.1%). A total of 85.7% were of Spanish nationality and 47.5% died at home. Natural death was the leading cause of death by DFI (55.8%), followed by accidental deaths (26.2%) and suicides (15.6%). There were 586 homicides (1.1% of all DFI). The ILMFS with the highest number of DFI investigated was the ILMSF of Catalonia (8812, 16.79%) and the lowest was the ILMFS of Melilla (64, 0.12%). There are important differences between the different regions of Spain in terms of percentage of DFI over overall mortality and percentage of deaths due to natural causes.

CONCLUSIONS: Forensic sources are crucial to know certain causes of death and to incorporate this information into the mortality statistics circuit. It highlights the opportunity to assess the impact of forensic medicine on public health and to offer the public a public space for forensic data.

P02-056 | *Forensic Pathology*

Fatal Alveolar Hemorrhage Secondary to Vedolizumab in a Young Patient with UC: An Autopsy Case

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Large airway disease, strongly associated with UC, is the most common presentation of pulmonary manifestations. In correlation with this the presentation of this case aims to show the possibility that Vedolizuamb can cause pulmonary hemorrhage like many other monoclonal antibodies with different pharmacodynamics, a potential adverse effect currently not known. A young man on third decade with ulcerative colitis died suddenly after an effort. His body was found in a pool of blood; no external lesions; to identify the cause of death it was necessary to perform autopsies, macroscopic and histological investigations, toxicological tests, and study of the clinical history through the medical records. Colitis was diagnosed 6 years before. The disease was treated with biological therapy for 2 years, in particular with vedolizumab for approximately 8 months. The external cadaveric examination highlighted the presence of blood material mixed with pinkish foamy material coming from the nose and/or mouth. The autopsy confirmed the diagnosis of atypical ulcerative colitis in accordance with the clinical history. Histopathological investigation demonstrated widespread pulmonary hemorrhage with areas of edema and emphysematous expressions. Furthermore, a lymphomonocytic infiltrate with a periarteriolar sheath invades the vessel wall with dissociation of the tunica media. Areas of bronchiolitis, focal pleural fibrosis associated with fibroids of the central lobular and peribronchoacinar interlobar connective tissue. We determinate the cause of death for HDA. This pulmonary complication is consistent with the fatal adverse reaction from Vedolizumab secondary to drug infusion 5 days before death in accordance with the pharmacokinetics of the antibody. In light of the current literature, we aim to recommend close pneumological follow-up from a clinical point of view, during the use of monoclonal antibodies, to early identify any adverse acute manifestations which endangers the patient's life.

P02-057 | *Forensic Odontology*

Age Estimation of Children Based on Open Apex Measurement in the Developing Dentition: A Belgrade Age Formula (BAF)

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INTRODUCTION: Cameriere's method has been tested in many populations and is widely accepted for dental age estimation. A novel formula (Belgrade Age Formula) for age estimation in children is based on prof. Cameriere's European formula but this one is faster and easier to perform. We tested it on Bosnian children population.

AIM: To test a new formula for age estimation based on measurement of open apices of permamanent mandibular teeth, on Bosnian children population.

METHODS: The measurements are the same as in the European formula where we measure the width of the open apices of the lower left permanent teeth (1-7) and the length of these teeth. But in BAF we measure only teeth 37 and 33. Then, we use these measurements in BAF formula. We had 210 children age groups 7-13 (30 children in each age group-15 male,15 female). We performed both methods (European and BAF) and compared the results between the estimated and chronological age in each group.

RESULTS: In younger age groups there was no statistically significant difference between estimated and chronological age in both methods. In older groups there was a difference. However, in most groups we had a very high percentage of age estimations in range ± 6 months and in some even within ± 3 months. We calculate residual (chronological-estimated age) for every person, then we put these values in absolute values. Further statistics was based on residuals for every age group. The results are also good and a little bit better in males. BAF and European formula showed similar accuracy. Better results are found in the age groups 7-10 ($p>0.05$) than in age groups 11-13 ($p<0.05$) for both methods.

CONCLUSION: BAF was found to be accurate in the Bosnian children populations.

KEYWORDS: Age estimation, dental maturation, open apices, forensic anthropology

P02-058 | *Forensic Odontology*

Use of QR Code in Removable Prostheses – Identification Process

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INTRODUCTION: Identification in completely edentulous individuals is a complex process. In these cases the complete denture analysis can be the only element that allows the identification of individuals. Labelling dental prostheses with Quick Response Codes (QR Codes) that encode identifying information is a solution to simplify the establishment of identity.
The objective of this research was to analyze the use of QR codes for marking total removable prostheses, as a way of contributing to human identification in situations of forensic interest.

MATERIAL AND METHODS: Different materials (titanium and stainless steel) and different sizes (7.5mm*7.5mm; 5mm*5mm; 3.5mm*3.5mm) were selected to test the feasibility of the process of obtaining and reading QR Codes. The selected parts were analyzed in relation to resistance when exposed to different high temperatures during a period of 30 minutes and to the action of corrosive substances (sulfuric acid and sodium hydroxide), during sequential periods of 1 hour.

RESULTS: The smallest readable size with 64Megapixel resolution cameras was 7.5mm*7.5mm. Exposure of titanium and stainless steel to high temperatures for prolonged periods revealed problems of oxidation. Regarding exposure to corrosive substances, titanium showed high resistance to sulfuric acid corrosion and moderate resistance to sodium hydroxide corrosion, while stainless steel showed very low resistance to sulfuric acid corrosion and high resistance to sodium hydroxide corrosion.

CONCLUSION: The use of QR Code as a form of human identification in total edentulous individuals can be a first-line method, when all other dental identification elements are missing. This study develops a fast, efficient, and affordable method of manufacturing small parts that can be included in removable prostheses. Titanium was the material that

presented the best properties and resistance to the physicochemical processes to which it was subjected. More studies are needed so that this identification method can be widely applied in the future.

P02-059 | *Forensic Imaging*

From Bedside Ecography to "Deadside Ecopsy"

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During the 90s, in Spain, the term "ecopsy" was coined for ultrasound studies conducted during minimally invasive clinical autopsies. This technique assisted pathology specialists in making diagnoses and performing image-guided biopsies, making their work easier and better preserving the condition of the corpse. Subsequently, in the 2000s, attempts were made to replicate this technique in the field of forensic medicine, with poor results due to numerous identified limitations. However, we have learned from healthcare professionals that bringing the technique to the "patient's bedside" could address several of these issues, helping the forensic pathologist detect natural causes of death, thus avoiding the need for unnecessary procedures or guiding towards a subsequent standardized autopsy. All of this has been made possible thanks to the development of pocket-sized ultrasound devices, allowing their transport in a work briefcase wherever needed, overcoming temporal limitations and those derived from putrefactive phenomena.
In this poster, we present a series of cases from our pilot experience conducting ecopsies, both at the scene and the autopsy room.

P02-060 | *Forensic Imaging*

The Role of Post-Mortem CT in Exhumations: A Case Series

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Our study highlights the significant role of a multidisciplinary approach in exhumations, where the combined expertise of radiologists and forensic pathologists proves invaluable in unraveling concealed conditions and injuries.

The presentation will impact the forensic community in case of exhumations showing that a multidisciplinary approach proves to be a crucial advantage in studying complex cases, with post-mortem CT serving as an essential guide, providing clear images through 3D reconstructions, while complementing but not replacing the traditional autopsy.

In our case series, we point out how the combination of radiologists and forensic pathologists has been useful to show uncommon conditions and injuries in four exhumations. Exhumations are the retrieval of a previously buried body for post-mortem examination and an adequate and frequently successful tool to recover evidence that should have been collected immediately after the death of a person. Additionally, exhumations can be seen as an instrument to evaluate the quality of death investigations.

CASE no.1: An 80-year-old woman, was exhumated after 13 months from death to exclude traumatic or violent injuries. Post-mortem CT didn't show bone traumatic injuries, the traditional autopsy didn't highlight macroscopic injuries, and histological investigations showed a morphological substrate compatible with a malignant arrhythmic event like disarray, myofiber break-up, coronary sclerosis, and fibrosis. This confirmed death was caused by natural pathological causes.

CASE no.2: An 81-year-old man, was exhumated after 1 month from death to exclude traumatic or violent injuries. Post-mortem CT didn't show bone traumatic injuries. Macroscopic and microscopic findings confirmed coronary artery disease and diffuse atherosclerosis. The presence of fibrosis and coronary sclerosis is therefore compatible with a cardiac substrate that may predispose to ischaemic and arrhythmic events. The cardiac findings, therefore, argue for a cardiac death with a likely arrhythmic origin in an elderly subject with multiple comorbidities.

CASE no.3: A 78-year-old man, was exhumated after 12 months from death to establish the cause of death and to show the presence of professional disease. Post-mortem CT highlighted neoformations in both lungs. Macroscopic and microscopic findings confirmed pathological lung disease due to asbestosis.

CASE no.4: A 57-year-old man, was exhumated after 3 months from death to show traumatic injuries and their mechanism in a case of suspected road trauma. Post-mortem CT highlighted fractures of the skull, thorax, abdomen, and left upper limb, with hemorrhage of the subcutaneous tissues nearby the subclavian vein, due to a small laceration as a consequence of clavicle fracture. Macroscopic and microscopic confirmed causes of death due to traffic accident.

We present compelling instances in exhumation cases where post-mortem CT assisted in establishing postmortem interval, excluding traumatic injuries in suspected homicides, establishing cardiac death origin in elderly subjects with comorbidities, demonstrating pathological lung diseases, and determining traumatic injuries and their mechanisms in road trauma.

P02-061 | *Forensic Imaging*

Late Death from Grenade Explosion

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In 1962, a hand grenade exploded in the hand of a then 14-year-old boy, causing partial amputation of his left hand, damage to his right eye, and shrapnel embedded in the skull and scalp.
According to the available medical documentation, no further diagnostic or curative care was provided. In the following decades, the patient suffered from periodic headaches and dizziness several times.
In 2009, a CT scan of the skull was performed, which confirmed a traumatic frontal lobe injury and metal fragments within the brain.
During further examinations for headache and dizziness, no other cause than the previous traumatic skull injury could be proven.
At the age of 70, the patient had an epileptic seizure, which was accompanied by spasms of the right upper limb and loss of consciousness. The epileptic seizure remains refractory to therapy, and deep sedation became necessary for 4 days after admission to the ward. The patient's consciousness later did not return.
During further medical examinations no new morphological damage could be verified and the neurological expert opinion suggested that the source of the epileptic seizures was the traumatic damage to the central nervous system suffered decades earlier.
On the 4th day of hospitalization, the EEG test confirmed severe diffuse cerebral cortex damage, and mechanical ventilation became necessary.
On the 17th day of hospitalization, an X-ray examination confirmed extensive pneumonia.
On the 18th day of hospitalization, the patient died of respiratory failure caused by pneumonia. Considering that the epicenter of the epileptic seizure was the brain injury suffered during the grenade explosion and the metal fragments embedded in the brain, so official autopsy was ordered, which confirmed the causal connection between the grenade explosion suffered 56 years earlier and his late death.
The immediate and early effects caused by the explosion are the subject of intensive research, however, out of the decades-long investigations comparable to the present case, documentation of only a few dozen cases can be found in the literature.

P02-062 | *Forensic Humanitarian Action*

Dying at the Gate of Europe – Migrants Deaths in Croatia

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INTRODUCTION: The Western Balkan route has been one of the main migratory paths into Europe, reflected the influx on the Eastern Mediterranean route which passes through countries including Serbia and Bosnia to the EU member states of Hungary and Croatia. After the record number of arrivals in the European Union in 2015, the number of irregular migrants choosing this route fell steadily for a few years and has started to pick up again from 2019 onwards. The aim of this study was to investigate how many migrants died over eight-year period, from 2015 to April 2023, how many of them were identified, the methods of identification, gender, and the cause of their death. We also analyzed age and country of origin of identified migrants.

MATERIALS AND METHODS: Data related to migrants' death from autopsy reports and police records of all migrants who died in the territory of the Republic of Croatia were analyzed in SPSS.

RESULTS: During the period from 2015 to 2023, bodies of 87 migrants were found dead in Croatia, with highest rate of 22 bodies in the year 2022. They lost their life mostly by accident; 47 of them drowned and 11 died because of hypothermia. Of those 87 migrants, 54 were identified, mostly visually and rest by fingerprints or DNA analysis. The highest percentage of identified migrants were male (96%) at the age of 25 to 35 years old (34%) from Algeria (12 persons), Morocco (8 persons) and Pakistan (7 persons).

CONCLUSIONS: The largest number of migrants who died in Croatia lost their lives by accident due to unawareness of dangerous territory on their way. Most of them are young males who travel from economically and politically unstable countries such as Algeria, Morocco, Afghanistan, and Pakistan in search for a better life.

P02-063 | *Forensic Humanitarian Action*

Evidence of Physical Violence and Torture in Unaccompanied Minor Refugees and Migrants Seeking Asylum in Palermo (Sicily, Italy)

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Sicily is a destination country for many people forced to flee their homes and is a frequent recipient nations of migrants in the Mediterranean. The Institute of Forensic Medicine at the University of Palermo, in collaboration with the University of Palermo and local non-profit organizations like Médecine Sans Frontières, has placed a strong emphasis on conducting medico-legal assessments of torture victims as a central aspect of their project, especially for unaccompanied minors[1]. Particularly when dealing with adolescents, protection derives, for those without documents, from properly ascertaining that they are minors[2]. The Institute of Forensic Medicine at the University of Palermo is actively involved in forensic assessment of alleged torture, following the Istanbul Protocol guidelines, in the presence of a cultural mediator, a forensic specialist, a psychologist and legal tutor. In this 5-year retrospective study, we analyze evidence of torture found during forensic inspections in unaccompanied minors and present our methodology, aiming to provide methodological proposals for improving the accuracy and reliability of forensic assessments in immigrants. Thirty-seven forensic inspections of unaccompanied minors were performed in a 5-year period (2018-2022) (Mean age 16,3; 73% were male subjects). 59,5 % of subjects were victims of torture in Libia. 94% of subjects came from Africa, 6 % from Asia. The most frequent mechanisms of injury/torture were thermal injuries (51,4%), followed by cut/stabbed injuries (33,1 %), blunt force injuries (29,7%), electric injuries (21,6%) and gunshot (8,4%). In 21,6% of female subjects the inspection showed female genital mutilation. 5,4% of subjects were victim of falaka. The interval time between torture and the forensic inspection was always more than 6 months. The most frequent reason for departure and for seeking asylum was due to familiar problems, followed by ethnic and politics and economic issues. The findings will be shown during the presentation. Our inspection is frequently performed after a long time from the episodes of torture. Signs of torture could disappear, thereby leading to the need for a comprehensive and complete approach in all branches of forensic disciplines. Moreover, our visit has a medical and humanitarian purpose, therefore the study highlights the role of forensic medicine to assess the effects of torture and guarantee the respect of human rights of unaccompanied minor migrants.

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P02-064 | *Forensic Humanitarian Action*

Forensic Humanitarian Action in Greece

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In times of conflict, disasters, and migration, the respectful and dignified handling of the deceased is paramount. The search, recovery, and identification of the remains of unknown individuals become critical tasks. Forensic science, with its unparalleled tools and expertise, plays a pivotal role in addressing these humanitarian challenges.

In March 2016, the International Committee of the Red Cross (ICRC) opened its mission in Athens to provide humanitarian and technical support in response to migration flows and more specifically on the question of missing people. Migrants who die along migratory routes often remain unidentified and the task of managing their remains can overwhelm local forensic facilities.

The ICRC's humanitarian response in Greece has been multifaceted, involving comprehensive support, training sessions, and forensic expert guidance for Greek authorities.

In response to several shipwrecks, the ICRC Forensic Unit provided crucial support to forensic authorities and first responders, ensuring the dignified management of the deceased and appropriate identification procedures. The ICRC has worked all these years with local authorities and forensic practitioners to develop standardized procedures and protocols, and to improve communication and cooperation strategies, for addressing this critical issue.

In a dedicated endeavor to offer answers to the families of the missing and clarify their fates and whereabouts, the ICRC, in collaboration with forensic authorities, has actively supported families engaged in the search for answers.

Support was provided in the aftermath of 13 significant incidents occurring between 2015 and 2023. This support aimed to alleviate the burden on local authorities and strengthen the overall response mechanism.

To foster communication and cooperation among forensic services and other agencies, the ICRC organized roundtable discussions, workshops, and training sessions. These initiatives aimed to promote best practices that help prevent and resolve the tragedy of people unaccounted for as a result of migration and to address the existing challenges within the medico-legal death investigation system in Greece, particularly focusing on the significant caseload of deceased individuals and missing migrants.

In addition, forensic material support and equipment, were provided to forensic authorities to enhance their capacity.

Moreover, the ICRC has actively taken on the accountability of restoring burial conditions for both identified and unidentified bodies to enhance

traceability, aligning with the ICRC's overarching goal of giving dignity and respect upon the deceased.
The field of forensic humanitarian action dynamically evolves, in harmony with advancements in forensic science and responsive to the evolving needs of the affected population within the context of our actions, particularly within the migration domain, which is consistently influenced by geopolitical changes, including new international and non-international armed conflicts, as well as the incipient significant issue of climate change.

P02-065 | *Clinical Forensic Medicine*

A Patient's Perspective on a Medical Malpractice Case: To Be or Not to Be Diagnosed with Pancreatic Cancer

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INTRODUCTION AND OBJECTIVE: This presentation explores an intricate medical malpractice case, providing a viewpoint from the patient's perspective. The emphasis lies on the difficult choice between a potential diagnosis of pancreatic cancer or an alternative outlook. The goal is to conduct a comprehensive analysis of the diagnostic and treatment process, carefully examining the decision-making procedures and evaluating compliance with recognized medical regulations.

CASE: Initiating from symptoms of abdominal discomfort, the patient underwent a comprehensive examination at a private medical center. Radiological assessments revealed abnormalities in the gallbladder and bile ducts, triggering further investigations. Subsequent evaluations at an academic health facility unveiled a dubious abnormality in the pancreas, initially interpreted as a possible malignancy based on a PET/CT scan. The inconclusive exploratory laparotomy led to the prescription of a treatment regimen involving chemotherapy and radiotherapy. The treatment course encompassed cycles of chemotherapy and radiotherapy, commencing in the early stages of 2020. Notably, the patient's care transitioned among various healthcare practitioners during this period, raising concerns about the consistency of decision-making.
Despite the initial prognosis suggesting a three-month life expectancy following the refusal of radiotherapy and chemotherapy after several cycles, the patient remarkably experienced rapid recovery three months later. This surprising turn of events was accompanied by upheavals in the patient's social life, leading to the initiation of legal proceedings. Notably, during this period, the hospital where the patient underwent surgery claimed a complete cure.
The treatment course encompassed cycles of chemotherapy and radiotherapy, commencing in the early stages of 2020. Notably, the patient's care transitioned among various healthcare practitioners during this period, raising concerns about the consistency of decision-making.

DISCUSSION AND CONCLUSION: The diagnostic journey created substantial skepticism regarding the initial suspicion of pancreatic cancer. This case emphasizes the crucial significance of employing a multidisciplinary strategy and utilizing modern diagnostics prior to considering surgery, in accordance with current medical norms. The choice to terminate the exploratory laparotomy without obtaining a tissue specimen highlights potential deficiencies in preoperative evaluations and adherence to medical protocols. The deviation of the medical professional's approach from established criteria is apparent, particularly with the commencement of chemotherapy and radiotherapy without a proven pathological diagnosis.
As the patient's treatment moves through many healthcare institutions, it stimulates a careful examination of the decision-making processes among multiple medical practitioners. The lack of essential medical documentation and comments from physicians in the case file highlights the need for a thorough examination, which will guide the way for a detailed forensic study of this complex medical malpractice case.

KEYWORDS: medical malpractice, pancreas cancer, radiology, general surgery, hepatopancreatobiliary, medical oncology

P02-066 | *Forensic Anthropology*

Hollywood Worthy Scenario – Forensic Medicine as a Multidisciplinary Science

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INTRODUCTION: Forensic medicine is primarily concerned with the autopsy of the deceased and the determination of the cause and manner of death in cases of suspicious or sudden death. Over the decades of its existence, forensic medicine has evolved as a science and expanded its field of activity. It has become clear that new knowledge, skills and competencies are required of us professionals in order to work successfully and keep up. Even more important is the fact that a single expert cannot master all modern approaches in forensic medicine.
I would like to use the following example to show the importance of collaboration between different profiles and experts.

BACKGROUND: At the end of March 2023, Mr. D. contacted the police in Ljubljana and stated that his son K.D. had been missing since around 4 p.m. The criminal investigation revealed that the missing K.D. had last been seen in an apartment in the Ljubljana area, at the company AB. An inspection of the apartment revealed a bedstead without a mattress and a floor. There were bloodstains on the front of the bed frame. No other traces of blood were found in the apartment. The forensic examination revealed that there were traces of cleaning. Analysis of the bloodstains revealed that they were from a potentially life-threatening injury. Molecular genetic tests revealed that the bloodstains belonged to the missing K.D. The case began to develop in midsummer. Mushroom pickers found ossified human remains on a hill near the town. We investigated the site and found that the human remains were completely skeletonized. They were scattered over an area of about 300 x 400 metres. We also found a watch, clothes and parts of clothes and a sleeping bag nearby. The criminalists suspected that the remains belonged to the missing person KD. We carried out an anthropological analysis at the Institute of Forensic Medicine. It turned out that the remains belonged to a male person aged between 30 and 40. We also found a gunshot wound to the head. The entry wound was at the back of the head. The final identity was confirmed by molecular genetic testing. We have confirmed that the remains belong to the missing KD.

CONCLUSIONS: In this case, which is worthy of the best Hollywood scenario, the cooperation of various experts proved to be important. Findings from the fields of criminology, forensic medicine, forensic anthropology, genetics and bloodstain analysis contribute significantly to solving cases of suspicious deaths. At the same time, this sets the direction in which forensic medicine will develop in the future. Today, forensic medicine is a multidisciplinary science involving experts from various fields and will involve even more different experts in the future.

P02-067 | *Forensic Anthropology*

Age Estimation Using Multislice Computed Scanography of the Pubic Symphysis: Application in Tunisian Population

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INTRODUCTION: The determination of age is a medico-legal act often requested by the judicial authorities which can concern the deceased and the living. The pelvis is of great interest in determining the age of adults. Advances in radiology and computer techniques have helped the development of age estimation, especially for living persons.

GOAL: Develop an age estimation model based on the morphological scan approach in the form of a digital score from the pubic symphysis study.

MATERIAL AND METHODS: It was a retrospective study that included 500 CT scans of the pelvis of living Tunisian males practised at the Radiology Medicine Service of the Fattouma Bourguiba University Hospital in Monastir aged between 15 years and 91 years. We studied the criteria for maturation of the pubic symphysis based on a scoring system. We studied the correlation of these criteria with real age. We established a score from eight maturation criteria for the right and left pubic symphysis. We have tested the reproducibility and repeatability of the score criteria. We have calculated the estimated age for the score as well as the relationship between the estimated age and the chronological age.

RESULTS: We have found a statistically significant difference (p=0.007) between the right and the left pubic symphysis. The criteria of the maturation of the pubic symphysis have shown good correlations with age (varied between 0.653 to 0.897 for the left side and between 0.648 to 0.894 for the right side) except for the bone nodule criterion (-0.437 for the left side and -0.421 for the right side). The pelvic score included eight criteria (ridges, upper extremity, lower extremity, dorsal edge, ventral edge, ventral bulwark, pubic tubercle and joint surface). The score varied between 8 and 29. This score has shown a very good correlation with age (0.93). The study of the reproducibility and repeatability of the criteria was good or sometimes very good. We found that a score greater than 12 corresponds to an actual age greater than 18 years with a specificity of 100% and sensitivity of 91% and when the calculated score is greater than 27, it corresponds to an actual age greater than 62 years, with a sensitivity of 86.8% and a specificity of 86.3% and a confidence interval of 95%.

CONCLUSION: The score established made it possible to estimate the age in a Tunisian male population with a very good correlation with age. This method constitutes one method among others which can be applied to the living and deceased person.

P02-068 | *Forensic Anthropology*

Age Estimation in the Living by the Study of MRI-Scan Images of the Knee Region

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INTRODUCTION: Forensic bone identification of the living is becoming increasingly important in today's society. Age estimation is one of the most crucial aspects required to identify human parts. The knee region is recently used in several radiological studies, owing to its reliability in forensic identification.

OBJECTIVES: To establish MRI scan-based scores allowing age estimation in the living Tunisian subjects from the study of the knee region, according to an anthropo-morphological approach.

MATERIALS AND METHODS: We retrospectively collected and studied 605 MRI scans performed in the Department of Medical Imaging of Fattouma Bourguiba University Hospital (Monastir). The study included living Tunisian subjects (aged 10 to 57 years). We tested the applicability of the radiological methods of Dedouit and Schmelling Kellinghaus. We studied the correlation of Dedouit and Schmelling Kellinghaus radiological phases with chronological age (CA).

RESULTS: The most correlated classification to CA was Dedouit's method, the most correlated epiphysis to CA was the distal femoral epiphysis. The correlation between the Dedouit radiological phases, and the chronological age was at 0.644. The age estimation was determined with a Standard Error Estimation (SEE) of ± 1.47 years (males), SEE ± 1.93 years (females) and a confidence interval (CI) of 95%.

CONCLUSION: The age estimation score gave an estimation of age with a SEE from the CA of about 1.47 to 1.97 years. Both the Dedouit and Schmelling methods can be used reliably in the estimation of the age of Tunisian individuals. The knee region is favorable for age estimation in the living.

P02-069 | *Forensic Anthropology*

Sexual Dimorphism in the Living by the Study of MRI-Scan Images of the Knee: Application on a Tunisian Population

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INTRODUCTION: Forensic bone identification of the living is becoming increasingly important in today's society. Sex determination is the most crucial aspects required to identify human parts. The knee region is recently used in several radiological studies, owing to its reliability in forensic identification.

AIMS: To establish MRI scan-based scores sex determination in the living Tunisian subjects from the study of the knee region, according to an anthropo-morphological approach.

MATERIALS AND METHODS: We retrospectively collected and studied 605 MRI scans performed in the Department of Medical Imaging of Fattouma Bourguiba University Hospital (Monastir). We studied the applicability of different morphometric and 3D volumetric measurements. We studied the correlation between the different MRI measurements and the sex of the subject. We established a composite score of sex determination based on twelve variables.

RESULTS: All the studied variables showed a sexual dimorphism except for MCT, NSI, NWI, PCA, NAI. In fact, all measurements were larger in males than in females. The best discriminatory parameters for sex determination were condylar area and bicondylar width. We used the morphological and volumetric variables to establish an unstandardised canonical discriminant function equation, which enabled sex determination with satisfying specificity and sensitivity.

CONCLUSION: Sex determination was successfully established through the proposed score. Therefore, the knee region is favorable for sex determination.

P02-070 | *Forensic Anthropology*

Virtual Restoration of Human Osteological Remains: A Digitally Reassembling Method Using a Guided Pipeline and Open-Source Software

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In forensic and archaeological scenarios, human remains are often found fragmented, and it may be challenging to reassemble them. Important information for the anthropologist's assessment can only be seen when the fragmented bones are complete, showing specific signs of trauma, lesions, and other pathologies.
This operation is time-consuming and often difficult to perform or even impossible. Some skeletal remains can be so fragile or deformed or

enclosed in hard soil, which makes it impossible to clean without damaging the original specimen. The current methods used for reassembling bones include the manual cleaning from soil and the use of glue and tape. Unfortunately, not all the specimens can be restored with the help of these materials, since they might affect future analysis.
CT scanning is a technique increasingly used in the field of archaeology and forensic sciences since it allows to create virtual 3D digital copy of the original bones. These 3D models can be virtually reassembled and some promising results have been recently achieved when using advanced algorithms and software that can help with the automatization of this process. However, still more research is needed.
This project aims to investigate the feasibility of a manual digital reassembling method, using affordable tools and a precise pipeline to guide anthropologists, regardless of their knowledge of 3D software and level of expertise. A set of archaeological human unburned remains, (2 crania, 2 mandibles, 2 maxillary bones, 3 vertebrae, 2 clavicles, 1 scapula, 2 ribs, 2 humerus, 1 ulna, 1 radius, 3 hip bones, 1 coccyx, 2 femurs, 2 tibiae, 1 fibula), showing different levels of fragmentation, were selected. The bones were CT scanned twice: once, in their fragmented status and secondly when manually reassembled. A Siemens Somatom Definition AS was used with the following parameters: 0.6 mm slice thickness, 0, 4 pith 0,4 mm slice increment and a sharp reconstruction algorithm. The 3D digital models were then created using Mimics Software and the 3D models (in STL format) were imported in Blender, where they were manually roughly positioned and then precisely aligned using the snap tool and enabling the rotation trackball. The digitally reassembled models were then imported in CloudCompare software for comparing the digital reassembled 3D models with those manually reassembled (the gold standard in our study). We found deviations of few millimeters in most the sample. Afterwards, a pipeline was created and tested on different researchers with various levels of expertise.
We developed an easy and quite accurate pipeline for digitally reassembling bones using open source. Our results were based on 3D models from CT scanning but our approach is independent from the 3D input, whether they were produced from surface scanning or photogrammetry.

P02-071 | *Forensic Anthropology*

The Bizarre Case of the Italian Bones Collector (the Jigsaw Skeleton)

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The case of the Italian bone collector (also known as "the jigsaw skeleton") drew the attention both of international media and public opinion since 2007. The bones were accurately examined through forensic analysis. The case has recently been processed through new elements and techniques, opening new possibility for the identification.
On 26 July 2007, a typical summer fire breaks out in the cane thicket near a cycle path on Tevere riverside. At the end of the extinguishing operations, the firefighters identified a perfectly composed skeleton lying on the ground. Therefore, they called both for police and forensic pathologist. The skeleton was barely touched by the flames and during the crime scene investigation, in its nearby, a backpack containing some keys and an identity card of a 77-years-old retired man missing since 2003 were found. On the recovered bones were performed anthropological, medico-legal, soil and microelements analyses. The findings were not in contrast with the identification of the skeleton with the old, retired man.
Surprisingly the DNA examination revealed that the skeleton was assembled with bones belonging to at least 5 individuals: three women (cranium, right tibia, left tibia) and two men (right humerus and right ulna): so further scientific examination and police investigation were ordered.
Bone samples were examined according to AMS C14 dating.
Mitochondrial DNA analysis revealed that the skull belonged to a woman who had some loci common with the maternal line of the missed man and, as him, was of Jewish origin. This can be a very common result in the Roman territory, which hosts one of the largest Jewish communities in Italy. So, this information can be used cautiously. Even for the analogy with the movie "The bone collector" the case raised to the attention of the international media and was objected of a many TV-shows.
Although the efforts of the forensic scientists and police investigators the identity of the victims was not established.
In 2017, a new protocol of the Ministry of Interior, establish that all unidentified bodies again had to be analyzed to properly collect all post-mortem data (anthropological, odontological analysis, and biological sampling). The protocol involved the case of the bone collector of Rome too. A new anthropological analysis of the bones was performed together with a new possible interpretation of the data according with the most modern scientific findings. A 3D facial reconstruction was performed from the skull.
This presentation will impact investigators and forensic scientists, highlighting that cold cases can be reviewed using modern techniques adding new elements. Different hypothesis can also be performed. Looking for evidence to demonstrate a pre-established thesis is an easy and common issue and it can be misleading if an objective evaluation is not attempted a priori, even with simpler hypotheses.

P02-072 | *Forensic Anthropology*

A Preliminary Data Analysis of the Effect of Different Case-Related Variables on the Decomposition Pattern and Rate of Small-Sized Pig Cadavers in the Netherlands

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OBJECTIVE: On average, the remains of deceased infants are found approximately three times a year in the Netherlands in an outdoor context, making knowledge on the decomposition pattern and rate of small sized-remains important in order to be able to understand taphonomic changes and estimate the Post-Mortem Interval (PMI). In the majority of these cases, however, these infants are found clothed or inside (plastic) bags or containers. Since these case-related variables can influence the rate and pattern of decomposition, and thus the PMI to be estimated, it is crucial to investigate the effect of these external variables.

METHOD: To investigate the effect of these case-related variables, a decomposition study was conducted with small pig cadavers as a proxy for human infants. Case-related variables, including clothing, plastic bags, and traumas, were introduced to these pigs and compared with a naked cadaver to access the effects of these variables.

RESULTS: The results showed that case-related variables have an effect on both the pattern and rate of decomposition compared to naked cadavers. Furthermore, new insights were gained into the effect of these variables on the rate and extent of post-mortem alterations.

CONCLUSION: Based on these preliminary results, it is evident that case-related variables can have a significant effect on the decomposition pattern and rate of small cadavers. Therefore, accounting for these variables is crucial when estimating the PMI. Follow-up research is recommended to gain more knowledge and insights in this influence.

P02-073 | *Criminalistics*

Intrafamily Homicide in the North of Tunisia: A Fifteen-Year Retrospective Study Focusing on Mothers and Fathers as Victims

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The loss of a member of the family impacts the rest of them, especially when the child is responsible for the death of his father or his mother. Besides, information about this specific type of intrafamily homicide is lacking. We aim to study the epidemiological and medico-legal particularities of intrafamily homicide, including parents as victims.
A retrospective study was carried out in the Department of Forensic Medicine of Charles Nicole Hospital in Tunis, Tunisia, from January 2007 to December 2021, including all the cases of homicides where the perpetrator was the child and the victim was a mother or a father.
A total of 29 cases were collected in our study. The mean age of the victims was 64 years old. Among the victims, 55.2% were fathers (n=16). The majority of the victims were living in urban areas (n=19; 65.5%). Most of them were married (n=18; 62.1%) and retired (n=15; 51.7%) at the time of the facts. They had no medical history in 48.3% of cases (n=14). Males were the main perpetrators in our study (n=17; 93.1%). Their mean age was 31 years old. Nearly half of murderers had a psychiatric history (n=14; 48.3%), and the homicide was due to a decompensation of their mental illness (n=12; 41.4%). Wednesday and Sunday were the main days of the week when the crime happened with the evening being the most likely time to kill (n=12; 41.4%). The majority of the crimes occurred in the summer (n=10; 34.5%). Just after the murder, nine perpetrators fled from the crime scene; only one turned himself in, and two of them committed suicide after killing their own parents. Three cases in our recovery were multiple family homicides. Blunt objects were used in nine murders, while incising and blunt heavy weapons were the second most used instruments (n=6). Overkill was noticed in 75% of the cases.
In conclusion, intrafamily homicide, including parents as victims, is a tragic event where the identification of risk factors such as the mental illness of the child could help in establishing strategies of prevention.

KEYWORDS: Intrafamily Homicide, north of Tunisia, retrospective study

P02-074 | *Clinical Forensic Medicine*

First Reaction: Shock!

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The post-mortem diagnosis of PEA (Pulseless Electrical Activity) can be a challenging task, as it can be caused by several mechanisms. We present two cases of death by PEA due to anaphylactic shock during surgery for oncogynaecological pathology in two patients admitted to a level III university hospital, 14 months apart.

The first case, currently under criminal investigation for alleged professional negligence, involves the clinical case of a 63-year-old woman with metastatic ovarian cancer. The patient underwent surgery under general anaesthesia for bilateral hysteroannessiectomy with cytoreduction, after intraoperative administration of indocyanine green to identify the sentinel lymph node. During the surgery, the patient suffered PEA, without resuscitation despite ALS. By integrating autopsy data with the results of instrumental (chest X-ray, echocardiogram), laboratory (troponin assay) and histopathological (in vivo lymph node biopsy) investigations performed on the patient shortly before death, post-mortem diagnosis was fatal anaphylactic shock due to misdiagnosed mastocytosis.

The second case involved a 58-year-old woman who was receiving neoadjuvant therapy for metastatic ovarian cancer. The patient died during the ablation procedure due to electromechanical dissociation. The patient underwent a post-mortem examination, including laboratory and instrumental investigations. The cardiac cause was investigated by echocardiography. Pulmonary causes, such as PTX, tamponade and pulmonary embolism were excluded by post-mortem CT scan. Moreover, necropsy examination confirmed the absence of haemorrhage, myocardial infarction and septic shock based on macroscopic and microscopic data. A myocardial bridge on IVA was identified. Following the experience of the first case, it was decided to perform a troponin and B-tryptase assay on a preserved blood sample that had been prewashed during patient's lifetime. Troponin was mildly positive. The B-tryptase positive result suggested mast cell degranulation. Histological features (using toluidine blue and immunohistochemical tests) on heart and lung tissue revealed the presence of degranulating mast cells. The patient subsequently died of anaphylactic shock with cardiac arrest refractory to cardiopulmonary resuscitation as a result of a myocardial bridge.

What is already known on this topic? A correct methodological approach can facilitate the definitive diagnosis of PEA, which can be defined by excluding all possible causes. The preservation of histological and laboratory samples in vivo allows for the identification of possible underlying allergic components, that cannot be assessed post-mortem due to the rapid degradation of B-tryptase. In addition, post-mortem CT scans can be used to verify the possible presence of pneumothorax, which can be challenging to diagnose on the autopsy table due to the difficulty of reproducing hydrodynamic tests.

What our experience may add? The first case suggested screening for mastocytosis in patients candidates for the use of indocyanine green; the second reminded us that true searching is the key to strengthening the relationships with victim's relatives, avoiding lawsuits, and giving comfort.

P02-075 | *Clinical Forensic Medicine*

Medico-Legal Assessment of an Alleged Sexual Offender – The Evaluation of the Sexual Desire

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INTRODUCTION: Forensic sexual offenders assessments frequently involve an exploration of various factors that may contribute to the alleged offense and are usually related to mental health evaluation. In Portugal, Clinical Forensic Medicine assessments of alleged sexual offenders are not common and they're usually related to specific medical issues, as the case reported, commonly related to defense/indictment allegations.

CLINICAL CASE: 66-year-old male, allegedly sexual abused his 8-year-old granddaughter. The examinee refutes all accusations, stating that he had suffered a stroke some time ago, which made it impossible for him to feel sexual desire and obtain an erection. Medical-legal expertise was requested to clarify the judge as to whether the alleged offender suffered from erectile dysfunction and if so, whether he could obtain sexual desire. Expertise from the specialties of Forensic Psychology and Urology were requested.
Urology expert reported that sexual dysfunction is a multifactorial condition that can be conditioned by a stroke as other risk factors presented by the examinee, as age, smoke and alcoholic habits, diabetes and cardiovascular disease.
Forensic Psychology expert reported that he was a sociable individual, however with superficial and narcissistic interpersonal relationships. He could sometimes resort to manipulation and presented low empathy. No diagnosis of paraphilia was found. The expert referred that the examinee is self-centered, with overvaluation of his sexual life, superficial and emotionally distant from his granddaughters. Regarding alleged sexual dysfunction, this is generally a severe blow to male self-concept, with bibliography reporting that they can contribute directly and indirectly to

triggering abusive sexual behavior, including the search for underage sexual partners.
This case is still under trial, so its outcome is unknown.

DISCUSSION: This case portrays a type of medico-legal evaluation that is uncommon in Clinical Forensic Medicine, which generally evaluates the abused victim, with only a few opportunities to evaluate the alleged aggressor. In this case, we made a multidisciplinary analysis, involving urology and psychology, aiming to understand the case and answering the judge's questions.
The medico-legal evaluation of a sexual offender who claims sexual dysfunction involves the analysis of medical evidence and legal considerations. It underscores the intricate relationship between medical conditions and criminal culpability, requiring a careful balance between understanding the accused individual's health and ensuring justice for the victim.
In this case, forensic psychology played a crucial role. Personality traits commonly observed in sexual offenders are narcissism, psychopathy and impulsivity. Cognitive processes, such as distorted perceptions of consent and entitlement are scrutinized to elucidate the mechanisms through which sexual offenders rationalize their actions.

P02-076 | *Clinical Forensic Medicine*

Surgical Forgetfulness: Textiloma after Surgery and Medical Legal Implications

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Textiloma or gossyiboma is formed as a body response to a gauze or surgical sponge retained in the body after surgery. It is a rare iatrogenic complication, certainly underestimated, which can remain unrecognized for years and can subsequently represent an enigma for the doctor with different clinical and medicolegal implications depending on the patient's outcome. We conducted a review searching on a single database (PumMed) for the words “textiloma” AND ‘post surgery’ from 2014 to 2024. We found 499 articles from which we excluded those of no forensic interest and cases in which the foreign body was not of iatrogenic origin. Therefore, we analysed 24 documents. Further literature and data, and other additional records were considered through hand searching. The aim of the study is to highlight the different medico-legal implications of this post-surgical complication. The clinical presentation of textiloma is heterogeneous, and different for the different surgical areas. We found that in 70% of the cases analyzed, textiloma was found following abdominal surgery performed even years earlier. All patients undergo further surgery, sometimes with evidence of migration to other organs. In half of the cases, the diagnosis was difficult due to the mimicry of the foreign body that often forms part of the differential diagnosis with neoplasms. This complication has important medical-legal implications. Once the causal link has been identified, doctors can be subjected to criminal proceedings for negligence even many years later. Fatal cases from textiloma with different pathological mechanisms have also been described in the literature and in those cases the surgeons were subsequently investigated for murder. Finally, in the case of multiple surgeries in the clinical history, it can be complicated to establish the origin of the textiloma, but today forms of verification are practicable that allow us to trace at least the tissue pattern and, therefore, to know whether it was used or not in specific hospital facilities during the period under examination. The discovery of a textiloma can lead to different implications. From the point of view of professional responsibility, the physician can be subjected to criminal proceedings for personal injury or even death of the patient. This naturally causes damage to the professional's career as well as representing an expression of medical malpractice. An incorrect diagnosis can force the patient to undergo various surgical operations or diagnostic and therapeutic procedures, even harmful or otherwise unnecessary. Therefore, textiloma, as it is preventable, is not only an event that surgeons should avoid both from professional and legal point of view, but also and especially for public health reasons.

P02-077 | *Clinical Forensic Medicine*

Shaken Baby Syndrome – A Life-Threatening Assault

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INTRODUCTION: Shaken Baby Syndrome is a form of child abuse involving violently shaking the child, causing rapid and successive flexion-extension and rotational movements of the neck and skull. It is characterized by a classical triad of findings, including subdural hemorrhage, retinal hemorrhages, and encephalopathy.
Although this is a serious condition, with reported mortality rates around 30%, there are few studies reporting its long-term outcomes and even fewer depicting short-term complications.

CASE PRESENTATION: A 3-month-old male, previously healthy infant was admitted to the emergency department due to lethargy, apnea, and seizures.
After an exhaustive clinical and imaging study, extensive bilateral retinal, subdural, and subarachnoid hemorrhages in different stages (subacute/acute) were detected. During hospitalization, the infant experienced multiple difficult-to-control seizures, requiring sedation, orotracheal intubation, and invasive mechanical ventilation. The electroencephalogram revealed mild to moderate diffuse encephalopathy and the brain MRI showed contusional and ischemic cerebral injuries, as well as the aforementioned hemorrhages.
In the multiple ancillary studies no other abnormalities or medical conditions were found that could explain the injuries in the absence of trauma. The child was hospitalized for about a month, showing good clinical evolution and then discharged to a foster care institution.
Approximately a month after discharge, the child was brought back to the emergency department with respiratory symptoms and fever, requiring a second hospital admission and persisting despite the instituted therapy. After a lumbar puncture and new CT scan, the infant was diagnosed with acute meningitis, complicated with cerebral empyema (infection of the unabsorbed subdural hemorrhages), with increased intracranial pressure, requiring two surgical drainage procedures. During this hospitalization, the child experienced another episode of refractory seizures, requiring sedation and intubation.

DISCUSSION AND CONCLUSION: A medico-legal assessment was requested by the Penal Public Prosecutor's Office to assess the child. After talking to the parents, no traumatic mechanism was described that could possibly explain these injuries. The classical triad found initially is consistent with Shaken Baby Syndrome. In spite of the injuries and life-threatening seizures, the child survived and was discharged after a month.
However, the occurrence of an acute meningitis almost immediately after the first hospital discharge, complicated with cerebral empyema superimposed on the subdural hemorrhages and new refractory seizures, carried a worse prognosis. The child survived and was again discharged to foster care. Clinical follow-up will be needed in order to understand the full developmental consequences of the events.
This case illustrates a rare infectious complication of the subdural hemorrhages resulting from the shaken baby initial trauma. Both clinical and forensic doctors must be aware of the syndrome and the possible short and long-term complications, as rare as they may be, in order to get a proper and quick diagnosis and ensure the proper protection of the victim.

P02-078 | *Clinical Forensic Medicine*

Burn Injury in Child – Domestic Violence or Institutional Neglect?

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INTRODUCTION: Burn injuries in children should always be considered a warning sign, warranting an in-depth investigation to exclude potential abuse.

CASE PRESENTATION: We present a case of a 2-year-old boy, admitted to the emergency department with second-degree burns on both buttocks, sparing the perineal region, and on both feet, particularly on the left foot. The lesion on the left foot had a circular distribution, affecting both the sole and the dorsum of the foot (where the depth of the lesion appeared to be greater). The right foot showed smaller lesions.
The child had been dropped off at the day-care centre that morning, with no reported changes in behaviour by the parents. The day care staff reported the need to bath the child, allegedly detecting the burns thereat, prompting them to take the child to the hospital.
Thus, the question arises: were did the burns occurred, at home or at the day-care? Is this abuse?

DISCUSSION: A medico-legal assessment was requested by the Public Prosecutor's Office to assess the child, due to suspicion of possible physical abuse. The injuries described were consistent with scald injuries resulting from hot liquid. Their distribution (the fact that two non-contiguous areas were affected), the relatively well-defined borders and the fact that no explanation was given for the occurrence of said lesions, point towards a non-accidental injury. The involvement of both the sole and the dorsum of the left foot also rules out the hypothesis of a contact burn from a hot surface.
As for the location of the event, a surveillance video provided by the Public Prosecutor's Office showed the child being dropped off at the day-care, smiling, walking, and running without difficulty, which would be implausible if such injuries had already occurred, considering its painful nature.

P02-079 | *Clinical Forensic Medicine*

Cost-Effectiveness Analysis of Medico-Legal Management of Claims Related to Healthcare-Associated Infections in an Italian Tertiary Hospital

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Healthcare-associated infections (HAI) are the main reported adverse event in healthcare with a very significant economic impact in terms of in-hospital mortality, length of stays, direct costs of care, and disability-adjusted life years. Most of HAI are of (at least potential) medico-legal interest, since they are considered often preventable through interventions like active hospital surveillance. A recent ruling of the Italian Supreme Court (6386/2023) compels hospitals to compensate patient who suffered from HAI unless they are able to prove 13 items ranging from air quality to the use of microbiological data for HAI surveillance. This severe burden of proof entails the risk of creating a quasi-no-fault compensation system, with significant economical implications for insurers and healthcare systems. In the Careggi University Hospital (a public tertiary hospital in Florence, Italy) medical malpractice claims concerning HAI are evaluated by a Committee that, starting from 2019, has implemented its evaluation methods, systematically including experts in HAI surveillance and using all the available surveillance information (in particular epidemiological reports) in order to decide whether to compensate the patients or not. The primary endpoint of the study is to verify whether this strategy has had an impact on the performance of the Committee and on the mean cost of claims. The secondary endpoint is to evaluate what would have been the economic impact of a mandatory no-fault system on public health system finances and on the plaintiffs (rather than the fault-based system currently valid in Italy). The presentation will discuss our preliminary findings, comparing the findings with current scientific evidence from international literature.

P02-080 | *Clinical Forensic Medicine*

Professional Liability in Healthcare-Associated Infections: Proposal of a Score as a Tool for Medico-Legal Assessment

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BACKGROUND: Healthcare-Acquired-Infections have been recently the subject of the judgment n. 6386 pronounced on 3rd March 2023 by the Italian Supreme Court. This sentence provided three criteria to determine whether a health facility is responsible for the patient contracting a nosocomial infection, i.e. time criterion, topographical criterion, and clinical criterion. Accordingly, the healthcare facility is obliged to prove the fulfillment of a series of preventive hygiene measures specifically detailed by the legislator. Herein, the positive predictive value of these criteria ("juridic criteria") in the identification of professional liability for nosocomial infections was evaluated in comparison with clinical criteria reviewed by infectious disease specialists ("Infectious-Disease criteria", i.e. presence of a multidrug-resistant organism; development of surgical site infection; inadequate antibiotic therapy; inadequate disinfection).

METHODS: Two retrospective cohorts were compared. By computing the Telematic Services Portal of the Ministry of Justice, 51 patients were extrapolated from Italian judgments concerning claims for Gram-negative nosocomial infections in the three-year period 2020-2022. Meanwhile, from the electronic database of University Hospital of Bari we extracted 349 patients affected by Gram-negative infections in the same timespan. Both "juridic" and "Infectious-Disease" criteria were then applied to the full cohort after stratification for cohort of origin and for nosocomial or non-nosocomial infections. Predictive value of criteria was evaluated through Receiver Operating Characteristic (ROC) curves.

RESULTS: Overall, the incidence of definite nosocomial infections (according to final judgement or clinical records discharge letter) was 84% in "juridic" cohort and 46% in "real-world" series. Data suggested that the presence of all three juridic criteria [ROC AUC=0.944 (95%CI=0.924–0.963)] or the four clinical criteria [ROC AUC=0.948 (95%CI=0.928–0.969)] well predicted a case of nosocomial infection with professional liability. Moreover, by summarizing both criteria in a single classification system, the generated ROC curve was the one with the highest AUC [0.9488 (95%CI=0.928–0.969)]. Accordingly, further tests were performed, evaluating the predictive value of one juridic criterium plus one or more Infectious-Disease criteria. Interestingly, the ROCs curves demonstrated that the presence of at least 1 juridic criteria plus at least two Infectious Disease criteria reached a predictive value comparable to 2 or 3 juridic criteria.

CONCLUSIONS: Despite the distance between juridic and scientific decision-making process, our results highlight the efficiency of new criteria laid down in the judgment of the Italian Supreme Court to attribute liability for nosocomial infection. In addition, the use of a score combining "juridic" and "Infectious-Disease" criteria provides to technical consultants a high-quality tool to evaluate cases of nosocomial infections with alleged professional liability, even when poor medical records are available. This sheds light on the possibility to face worldwide judicial inquiries with scientific rigour.

P02-081 | *Clinical Forensic Medicine*

Forensic Assessment in Civil Law in a Case of Firearm Discharge – When the Role of the Medical Expert Goes Beyond Bodily Damage Assessment

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INTRODUCTION: While elaborating a forensic assessment, medical expert often resorts to expertise from other medical specialties when the required knowledge exceeds their competencies and expertise. This multidisciplinary approach allows for more comprehensive and well-founded reports, proving particularly relevant in situations of high complexity.

METHODS: A case is reported that was aided by a radiologist expert's opinion to define the trajectory of the projectile in the victim's body, thereby aiding the judge in determining the circumstances of the event.

CASE REPORT: A 27-year-old male, suspect in an alleged armed robbery, reportedly attempted to flee as the driver of a vehicle. Law enforcement officers (on foot) allegedly fired shots at the vehicle's wheels, resulting in its subsequent crash. Upon examination in the emergency department, the subject exhibited a projectile entry wound in the right interscapular region, lower limb paraplegia, and upper limb paresis. Cervical CT scan revealed an intracanal projectile situated at the cervicodorsal junction, and foreign bodies spread through this region and paravertebral soft tissues; without surgical indication and thus, with no possibility of removing the projectile.
At the time of the forensic examination, the individual used a wheelchair for locomotion, and was dependent on others for all activities of daily living, with: lower limb paraplegia; upper limb paresis; erectile, vesical, and intestinal dysfunction; and persistent mood disturbance diagnosed by Forensic Psychiatry. A total of 83 points of permanent deficit were attributed.
The court also requested a forensic medical opinion to ascertain the location and characteristics of the object in the spinal column, specifically whether it was a projectile, a projectile fragment, or another object. The experts called on an imaging expert who, through a cervical CT, determined it to be a slightly deformed metallic projectile located intracanally at the D1 level, with the presence of metallic debris in the entry path at the right lamina of D2 and in the D2-D1 transition channel, as well as bone debris in the vertebral canal. Based on this information and the objective examination description, the projectile's trajectory in the victim's body was determined to be from bottom to top, right to left, and back to front.

DISCUSSION AND CONCLUSIONS: This case aims to demonstrate the importance of forensic medical expertise in both bodily harm assessment and clarification of the circumstances of the event. In this context, determining the projectile's trajectory in the victim's body, when considered alongside other evidence, may allow inferences about whether the projectile directly hit the subject or resulted from a ricochet. Such determinations can be crucial for the judicial decision regarding the degree of responsibility of the parties involved and the corresponding compensation or indemnification.

P02-082 | *Clinical Forensic Medicine*

Cerebral Air Embolism – A Rare Complication of Intra-Aortic Balloon Pump Insertion: Case Report

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INTRODUCTION: Our aim with this case report is to raise awareness of a serious complication of Intra-aortic balloon pump insertion. The Intra-aortic balloon pump is the most widely used and the simplest mechanical circulatory support device in patients with compromised cardiac function. The intra-aortic balloon pump insertion is associated with approximately 30% complication rate. Certain diseases and other uncontrollable factors are associated with the likelihood of complications of intra-aortic balloon pump insertion. We report a case of an 88-year-old man who suffered myocardial infarction and during his hospital care suddenly lost his consciousness due to air embolism caused by intra-aortic balloon pump rupture which led to his death few days later.

MATERIALS AND METHODS: Autopsy was performed 8 days after the death of the patient and histological samples were provided from multiple organs.

RESULTS AND CONCLUSIONS: During the autopsy we found cerebral edema with blurred border of the grey and white matter in some locations. The brainstem together with the cerebellum was friable and their normal structure was not recognisable. In addition to the above, we found moderate generalised atherosclerosis, severe coronary artery calcification, obstructive thrombosis of the right coronary artery and myocardial scarring along with pleural effusion, pulmonary edema and signs of congestion in the liver. Histological examination showed pericellular edema and vascular congestion in the brain sample. In this case, the premortem CT was indispensable for the diagnosis.

P02-083 | *Biology in Forensic Medicine*

Non-Human Bones Species ID: Successful Molecular Identification Through 12S rRNA

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In order to exclude or confirm the human origin of skeletal remains founded during an investigative survey, the first task is to recognize the samples species.
Compromised bone evidences species ID could be challenging: molecular methods could potentially allow to overcome the limits of classical inspection techniques based on morphology.
Animal DNA-based ID is commonly performed through cytochrome b (cyt b) and cytochrome oxidase subunit I (COI) universal mitochondrial markers that mostly provide high performances. When analyzing highly degraded samples, the choice of shorter markers could be preferrable.
We present two different caseworks involving bone samples founded during medico-legal outdoor investigations for which a molecular analysis was requested. In order to exclude the human nature of the specimens and to determine the exact species they belong to, we proceeded with the molecular approach trying to generate sequences from the classical mtDNA markers cyt b and COI. However, they both gave critical results. For that, a short amplicon of ~ 150 bp of the 12S rRNA gene was used as an alternative. This short fragment was sufficient to identify the biological origin of the bone specimens with a high degree of certainty, leading to the exclusion of their human nature.
The two caseworks are linked by the success of the ribosomal marker 12S rRNA at the expense of the opposite behavior of the two cytochromes which in case 1 both completely fail to give usable sequences whereas gave a complete answer in case 2.
The variability of the response of the two longer fragments is probably attributable to the type of particularly compromised starting material. The degree of DNA degradation in bone samples often prevents the amplification of long PCR fragments, hence that of the most frequently used reference markers.
Our experience shows the utility of the 12S rRNA as valid alternative marker in forensic routine species identification when starting from challenging specimens.
This work highlights the importance to further deep the choice of alternative shorter markers in forensic species diagnosis, in order to achieve successful identification even from challenging and degraded material such as skeletal remains.
Furthermore, the utility of an alternative developed powder-free extraction protocol was presented which has proved to be a successful strategy as, together with a great practicality of the method, it allowed to simplify the sample treatment as well as to obtain an adequate DNA yield and quantity for the subsequent analysis.

P02-084 | *Clinical Forensic Medicine*

Cyst-Masked Projectile

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INTRODUCTION: Injuries caused by foreign bodies mostly occur on children and can be associated to serious complications. Pediatric head trauma is an important cause of morbidity and mortality in children and may be seen in the setting of accidental or abusive injuries. Foreign bodies are usually removed a few hours after the incident. However, in a minority of patients the foreign body is detected accidentally, with no record and/or memory of the initial event. Residual foreign bodies tend to generate acute and chronic inflammatory reactions, leading to the development of granulomatous tissue and creating a capsule that surrounds the foreign body.

CASE REPORT: A 2 year old Indian boy accompanied by his father who was evaluated at our Delegation due to a situation that occurred one year prior – the child was playing next to an open window in his house when, suddenly, started crying and bleeding from his forehead, without any associated change in his state of consciousness. Note that his father was present at that moment and denied the child had fallen or in any way hit his head. After that, on the same day, the boy was evaluated on the emergency room and biological glue was applied to the injury.
A few days later, his father took him to the attending physician because the child was still complaining of pain and showed frontal swelling associated to the injury. As a recommendation of his physician he underwent an ultrasound of the forehead and was referred to the Pediatric Surgery Specialty in order to remove what was considered to be a "frontal cyst". As the child had recurrent fever, the surgical intervention was postponed several times.
When the child was submitted to the surgery it was revealed that "the frontal swelling was due to a projectile".
Subsequently, considering the possibility of a criminal offense, a medical legal evaluation was performed at our Delegation. The physical examination revealed a scar in the frontal region. Our findings along with the clinical information were compatible with firearm injury.

DISCUSSION AND CONCLUSIONS: This case-report highlights the necessity of increased care when dealing with injuries related to potential traumatic events in children, particularly in cases in which the history is lacking, due to the child's age and/or due to the event not being witnessed. A delay in the detection of the real cause of the injury, as verified on this case, may lead to a delay on the judicial investigation.

P02-085 | *Clinical Forensic Medicine*

Comparative Analysis of In-Hospital Medico-Legal Management of Claims Related to Healthcare-Acquired Infections in Insured and Non-Insured Tertiary Hospitals

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In European Union insurance coverage for medico-legal risks of healthcare providers is not mandatory if other means of protection are granted pursuant to Directive 2011/24 (Chapter II, art. 4, section 2b). In Italy, many hospitals opted for a direct assumption of the medico-legal risk (i.e., no insurance coverage) or for insurance coverage with high deductible, in order to be able to directly manage (at least most of) the medical malpractice claims, improving experience of the claims manager and enabling prompt responses to errors. Careggi University Hospital (Florence, Italy) and Fondazione Policlinico A. Gemelli IRCCS (Rome, Italy) are two of the largest tertiary hospitals in Italy, with about 1500 beds each and similar annual incidences of medical malpractice claims. Careggi University Hospital has opted for a self-retention model since 2009, while in the same time span Fondazione Policlinico Universitario Agostino Gemelli IRCCS adopted four different models: A) 2010-2012: annual aggregate deductible 3.500.000 euros, per-claim deductible 10.000 euros; B) 2012-2014: annual aggregate deductible 5.000.000 euros, per-claim deductible 250.000 euros; C) 2015-2018: deductible per claim: 2.000.000 euros; D) 2018-current: deductible per claim: 5.000.000 euros. In both the institutions, the committees that analyze the claims and decide whether to compensate them or not are also composed by trained experts in Legal Medicine. Despite some authors discussed the performance of both models (direct assumption of risk and high-deductible insurance coverage), no comparative evidence is available up to date and thus hospitals cannot take evidence-based and tailored decisions for the claims management model. According to scientific literature, one of the most critical kind of claims – in terms of both economic impact and likelihood of compensation – is represented by healthcare-associated infections (HAI). Hence, in our poster we will compare the two systems focusing on the claims related to HAI, describing the incidence of actual claims and of incurred-but-not-reported claims (estimated through actuarial tools), the incidence of civil proceedings due to failed negotiation, the incidence of compensated claims and the mean compensations (adjusted to confounding economic variables like inflation). The hypothesis to be discussed is whether the hospitals' committees improved performance over time and whether insurance coverage (with different deductibles) lead to a different performance in comparison with hospitals that have never adopted one.

P02-086 | *Clinical Forensic Medicine*

General Data Protection Regulation: An Algorithmic Proposal for Forensic Photography

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The General Data Protection Regulation (GDPR) has, since 2018, regulated personal data usage within the scope of the European Union, including photography of the human body for medical purposes.
Exposing forensic professionals to this body of law is now crucial to maintaining good practices in this field, for both field work and scientific research.
After careful study of the GDPR, we designed an algorithm capable of informing forensic professionals while maintaining compliance with the law.
informed consent of the subject, acceptable image capture practices (data), data storage and security at rest, and data transfers and security in transit. All these pillars have different approaches currently in use by forensic professionals, however, only some of them are permitted under the law. We present the appropriate ways to proceed while remaining in compliance and maintaining the ability to share data critical to field and scientific works; moreover, demonstrating some of the common pitfalls. The algorithm showcased in this work facilitates compliance with European regulations relating to personal data usage, as applied to forensic photography.

P02-087 | *Clinical Forensic Medicine*

The Prevalence of Genital Injuries in Post-Pubertal Females Presenting for Forensic Examination after Reported Sexual Violence: A Systematic Review

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BACKGROUND: Sexual violence is a prevalent issue in contemporary society requiring a robust forensic healthcare response. It is critically

important that forensic examiners put clinical examination findings into an appropriate evidence-based context. The presence of genital injuries has been shown to increase the likelihood of successful criminal prosecution and report the crime. However, the reported rates of genital injury vary widely in published studies.

AIMS AND OBJECTIVES: We aim to critically evaluate and synthesize existing literature on the prevalence of genital injuries in post-pubertal females, examined following sexual violence, with a view to describing the prevalence and characteristics of genital injuries as well as the range of forensic practices employed.
Methods: Three online databases (PubMed, Embase, and Scopus) were systematically searched with key terms.

RESULTS: Of the 1224 studies screened, 141 full-text publications met the inclusion criteria. Reported injury prevalence rates varied widely. Details pertaining to forensic examinations included in each study, such as grade of the examiner, type of examination, location of examination, and time interval from assault to examination also varied widely. Injury prevalence was highest in studies where enhanced visualization techniques were utilized.

CONCLUSIONS: This systematic review demonstrates that there is no universally agreed standard for documenting genital injuries in cases of sexual violence and highlights the need for standardized approaches and guidelines for assessing, documenting, and reporting these injuries. The review provides robust evidence to support a call for establishing consistent context, terminology, classification systems, and data collection methods to improve the comparability and reliability of future research findings.

P02-088 | *Clinical Forensic Medicine*

Sexual Transmitted Infection and Child Sexual Abuse: About Two Case Reports

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Every doctor could examine the anogenital sphere in his daily practice. Genital herpes and Human Papillomavirus (HPV) in prepubertal children can be diagnosed. Possible transmission modes are sexual or non-sexual, including vertical or horizontal transmission and autoinoculation. Sexual abuse is one of the circumstances leading STI's to prepubertal children. Hence, both legal and clinical implications are involved in anogenital warts.
We report two cases of STI's in children and we aim to detail medical and forensic documentations leading to the fortuitous suspicion of sexual abuse.

CASE 1: A 3-year-old girl, with no pathological history, was hospitalized in the pediatric department at Charles Nicolle hospital in Tunis, for the treatment of perianal vesicular lesions. An anal swab was performed showing a positive HSV 1 infection. Sexual assault was suspected. She was referred to the medico-judicial consultation at the forensic medicine department at Charles Nicolle Hospital of Tunis. Examination of the genital area revealed a deep intact annular hymen. Examination of the anal region revealed vesicular lesions with an erythematous background and clear content in a bouquet mainly next to the anal margin, extended towards the intergluteal fold below and the internal surface of the root of both thighs in high, predominantly on the right. Legal investigations revealed that her father has an old HSV1 infection.

CASE 2: A 12-year-old boy, with no pathological history, complained to his mother about peri-anal pimples. He was examined by a general practitioner. The latter suspected an HPV infection and a context of sexual abuse. The child admitted to his mother that friends of his father were abusing him. A medicolegal investigation was initiated. The documentation in the medico-legal unity of Charles Nicolle hospital in Tunis, showed anal and perianal condylomas. The dermatologists confirmed the HPV infection.

Because of the psychological impact and the potential physical sequel, STI's could affect a child's life, especially when related to a context of sexual abuse. Consequently, every practitioner should suspect a sexual abuse when noticing anogenital dermatological lesions.

P02-089 | *Clinical Forensic Medicine*

Child Sexual Abuse in the Region of Monastir: A 12 Year Study

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BACKGROUND: Child sexual abuse (CSA) represented a stigmatized issue in Tunisia, owing to social and religious reasons. The aims of our study were to study the epidemiological features of CSA in the region of Monastir (Tunisia), and to highlight the particularities of the medical expertise of CSA.

MATERIALS AND METHODS: We reviewed retrospectively the records of children, consulting for sexual abuse, examined in the Department of Legal Medicine of Fattouma Bourguiba University Hospital of Monastir, between January 2008 and December 2019.

RESULTS: During the period of study, 299 children aged 17 years and below, were examined for suspected sexual abuse. Male victims were slightly more than female victims (52.1%) were. The mean age of victims was 10.2 ±3.6 years for boys, and 13, 2±4.1 years for girls. Victims had a primary education in 76.9%, and were early school leavers in 8, 4%. The most frequent types of abuse were anal penetration (45.2%), genital rubbing (34%) and fondling (24%). Physical abuse was associated in 18 % of cases. All perpetrators were men and most frequently an intimate partner (28.8%) or a stranger (28.1%). Abnormal findings in the genito-anal sphere were observed in 47.8%. In most cases (66.2%), the medical conclusions neither confirmed nor excluded the suspicion of CSA.

CONCLUSIONS: The clinical assessment of a child suspected of abuse is difficult: physical signs of sexual abuse are non-specific, and the examination can be normal. Despite the existence of strict criminal laws, the need of a more interdisciplinary approach is necessary.

P02-090 | *Clinical Forensic Medicine*

N. Gonorrhoeae Infection in Children: Diagnostic of Sexual Abuse?

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INTRODUCTION: Neisseria gonorrhoeae is a bacteria that causes infection, usually genital, whose transmission occurs vertically (i.e. transmission from mother to child at birth) or through sexual contact.
While in adolescents and adult women the initial genital infection usually involves the cervix, pre-pubertal girls are susceptible to gonococcal vulvovaginitis, as their slightly alkaline vagina, with a thin atrophic mucosa without estrogens is less resistant to gonococcal colonization. It manifests with mucopurulent discharge, vaginal itching and vulvar erythema or can be asymptomatic. Its detection in a person who is underage and without an active sexual life was for a long time considered diagnostic of sexual assault (excluding vertical transmission).

CLINICAL CASE 1: 8-year-old girl tested positive for N. Gonorrhoeae after complaining of "viscous greenish discharge". The 19-year-old sister was also diagnosed with Gonorrhea. Her mother stated that the child had "cleaned herself with the same towel as her sister" as an explanation for the infection presented, denying any suspect of sexual abuse.
During objective examination, no relevant lesions on the skin surface and no visible traumatic changes in the anogenital region were observed. According to protocol, Forensic Psychology assessment was requested, and the child revealed her sister's boyfriend was abusing her.

CLINICAL CASE 2: 3-year-old girl tested positive for N. Gonorrhoeae after complaining of whitish discharge with blood traces. No family members were identified with N. Gonorrhoeae infection.
During objective examination, no relevant lesions on the skin surface or visible traumatic changes in the anogenital region were observed. Forensic Psychology's evaluation did not reveal any situations indicating that she may have been a victim of abuse. Despite there's no suggestive history of sexual abuse, biological samples were collected. The results revealed the presence of a Y chromosome in the vaginal introitus, highly suggestive of sexual abuse.

DISCUSSION: The most recent literature reports cases of infection where sexual contact has not been identified and where its occurrence is considered unlikely, questioning alternative routes of transmission, namely through shared objects (towels or bed linen), baths thermal or even cross-contamination, particularly in nurseries. Because of that, infection by N. Gonorrhoeae has been considered highly suggestive of sexual assault in children, instead of diagnostic of sexual contact.
These two cases are examples of situations in which alternative routes of gonorrhea transmission were initially considered, as there was low suspicion of sexual abuse. However, it is imperative that all cases of gonococcal infection in children are fully investigated since, as these cases demonstrate, gonorrhea remains highly suggestive of sexual abuse, with non-sexual transmission being of a remote probability and an exclusion diagnosis.

P02-091 | *Biology in Forensic Medicine*

Detection of Isoalleles and Flanking Region Mutations At 7 X-STRs by MPS

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The introduction of massively parallel sequencing (MPS) in the forensic genetic field has made it possible to acquire information regarding the size and sequence of commonly used short tandem repeats (STRs) markers.
In particular, MPS allowed for detecting the potential presence of sequence variations both in the repetitive motifs of alleles of identical size under a homozygosity state, i.e., identifying two distinct isometric sequences (iso alleles), and in the flanking regions of the marker. Compared to what was found in CE, the sequence mutations highlighted using MPS methodology generate "new" alleles that increase in number and positively influence the forensic genetic parameters initially evaluated in a population, such as improved the power of discrimination (PD).
In this study, the DNA extracted from buccal swabs of seventy-two unrelated females native from North-East Italy, previously genotyped with Investigator Argus X-12 QS Kit (Qiagen) using a CE platform (SeqStudio Genetic Analyzer for HID- Applied Biosystems), were genotyped by MPS technique.
For this purpose, the ForenSeq™ DNA Signature Prep kit/DNA Primer Mix A (Verogen, San Diego, CA, USA), which includes primers for amplification of 7 X-STRs, was used for library preparation, and sequencing was performed using MiSeq FGx™ Forensic Genomics System (Illumina). Data analysis was done using Universal Analysis Software (UAS) v1.2 (Verogen). Subsequently, the output FASTQ files from the UAS pipeline were re-analyzed using STRait Razor v3 (SR3), and the X-STR genotypes were compared with those obtained with UAS.
A complete concordance of length-based alleles between CE and MPS was found. When the analysis was conducted based on the allelic sequence, both UAS and SR3 revealed the presence of isoalleles in some homozygous genotypes of the DXS10103 and DXS10135 markers; the latter was also the marker with the highest number of isoalleles (24 isoalleles). In addition, at the DXS10074 locus, SR3 revealed the presence of SNPs in the flanking regions.
Isoalleles and SNPs in flanking regions involve a change from a homozygous state based on allele length to a heterozygous state based on sequence. This phenomenon is evident in this study: it was observed that the frequency of homozygotes for the DXS10103 locus decreases from 43.06% to 26.39%, and conversely, heterozygosity increases from 56.94% to 73.61%."
The observed decrease in homozygosity has an impact on the discrimination power of the three X-STRs, leading to an increase from 0.952 to 0.959 for DXS10074, from 0.978 to 0.983 for DXS10135, and from 0.876 to 0.921 for DXS10103.
Overall, sequence variations seem to strengthen the forensic parameters of genetic markers, allowing more efficient application in different forensic settings.

P02-092 | *Biology in Forensic Medicine*

Experiences of the Civil Police of Minas Gerais Related to the Largest Regional Bank of Genetic Profiles in Brazil

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The Integrated Network of Genetic Profile Banks (RIBPG) was created in 2013 with the main purpose of maintaining, sharing and comparing genetic profiles in order to assist in criminal investigation and procedural instruction. This is a joint action between the Public Security Secretariats, Civil Police, Scientific Police, Federal Police and the National Public Security Secretariat (SENASP) to share genetic profiles obtained in forensic genetics laboratories. Regularly, the genetic profiles stored in databases are compared in search of coincidences that allow suspects to be linked to crime scenes or different crime locations with each other. In the context of criminal investigation, genetic profiles originating from traces of crime scenes are compared with each other, as well as genetic profiles of individuals registered criminally under criminal enforcement law or by court order. Another primary use of the genetic profile bank is the identification of missing people. In November/2023, there were 207,359 genetic profiles registered in the national database. The Civil Police of Minas Gerais is the federation unit with the largest regional bank, counting, on the same date, 26812 registered genetic profiles. Most of the genetic profiles in Minas Gerais refer to convicts and, secondly, to traces of crime. The present study is intended to detail the strategies of the Civil Police of Minas Gerais to obtain the largest regional database of genetic profiles in Brazil, the 117 criminal investigations already assisted by RIBPG and the challenges to improve the project.

P02-093 | *Biology in Forensic Medicine*

Characterization of the 172 SNPs included in ForenSeq™ DNA Signature Prep Kit

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Massively parallel sequencing (MPS) methodology allows the typing of a significant number of different genetic markers in a single reaction, optimizing the amount of DNA available for analysis and providing information on allele sequence variations detected in each locus. Compared to analysis performed by capillary electrophoresis (CE), the advantages provided by MPS positively influence the forensic parameters that characterize individual populations.
To solve complex cases of forensic genetics, such as individual identification, kinship testing, mixture deconvolution, biogeographic and phenotypic identification, in which the analysis of STRs alone does not provide conclusive data, the use of various sets of single nucleotide polymorphisms (SNPs) could represent the correct methodological approach.

In this study, three different classes of SNPs were characterized: identity-informative (iiSNPs), phenotypic-informative (piSNPs), and ancestry-informative (aiSNPs).
For this purpose, twenty-one unrelated native subjects from North-East Italy were genotyped with the MPS technique. The ForenSeq™ DNA Signature Prep kit/DNA Primer Mix B that contains primers for amplification of compressively 172 SNPs (94 iiSNPs, 22 piSNPs, and 56 aiSNPs) (Verogen) was used for library preparation, and sequencing was performed using MiSeq FGx™ Forensic Genomics System (Illumina). Data analysis was done with Universal Analysis Software (UAS) v1.2 (Verogen). Subsequently, the output FASTQ files from the UAS pipeline were re-analyzed using STRait Razor v3 (SR3), and SNP amplicons were compared with those obtained with UAS.
Furthermore, the effective number of alleles (Ae), allele (haplotype) frequencies, and relevant forensic statistic parameters (observed heterozygosity (Ho), expected heterozygosity (He), matching probability (MP), power of exclusion (PE), power of discrimination (PD)) were calculated.
For each of the three classes of SNPs, two categories were identified based on the revealed allele or haplotype: non-variable haplotypes (bi-allelic SNPs) and microhaplotypes (MHs) that present at least two SNPs capable of generating ≥3 haplotypes.
Out of the 94 iiSNPs, 72 were bi-allelic SNPs, and 22 presented microhaplotypes characterized by 30 unique haplotypes. For the 56 aiSNPs, 48 non-variable haplotypes were revealed, and 6 showed unique microhaplotypes. For one of the latter, the rs1919550, the nomenclature was manually assigned due to the lack of identification by SR3, probably because the nucleotide mutation revealed in this study was not present in its sequence string-matching database. Of the 22 piSNPs, four revealed microhaplotypes with 9 unique haplotypes, and 13 bi-allelic SNPs were identified.
Overall, the presence of MHs at 34 of the 172 SNPs included in the ForenSeq™ DNA Signature Prep kit converts the polymorphism from a biallelic to a multiallelic SNP, generating a 13% increment in the typologies of unique sequences found, which leads to an increase in the discrimination power of the panel of SNPs adopted.

P02-094 | *Biology in Forensic Medicine*

Ketoacidosis in Putrefied Bodies: A Guide to the Differential Diagnosis Among Diabetic Ketoacidosis, Alcoholic Ketoacidosis, and Hypothermia

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Both forensic practice and literature provide many examples in which autopsy findings, especially in advanced decomposed bodies, cannot assign a clear cause of death. In such circumstances, severe cases were established as Ketoacidosis-related-deaths, therefore biochemistry analysis should be performed in order to evaluate whether metabolic alteration could be considered as the main lethal mechanism. Nevertheless, the results achieved may be complicate to evaluate, since some molecules could be attributable to both putrefaction and pathological premortem processes, among which Ketoacidosis represents one of the most recurring.
A 48 years old corpse was found along with medications, clinical documentation and daily glycemic diary which allow to establish HIV-positive status and diabetes mellitus of recent onset complicated with Ketoacidosis requiring hospitalisation three months before.
An autopsy was carried out in order to discover the cause of death. Given the anamnesis along with the impossibility of assigning a clear cause of death with macroscopic findings alone, the following analyses were performed on blood specimens: determination of abused substances profile, acetone, ethanol, BHB, ETG.
The autopsy showed mummification changes in skin tissue contextually to some larvae. The colliquation of viscera and other structures made it ardours to discover any alteration explanatory of the cause of both through macroscopic inspection and microscopic investigations. Toxicological investigation of commonly used drugs turn out to be negative. Biochemical analyses results:
- Acetone: 179 mg/dL
- BHB: 429,12 mg/L
- Ethanol: 1,05 g/L
- EtG negative

A further review of forensic literature was performed in order to achieve reliable thresholds to distinguish the main origins of high acetone blood levels which can be related both to putrefaction and pathological conditions, among with the most frequent are diabetic ketoacidosis, alcohol ketoacidosis and hypothermia fatalities.
Given blood acetone level exceeding the threshold of 20 mg/dL, BHB is requested in order to differentiate the origin of high acetone levels. The value obtained consists with antemortem Ketoacidosis, since BHB formation couldn't be attributable to this process. As ethanol is concerned, the high value was ascribable to putrefactive fermentation seen as negative EtG, which is proved to be the evidence of in vivo alcohol ingestion. The cause of the ketoacidosis was established in relation the anamnestic presence of diabetes mellitus recently uncompensated by ketoacidosis inasmuch glucose blood level could be determined both in blood and VH specimens, owing to advanced decomposition state.
The case as above suggests the importance of biochemical analyses in forensic practice which need to be evaluate along with autopsy findings. In this study a flow chart is performed with the purpose of illustrating biochemical analyses and the related differential diagnosis in order to assign the actual cause of death.

P02-095 | *Biology in Forensic Medicine*

An Italian "Body Farm" Experience: Transdisciplinary Methods to Study the Decomposition of 45 Human Heads Buried in Three Different Types of Soil

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The post-mortem interval (PMI) estimation of human skeletal remains is one of the most important issues in forensic sciences. Although new studies are published regularly, PMI evaluation remains a challenge in forensic practice, especially for intermediate and later stages of decomposition, because the accuracy and applicability of the existing methods remain weak. The complexity of PMI estimation is due to many variables related to physical, biological, and chemical changes. In cases of discovery of buried human remains, the difficulties of analysis reside in the relationship between the corpse and the deposition soil. The soil and the human body determine a modification of their characteristics through a reciprocal organic and inorganic exchange, which will be different according to the type of deposition soil. Buried bodies are known to decompose markedly differently than exposed ones. However, data on how established methods for estimating PMI perform under these conditions are scarce, and studies on different soil types are not currently available.
Moreover, much of the published literature on post-mortem interval estimation has been based on non-human animal subjects as proxies for humans, including rats and pigs. However, recent studies demonstrated different decomposition patterns and trajectories in humans for each season.
In this project we created, for the first time in Italy, an open-air lab dedicated to better understanding the pattern of human decomposition, thanks to the experience of American body farms. During this study, 45 heads belonging to human bodies donated to science have been buried in a field of 200 m2 located inside the cemetery of Varese to investigate the trend of cadaveric decomposition over two calendar years. In this area we excavated 45 holes, in which heads will each be placed approximately 1.5 meters from each other at a depth of 40 cm. Data

logger have been positioned near heads to constantly record all the data relating to the temperature and humidity of the surrounding soil. The holes have been filled with different soils: agricultural, clay, and riversand. We'll exhume the remains after 4, 8, 12, 16 and 20 months to acquire data on the progress of the experiment in several steps.
At each time, anthropological and entomological investigations, microscopic (optical and with ESEM) and proteomic analyses on frontal bone, and microbiome of the brain cavity studies will be performed.
The project aims to develop new transdisciplinary methods useful for estimation of PMI of the intermediate stages of decomposition, through an inter and multidisciplinary approach, and support the creation of a lab under conditions closer to reality than previous experiments performed on animals or de-fleshed human bones performed in the laboratory. Furthermore, this setting will allow to study the putrefaction of buried bodies and the influence of the different types of soil.

P02-096 | *Artificial intelligence in Forensic Sciences*

Using Deep Attention Multiple Instance Learning to Improve Malpractices Detection in the Health Sector

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In this study we developed a machine learning model to quantify the risk of malpractice based on historical medical claims data. The results are applied to improve the detection of malpractices in the context of the Catalan healthcare system. The system considers data about the medical facility, clinical staff, patient, law, and environmental conditions.

Our model is based on a supervised learning framework, where real claim data is available in tabular form and tagged with a binary label indicating risk or no risk. However, differently from traditional supervised learning tasks, in our setting each claim consists of a variable number of rows accounting for different instances of e.g. treatments or facilities involved.

To overcome that challenge, we propose a risk prediction method based on the state-of-the-art Deep Attention Multiple Instance Learning (DAMIL) model, specifically designed for healthcare applications, with a primary focus on predicting and preventing malpractice. The model is capable of assigning a risk probability to each claim, but also incorporates an explainability mechanism to indicate, when possible, to what degree each individual instance in the claim weighs in the calculation of the risk estimate. This enhancement is geared towards improving accuracy, interpretability, and overall applicability of AI algorithms in complex medical scenarios and opens interesting directions for the application of artificial intelligence in the interest of a safer and more efficient healthcare system.

Furthermore, we analyze the impact of predicting risk in medical claims using our model compared to the traditional assessment from experts. We prove that our model is more efficient than expert classification of claims, suggesting that economic positive impact can be derived from automatically predicting the claims with medical malpractice.

P02-097 | *Artificial intelligence in Forensic Sciences*

Sex Classification for Forensic Identification Based on GMA-AI Approach

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BACKGROUND: Given the significant sexual dimorphism influencing the size and shape of teeth, the Geometric Morphometric Analysis (GMA) of 3D occlusal surfaces of dental crowns seems to be an excellent tool for sex determination but requires the processing of a very significant number of variables.
Scope: The study aims to develop and validate an algorithmic approach to the GMA of premolars and molars for the purposes of sex classification.
MATERIALS AND METHODS: The pilot study followed two phases: firstly, we developed and validated the GMA-AI method using only one premolar tooth; secondly, we used a pattern of premolar and molar teeth. For the first phase, scans of the upper left premolars of 100 Caucasian Italian adults (50 females and 50 males) were collected. Inclusion criteria consisted of sound teeth, without treatments and tooth wear. An operator used the Viewbox 4.0 software to place and digitize the reference points (landmarks and semi-landmarks) on the occlusal surface of the teeth. Within the GMA, a General Procrustes Superimposition (GPS) and the Partial Least Square (PLS) analyses were performed, respectively, to study the shape variance between sexes and to eliminate landmark variations. The data obtained was used to create an artificial neural network for sex classification. For the second phase, the first and second left premolars and the upper left first molar of 230 Caucasian Italian adults (115 males and 115 females) were included in the study. The sample was completely different from the first phase sample to further validate preliminary results. Inclusion criteria and GMA analyses were conducted with the same protocol but shape and size variations between males and females were studied by GPS and the Principal Component Analysis (PCA). The ANN obtained with the new data was different from the previous one. For both ANNs, a "set-aside" approach was used to assess their accuracy: 75% of the samples were used to create and train the algorithms, while the remaining 25% were used to test the discriminatory and predictive potential of the ANNs.
RESULTS: Accuracy rates yielded by both methods in classifying sexes resulted in higher than 84% for the training sample and higher than 80% for the test sample. The combined use of GMA with ANN shows an excellent capability to classify by sex compared to odontometric and morphometric traditional methods, highlighting that females are more likely to be correctly classified, while males are more likely to be not misclassified. The shape variation between male and female premolars represents the best dimorphic feature compared with the first upper molars.
Future research is ongoing toward a complete automatic landmark placement that will allow for a consistent reduction of processing time compared to both previous traditional and the here proposed approaches.

P02-098 | *Bioethics & Medical Law*

Viability and Economic Sustainability of the Model of Professional Medical Liability of the Council of Medical Associations of Catalonia (Spain)

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In Catalonia, Spain, there is a singular and unique model of medical professional liability (MPL) insurance that is considered highly beneficial as a reference for professionals, the administration, citizens, society and patients. The joint policy of the Council of Medical Associations of Catalonia (CMCC), voluntary and contracted jointly with the Catalan Health Service (CatSalut), is managed in a coordinated but individual and independent manner. The main characteristic of the model is the delegation of the claims' management, administrative processes and defence in claims by the insurer of the model to the policyholders (CCMC and CatSalut), which allows the empowerment of the medical professionals in the management of Catalonian MPL insurance.

In view of the difficulties in obtaining insurance coverage for MPLs worldwide (U.S., Europe and Spain), the CMCC model was examined to verify its feasibility and economic sustainability.

The CMCC model was examined through a retrospective analysis of the number of claims and the cost compensated by specialty of the medical act of the claims for alleged malpractice filed with the Council of Medical Colleges of Catalonia (CCMC) between the years 2002 and 2017, claims covered by the MPL policy of the CCMC insurer (sample of 4.832 claims), with the aim of analyzing and drawing conclusions about the medical acts with the highest frequency of claims and economic impact. The feasibility and economic sustainability are analyzed in terms of cost compensated in the period 2002-2017 in relation to the premium paid to the insurer to cover the risk.

The result was evidence that clinical safety initiatives have a positive impact on sustainability and viability through knowledge and exploitation of data, modification of medical actions, minimization of the risk of adverse events, prevention of claims, improvement on clinical safety and contribution to medical education.

1. Medical malpractice insurance crisis continues worldwide (U.S., Europe and Spain).
2. The delegation of the claims' management allows empowerment of the medical professionals in the management of Catalonian MPL insurance.
3. The analysis of policy claims is a source of knowledge.
4. Analysis demonstrates that clinical safety initiatives have a positive impact on sustainability and economic feasibility of the MPL policy.
5. Direct management by medical professionals in accordance with the principles and values of the medical professional as a whole allows beneficial measures such as guidelines to ensure clinical safety: clinical practice guidelines, quality programs, etc.
6. The achievement of unquestionable improvements through management based on good medical practices and learning from errors is beneficial to patients and leads to a substantial reduction in the number of claims and cost of errors.
7. Defensive medicine and its corresponding health and economic costs are prevented.

P02-099 | *Bioethics & Medical Law*

Professional liability in Urology for Patient Death in Catalonia (Spain) from 1986 to 2023

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The Council of Medical Associations of Catalonia (CCMC) manages most of the professional liability insurance policies in Catalonia (currently with more than 26,500 insured doctors) and has registered all the claims suffered by insured professionals since 1986. Between 1986 and 2023, there were 11,092 claims, of which 288 (2.6%) related to the specialty of Urology (currently the ninth most demanded specialty in our environment).

Of the total 288 claims (n=43) in Urology, 14.93% (n=43) were due to the death of the patient. The analysis of the annual number of cases related to patient death during this period showed a stable trend.

In terms of cases where the procedural route was registered, 15% of complaints were out-of-court, 26% were civil and 59% were criminal (showing a significant increase in this route in relation to the percentage of criminal cases in the Urology specialty as a whole).

In 9 of the 43 cases, the complaint was related to major urological surgery (20.9%), in 8 to bladder neoplasia (18.6%) and in 7 (16.3%) to prostatectomy.

Regarding the existence of professional liability in the cases registered, either by sentence or out-of-court settlement, of the 27 cases closed (62.79%) in the period 1986-2023, professional liability was assumed in 29.63% of the cases (n=8), with an uneven distribution according to the procedure: 42.9% (3 of 7) in civil proceedings (same percentage as in the total of the Urology specialty) and 25.0% in criminal proceedings (4 of 16) and in out-of-court proceedings (1 of 4).

The stability in procedures of professional liability regarding to cases with patient death in Urology over the period studied by the CCMC and the relatively low rate of compensation shows that this special cases of Urology specialty has the same risk of liability than the rest of cases of Urology in our scenario.

P02-100 | *Bioethics & Medical Law*

Evaluation of Requests for Correction/Deletion of Medical Records in Terms of Forensic Medicine

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INTRODUCTION: Accurate and comprehensive information in patients' medical records is vital for effective treatment and patient safety. Patients may request changes or deletions by citing errors or even without any mistake changing the given medical history within the framework of the human rights and the Personal Data Protection Law (PDPL). If the Ministry of Health is uninformed, those alterations can lead to accusations of record falsification and pose medicolegal challenges. This presentation aims to explore these issues within the context of national and international laws, ethical declarations, and forensic sciences awareness.

CASES: The ten most frequent medico-legal cases encountered in our department are outlined below:
1: "I am moving to Canada, thus, resenting my country. Thus, I want all my medical records in my country to be deleted."
2: "I am single, so I want my □-HCG results and abortion records to be deleted."
3: "I do drugs, I don't want it to be recorded, I know it is a crime."
4: "I want my HIV-positive record to be deleted."
5: "I would like to request the deletion of the blood ethanol test after the traffic accident, as I have a lower blood ethanol value from another center I consulted three hours later."
6: "I would like to have my cancer diagnosis removed because it's causing my insurance costs to be too high."
7: "I want the diagnosis of autism spectrum disorder for my child to be deleted, no other center has this diagnosis."
8: "I told that I had anal intercourse, then had constipation, I saw this information was recorded, I want the information about anal intercourse to be deleted"
9: "I would like the information that my injury happened at work to be deleted, I was injured at home."
10: "I want my psychiatric diagnoses to be deleted from the system, I have recovered, I cannot get a gun license, I am a security guard."

DISCUSSION AND CONCLUSION: The Patient Rights Regulation and PDPL grant citizens the right to request data changes/deletions carried out within the framework of the Ministry of Health General Directorate of Health Information Systems Methodology to be Applied in Erroneous Health Records dated 04.09.2023. PDPL and international laws allow the deletion of health data in cases such as gender transition, psychological treatment, chronic diseases, and disability within the scope of the right to be forgotten. Applications must align with legislation, ethical obligations, human rights, and data privacy. Effective use of the "medical record hiding" feature in Turkey's online medical database -named as "E-NABIZ"- can reduce correction/deletion requests. Concerns among healthcare professionals about public security risks possibly rooted from the lack of knowledge about regulations underscore the need for robust medical-legal consultations.

KEYWORDS: Erasure of medical records

P02-101 | *Bioethics & Medical Law*

Professional Liability in Dermatology in Catalonia (Spain) from 1986 to 2023

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The Professional Liability Service of the Council of Medical Associations of Catalonia (CCMC) manages the majority of professional liability policies in Catalonia (more than 26,500 doctors) and has been recording all claims against insured professionals since 1986.

Between 1986 and 2023 11,092 claims were identified, of which 150 (1.4%) related to the specialty of Dermatology, which shows that this specialty has a relatively low risk of claims. Furthermore, analyses of the annual number of cases during this period showed a stable trend.

In terms of procedures, 62% of complaints were out-of-court, 15% were civil and 23% were criminal. The main reason for complaint was burn in relation to treatment (24.6%), followed by an error in practice for melanoma (21.3%), follow-up for carcinoma other than melanoma (12%) and an error in cosmetic treatment (12%). In 46% of cases, the complaint was not about surgery, in 42% it was about surgery and in 12%, it was about diagnostic or therapeutic procedures.

Regarding the existence of professional liability in the cases registered, either by sentence or out-of-court settlement, of the 112 cases closed (74.66%) in the period 1986-2023, professional liability was assumed in 28.6% of the cases (n=32), with an uneven distribution according to the procedure: 12% in criminal proceedings, 23.5% in civil proceedings and 35.7% in out-of-court proceedings. The average amount in the 32 compensated cases was 33,040.09 euros, with an unequal distribution according to the type of litigation: 61,315.94 euros in the civil procedure, 33,164.27 euros in the criminal procedure and 28,501.05 euros in the extrajudicial procedure.

The stability of the claim rate in dermatology over the period studied by the CCMC, the high rate of out-of-court claims and the low rate of compensation and its amounts show that Dermatology is a specialty with a low risk of professional liability in our scenario.

P02-102 | *Bioethics & Medical Law*

Ethical, Political and Technical Issues in the Clinical and Radiological Assessment to Estimate Age in Children in Colombia

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The clinical and radiological assessment to estimate age should only be done when its benefits for each individual outweigh the risks of radiological exposure, the economic costs for the State, the availability of qualified human resources to carry out the assessment and the impacts of the evaluation of sexual maturation on the people examined. All this within the framework of Constitutional protection in Colombia where children and adolescents have a higher interest according to international frame of children's rights.

Among the required criteria to carry out a clinical age assessment in people who report being under 18 years of age are: Official request, informed consent by a legal representative or agent of the public ministry and assent by the person to be examined, two clinical medical assessments of weight, height, Tanner; psychomotor development (under 7 years old) with a minimum distance of 6 months; Report of ossification, epiphyseal formation, epiphysis-metaphysis relationship, fusion in carpal radiography by Greulich and Pyle method for individuals between 2 and 15 years. Report of the degree of epiphyseal fusion in radiography of the ulna and radius for individuals around 18 years of age. (Optional if there is a dental radiological evaluation) or Dental radiography report for individuals between 10 and 18 years old by Demirjian, Goldstein and Tanner and modified Mincer method (Periapical radiographs).

We developed a Dental Automatic Detection System Using YOLOv8 in Panoramic Radiographs. YOLOv8 deep learning architecture for the identification of primary and permanent teeth in panoramic radiographs. Panoramic radiographs from 2830 anonymized Colombian patients, aged 3 to 24.9 years, were collected. The labeling of permanent and temporary teeth was conducted using the Roboflow ® program.

P02-103 | *Bioethics & Medical Law*

Assisted Dying: A Focus on Legislation and Ethical Aspects in Tunisia and around the World

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BACKGROUND AND OBJECTIVE: The last decades have seen a skyrocketing increase in the interest around the topic of assisted dying and its ethical complexities, which are still subject to countless debates. Due in part to a rapidly aging population, the conversation around physician assisted suicide and euthanasia is still ongoing and legislations differ greatly from one nation to the other.
This study aims to discuss the legislative and ethical aspects of assisted dying around the world by carefully analyzing laws and a selective review of the literature around the subject.

DISCUSSION: As of 2024, euthanasia is defined as the act of putting an end to a patient's life at that patient's explicit request, and it is legal in seven countries: starting with the Netherlands in 2001, Belgium, Luxembourg, Colombia, Canada, New Zealand, and lastly Spain in 2021. Portugal is potentially going to join this list, awaiting the regulation's approval.
Concerning physician assisted suicide, which is for a patient to end their own life using drugs prescribed by a healthcare professional, Switzerland was the first in 1942 permitting individuals to assist in another's suicide if the motive for doing so is not 'selfish.' In the United States it was pioneered in Oregon in 1994 and joined later by 10 more states. Australian legislation is similar, with Victoria being the first in 2017.
In Tunisia and many other countries, including France, England, China, and all Muslim countries, active euthanasia and assisted suicide are illegal and punishable by law, being qualified as either voluntary homicide, murder, or non-assistance to a person in danger.
An interesting practice that surfaced is passive euthanasia, which is intentionally letting a patient die by withholding artificial life support such as a ventilator. In fact, it is not rare to withhold life support from terminally ill patients in countries where the other forms of euthanasia are illegal. The artificial prolongation of life by use of machines can be seen by some as a cruel and undignified way for someone's life to end.
The ethical discussions surrounding assisted dying are complex. Advocates assert that these procedures uphold the patient's autonomy, providing the option to choose dying with dignity. However, critics argue that euthanasia and physician-assisted suicide go against the medical code and the Hippocratic Oath, while also opposing societal and religious norms.

CONCLUSION: Given the current legal void around assisted dying in most countries and the debate concerning its ethical issues, finding a compromise between established societal and religious norms, the patients autonomy and his fundamental right to life, and a transparent legislation is key to finding solutions in this debate.

P02-104 | *Bioethics & Medical Law*

Assessment of Medical Staff's Knowledge on the Health Rights of Persons Deprived of Liberty

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BACKGROUND: "Persons Deprived of Liberty" refers to individuals who are under legal authority or judicial processes, such as those who have been confined, incarcerated, detained, or otherwise, and have been temporarily stripped of their right to freedom due to their conviction or accusation.
Regardless of the nature of their actions, they retain all their fundamental rights as human beings and have the same rights to enjoy good physical and mental health, as well as to receive a standard of medical care at least equivalent to that enjoyed by the general population.
The aim of this project is to assess the medical staff's awareness of the right to health of individuals deprived of their liberty, with a view to enhancing the quality of care provided to this vulnerable population.

METHODS: This study is a descriptive cross-sectional study involving public sector medical staff. Data collection was carried out using a pre-defined anonymous questionnaire, carefully designed to address specific questions about the healthcare entitlements and rights of individuals deprived of their liberty.

RESULTS: A total of seventy-two responses to the questionnaire were collected. Only one respondent managed to answer all questions correctly. Participants' ages ranged from 26 to 52 years, with an average of 32.61 years ± 3.74. Among the respondents, 83.33% were physicians, with a significant proportion being residents (66.66%). The study covered ten medical specialties and two surgical specialties. The data indicates that the majority of participants have an adequate level of knowledge about the right to health of individuals deprived of their liberty.
Specifically, 77.78% of participants had an average level of knowledge, 16.67% had good knowledge, and 5.55% had poor knowledge.

DISCUSSION-CONCLUSION: The level of awareness of judicial and medico-legal concepts among healthcare professionals varies, potentially affecting the quality of patient care and the doctor-patient relationship. It is worth noting that medical staff who underwent post university education in medical law and health ethics have demonstrated a higher level of knowledge, evident in their more pertinent responses to the questionnaire. These findings underscore the importance of ongoing education in enhancing professionals understanding of legal and ethical aspects in healthcare.

Poster Discussion Session 3

P03-001 | *SARS CoV2*

Retrospective Investigation of Acute Substance Intoxication Pre and Post COVID-19 in a Poison Control Centre

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INTRODUCTION: The COVID-19 pandemic has profoundly impacted the habits of the global population, forcing individuals to experience a more daily relationship with the concept of health risk. Previous studies have underscored a statistically significant surge in consultation requests to poison control centres to address intoxication during the onset of the COVID-19 pandemic.

MATERIALS AND METHODS: This research is a monocentric observational study assessing the telephone consultations provided by our poison control centre between January 1, 2019 and December 31, 2022. Data from a total of 19,918 telephone consultations were processed. We implemented a temporal division into subgroups based on the epidemiological trend of positive COVID-19 cases across Italian territory and the lockdown measures enacted by the Italian government to combat the pandemic. 12 categories of substances involved in potential poisonings have been identified.

RESULTS: The Medical devices, Household Products and Cosmetics categories exhibit an increase in the number of calls during the pandemic phase. The call distribution for Drug intoxication exhibits a general decrease during the pandemic period. For anti-inflammatory and antibiotic subcategories of drugs, a decreasing trend is confirmed, despite a major use from the population. In contrast, the distribution of calls related to cardiological drugs follows a different trend, with a large number of call counts registered during the pandemic period. We also observe a seasonal trend over the four years studied, particularly in the Animals and Phytopharmaceuticals categories.

CONCLUSIONS: We have demonstrated the impact of cosmetics and medical device use, especially disinfectants, on the incidence of intoxication during the COVID-19 pandemic.
The increase in cardiological drug misuse during the pandemic and the reduction in analgesic/anti-inflammatory and antibiotics misuse during the lockdown phase suggest that public health choices and population's general behaviour could have impacted the type of intoxication that clinicians found themselves managing.

P03-002 | *Forensic Toxicology*

Fatal Diazoxon Poisoning – Case Presentation

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Diazoxon is an organophosphorus insecticide, widely used to control plant pests and animal parasites, resulting in widespread availability and the potential for accidental or intentional human exposure. The most common route of poisoning is ingestion. We present two fatal intoxications after accidental exposure. A 7-year-old girl and a 10-year-old girl were found with significantly decreased consciousness when the ambulance arrived. The response was negative, despite complete resuscitation measures. A solution containing diazoxon was applied by their grandmother to their hair to treat head lice. The solution was kept in an unlabeled 500 mL beer bottle. The post-mortem examination revealed cyanosis, inflammation of the mucosa of the upper and lower respiratory tract, esophagus and stomach, with petechial hemorrhages throughout pleural serosa, erosion of esophagus, laryngeal and gastric mucosa, visceral stasis and edema. Blood, bile, brain, gastric contents, kidney and liver were collected for toxicological analyses. Fragments of organs and skin were sent to histopathological examination. Tissues and body fluids were analyzed for general toxicological examination by HPLC and GCMS. Diazoxon was detected in blood sample, but not in the gastric contents. The general toxicological screening for the other biological products was negative. The cause of death was fatal poisoning by diazoxon inhalation, and the manner of death was accidental exposure. Raising awareness about the correct use of toxic substances and about the compliance with the rules of storage and labeling of toxic substances can prevent poisoning.

P03-003 | *Perinatal Medicine & Deaths in Pregnancy*

Fatal Clostridium Perfringens Sepsis Following a Spontaneous Abortion

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Maternal sepsis is a life-threatening condition defined as organ dysfunction resulting from infection that can occur during pregnancy, childbirth, post-abortion, or in the post-partum period. It is the third leading cause of maternal death worldwide, after hemorrhagic and vascular complications. We report the case of a 41-year-old woman who died of Clostridium perfringens sepsis after an early septic miscarriage.

The patient presented to the emergency department with abdominal pain and metrorrhagia, after 9 weeks of amenorrhea with no suspicion of pregnancy. Vital signs, including body temperature, were initially normal, and the abdomen was soft with mild pelvic tenderness. There was no active bleeding and the cervix looked normal without signs of trauma on gynecological examination. Biological analyses showed normocytic anemia, inflammation (neutrophilic leukocytosis, elevated CRP and PCT) and elevated Beta-HCG. An ultrasound revealed a thickened endometrium and intrauterine residuals in favor of a miscarriage. Shortly after her admission, the patient developed a shock with impaired consciousness, hypothermia, cyanosis and jaundice, followed by a cardiorespiratory arrest refractory to resuscitation. Laboratory analyses performed during resuscitation were consistent with septic shock with massive hemolysis and coagulopathy.

At autopsy, the patient was an obese woman in a advanced state of putrefaction despite prior body refrigeration. The uterus was enlarged and contained 50 g of soft, bloody residual tissue, with no traumatic injury of the genital tract which could suggest an unsafe induced abortion. There were a 500 mL bloody peritoneal fluid effusion, splenomegaly, and reddish pseudomembranes lining the abdominal organs, as well as the cardiac cavities. The bladder contained a few millilitres of black urine. Histology confirmed the intrauterine retention of feto-placental material, with secondary infection and cardiac and cerebral septic thromboembolism. Microbiological analyses revealed the presence of C. perfringens in the uterus, peritoneal fluid and peripheral blood, confirming the sepsis and its genital origin.

C. perfringens is an anaerobic bacteria commonly found in the human digestive flora, and capable of producing necrotoxins that can cause massive hemolysis. C. perfringens sepsis is a relatively rare but potentially fatal condition which occurs preferentially in patients with high-risk comorbidities such as cancer. C. perfringens has also been reported to cause genital and general infections in women, particularly after induced abortion. The incidence of sepsis following spontaneous abortion is not known but is considered to be very low. Only a few cases of fatal clostridial sepsis secondary to a septic miscarriage have been reported in the literature. This case emphasises the diagnostic difficulties and the potential severity of maternal C. perfringens infections, which are characterized by nonspecific symptoms and a rapid course that can result in a fatal outcome in the absence of appropriate treatment.

P03-004 | *Forensic Toxicology*

Exploring Cerebrospinal Fluid: A Pilot Study on Collection Protocols and Forensic Toxicological Implications

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BACKGROUND AND AIM: Since Cerebrospinal fluid (CSF) is an ultrafiltrate of plasma, it keeps similar chemical and physical proprieties. CSF consists mainly of water with a low content of cells and proteins. The study of its use in post-mortem (PM) analysis is still ongoing and only a few of analytical methods are available in literature. Collection sites and procedures can directly affect the quality of CSF, mainly in terms of blood contamination. This study aimed to a double scope: i) comparison of two collection procedures and ii) validation of highly sensitive analytical methods for quantification of the main drugs of abuse and their metabolites (i.e. cocaine, ketamine, amphetamine, MDPV, 6-monoacetylmorphine, morphine, codeine, methadone, fentanyl) by liquid chromatography – tandem mass spectrometry (LC-MS/MS).

METHODS: Samples of liquor and peripheral blood were obtained during autopsies performed in the early post-mortem period (absence of signs of putrefaction) at University of Florence (Florence, Italy). CSF was collected from the spinal cord putting the corpse in fetal position (when possible) or from the abdominal cavity after evisceration. A protein precipitation with addition of acetonitrile was adopted as sample treatment. After drying and reconstitution with methanol, the mixture was analysed in LC-MS/MS in positive ionization mode. Two transitions were used for detection of each analyte. Blood samples were useful to evaluate the correlation between the two biological fluids in case of positivity for a drug of abuse.

RESULTS: A validated protocol for sampling is needed since this operation is technically difficult: being this anatomical district highly vascularized, it is particularly challenging to collect a pure sample without a blood contamination. During this study, advantages and drawbacks of each procedure were evaluated and listed. A new analytical method for quantification of several illicit drugs was fully validated according to the most-updated forensic-toxicological guidelines.

CONCLUSION: This pilot study demonstrated how CFS can be considered an alternative matrix for PM analysis.

P03-005 | *Forensic Toxicology*

A Validated Gas Chromatography-Mass Spectrometric Method for the Determination of 9 Amphetamines and 7 Cathinones in Biological Samples of Forensic Cases

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Amphetamine type stimulants (ATS) are ranked third of misused drugs after cannabis and opioids worldwide. Synthetic cathinones (SCs) are structurally similar to ATS with some variations on their chemical and pharmacological properties and they represent the second biggest class of new psychoactive substances (NPS) after synthetic cannabinoids that are currently monitoring by the Early Warning System of EMCDDA. NPS are structurally modified molecules that are sold over the Internet or in head shops under the names “research chemicals” or “designer drugs” or “bath salts”, with the statement that they are “not for human consumption” in order to avoid law enforcement. The increasing rate of NPS in illicit market, in combination with the clinical cases of poisonings that are reported in the emergency departments of hospitals or the forensic cases involving drug fatalities, highlights the importance of developing new methods for the determination of these substances.

The aim of this study was to develop a sensitive GC/MS method for the simultaneous determination of 9 ATS (amphetamine, methamphetamine, ephedrine, pseudoephedrine, phenylpropanolamine, MDMA, MDA, MDEA, and MBDB) and 7 SCs [methcathinone, mephedrone (4-MMC), methedrone, pyrovalerone, MDPV, methylone, and naphyrone] in blood and urine samples. The sample preparation step combined solid phase extraction using non-polar cation exchange LRC cartridges and derivatization using pentafluoropropionic anhydride (PFPA) prior to GC/MS analysis, in

order to increase the sensitivity. Chromatographic separation of the 16 analytes was achieved in less than 11 min. The developed method was fully validated in accordance with international guidelines, and it was successfully applied in routine framework of the Department of Forensic Medicine and Toxicology, School of Medicine, National and Kapodistrian University of Athens. The LODs of the analytes ranged from 0.70-7.00 ng/mL and the values of the LOQs ranged from 2.00-20.00 ng/mL. The linearity of the 16 analytes, according to the group of substances, were 2.00-200.0 ng/mL, 5.00-500.0 ng/mL, 10.00-500.0 ng/mL and 20.00-500.0 ng/mL with R2 values > 0.99. Extraction recoveries were >80% for all analytes. Intra and inter day accuracy and precision of the method were within accepted limits (less than 15%). The method was proved to be useful for the toxicological analysis during the investigation of different forensic cases with the identification of classical ATS (amphetamine, methamphetamine, MDMA, MDEA, MBDB, pseudoephedrine and phenylpropanolamine). This simple and sensitive method could be a significant tool for any toxicology laboratory in order to investigate forensic or clinical toxicology cases related to these drugs of abuse.

P03-006 | *Forensic Toxicology*

Relevance of Post-Mortem Biochemistry in a Case of Death by Acute Complication of Diabetes Mellitus with Criminal Implications

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INTRODUCTION- OBJECTIVES: Post-mortem biochemistry, usually requested in natural causes of death, on rare occasions can help to determine causes and circumstances in suspected criminal deaths. A woman's death by non-specific respiratory failure case is presented, where biochemical results were fundamental to determine the cause of death.

MATERIAL AND METHODS: Retrospective study of one case of suspected death due to a diabetic decompensation with possible criminal implications. The following documentation was reviewed: autopsy report from Forensic Pathology Service, and laboratory reports from Forensic Laboratory Service. Toxicological analysis was performed using chromatographic techniques (GC-MS-FID, GC-MS). Biochemical techniques included reflectometry, enzymatic photometry, colorimetric techniques and GC-MS-FID.

RESULTS: 43 years old woman was found dead at home by her husband who related drug intoxication symptoms, hours before she died. Medical history of drug abuse of alcohol, cocaine, and type-1 DM were noted. The suspicious cause of death was a drug-related death.
Autopsy revealed non-specific internal findings. Meanwhile, police found videos recorded by her husband, where the woman showed symptoms compatible with acute complication of type-1 DM vs drugs intoxication, without receiving any help from him. With this information, the preliminary cause of death was determined as drug-related death vs diabetic decompensation. Blood, urine and vitreous humor samples, and also a nasal swab, were obtained, to perform toxicological and biochemical determinations, in addition to other complementary tests.
Toxicological results were negative for ethanol in blood, urine and vitreous humor. Benzoylecgonine was detected in blood and urine. Cocaine was detected in the nasal swab. Regarding biochemical results, high levels of ketone bodies (acetone, acetoacetate) were detected in blood and urine, presence of glucose in urine, and likewise, high levels of glucose (586 mg/dL) and lactate (132,9 mg/dL) in vitreous humor.
These biochemical and toxicological results made it possible to diagnose an acute complication of DM, in addition to a recent use of cocaine. Cocaine is a known precipitating cause of hyperglycemia and diabetic decompensations.

CONCLUSIONS: Forensic laboratory results confirmed the cause of death as an acute complication of type-1 DM that in addition to police investigation permitted to prosecute and sentence to prison the husband for murder due to omission of the duty to render aid.
Forensic laboratory analysis sometimes are essentials to establish the cause and circumstances of death. In spite of biochemical tests usually help to profile natural causes of death, in some very rare cases they are essential to the determination of a criminal death. Having these tests available can be of great interest in these types of cases.

P03-007 | *Forensic Toxicology*

Influence of Alcohol on Traffic Accidents with Fatal Injuries

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INTRODUCTION: Since alcohol can be the direct cause of many different behavioral disorders and disfunction of the senses and movement, it is clear that alcohol is important factor and one of the main causes behind traffic accidents as well. Risk for an individual to take part in traffic incidents increases following the increase of the concentration of alcohol in the blood of that individual.

THE AIM: Main goal of this paper is to clearly present the importance of alcohol as a factor in traffic accidents with fatal injuries and to determine correlation between those.

MATERIALS AND METHODS: As our source of materials, we have used the materials provided by Institute of Forensic Medicine in Niš that has been created during the period between the beginning of the year 2003 and the end of the year 2016, we have concluded parallel analysis of the provided data.

RESULTS: Processed materials imply that during this period 10.7% are individuals that have died in traffic accidents. These accidents have been mostly occurring between August and November, especially on Saturdays, between 6pm and midnight. Most of the fatalities were individuals older than 60 years. Men are the majority in these accidents and 40.8% of them were under the influence of alcohol and were either drivers, pedestrians or cyclists. Women were rarely acting as drivers, they have mostly taken part in fatal accidents while being pedestrians or co-driver and they were sober in 70% of the cases. 40% of the individuals involved in the fatalities had alcohol in their blood stream.

CONCLUSION: There should be zero tolerance for alcohol on any given occasion that is related to the individual taking part in traffic.

KEYWORDS: Traffic accidents; fatal result; alcoholism

P03-008 | *Forensic Toxicology*

Carbon Monoxide and Cyanide Poisoning in Fire-Related Deaths

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Carbon monoxide (CO) and hydrocyanic acid (HCN) are the main gases developed in indoor fires. The diagnosis of acute intoxication with HCN is difficult and often not suspected in victims exposed to the factors of a fire. We aim to highlight the role of the HCN and CO in causing death in indoor fires. We carried out a retrospective study for a period of 5 years, between January 2015 and December 2019 at 3 legal medicine services in Romania, 316 cases were selected. Carboxyhemoglobin concentrations (COHb)≥50% were determined in 41.77% of the subjects of the total group. Toxic values of HCN(≥0.5 μg mL-1) were highlighted in 26 of the 39 (66.66%) subjects were this gas was measured. The average concentration for HCN was 1.08 μg mL-1(range 0-2.8 μg mL-1).

Red cadaveric lividities, the asphyxial syndrome, the association between red cadaveric lividities and the presence of soot particles in the upper and lower respiratory tract was statistically significantly associated with COHb≥50%. HCN concentrations greater than 0.5 μg mL-1 were associated with red lividities, soot particles in the upper and lower respiratory tract, red tissues and viscera. Toxic values of HCN were significantly more frequently associated with COHb≥50%. The role of HCN in thanatogenesis was specified in 16 cases, in association with carbon monoxide poisoning, ethyl alcohol poisoning, upper respiratory tract burns, or skin burns. The medical cause of death was carbon monoxide poisoning in 34.18% of cases, in association with other causes. The presence of thermal and chemical lesions in the upper respiratory tract, or the presence of skin burns were more frequent in the group of COHb<30%, while their absence was associated with COHb≥50%.

P03-009 | *Forensic Toxicology*

Useful Yet Lethal: A Case Series of Death by Sodium Nitrite Intoxication

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Sodium nitrite is a water-soluble, odorless, white-yellow-colored inorganic salt, purchased without restrictions, with multiple applications such as food preservative, fertilizer, antifreeze additive and antidote for cyanide poisoning. Deaths by sodium nitrite intake have long been known related to accidental consumption, by mistaking it for sodium chloride, and suicidal purposes; these latter seem to be common among young people who may visit websites where this substance is presented as a relatively fast and cheap suicidal method.
Nitrites toxicity is related to their ability to oxidize the iron atoms of hemoglobin from Fe2+ to Fe3+, thus obtaining methemoglobin, an abnormal form of hemoglobin that cannot bind oxygen, resulting in peripheral tissue anoxia, which can be fatal if not promptly treated. Most common symptoms of sodium nitrite intake are nausea, vomiting, dizziness, and cyanosis leading to hypothermia, hypotension and shock; blood concentration over 70% of methemoglobin would be deadly when methemoglobin concentration exceeds 70% death occurs. Gastric lavage and administration of active charcoal is the first line-treatment in suspected nitrite poisoning; at present the only known antidote is methylene blue thanks to its reducing effects.
In this work three cases of fatal sodium nitrite intoxication, found in the database of the Institute of Forensic Medicine of Pavia over a period of 10 years from January 2014 to December 2023, are presented. Of the three deceased, two were male and one female, the mean age was 26. In none of the cases recordings of mental disorders were known, even if in one of them use of benzodiazepine was reported. Oral intake of the substance was reported for all the three cases. While two subjects were found already dead, the third one was able to reveal his suicidal intent to a relative and seek help, though no resuscitative maneuvers nor antidote administration were effective enough to save his life.
Since autopsy findings were nonspecific, such as slate gray hypostasis and polyvisceral congestion, circumstantial data played an important role in suspecting nitrite poisoning and therefore in directing following investigations. Toxicological analysis were performed on blood samples collected during autopsies to assess blood concentration of nitrates, since nitrates are, along with methemoglobin, the metabolites of the oxidative reaction between nitrites and oxyhemoglobin. Methemoglobin concentration was assessed just in one case, who died in a hospital setting, reaching up to 91%.
In all three cases no other substances were found in the samples. Nitrates concentration however, compared to baseline blood, was deemed high enough to identify the cause of death as nitrites poisoning.
This presentation provides information about sodium nitrite intoxication and points out the importance of including nitrates concentration assessment on blood whereas death scene and autopsy findings may suggest an intake of this substance.

P03-010 | *Forensic Pathology*

Suicides in Italian Prisons: A Case of Psychiatric Vulnerability

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The data provided by Italy's National Institute of Statistics (ISTAT) for the period 2012-2021 reveals 583 suicides within Italian penitentiary institutions, involving individuals aged 18 to 83.
In comparison to the European average (with a rate of 37, according to the SPACE I questionnaire), the Italian suicide rate per 1.000 inmates in 2021 is notably lower at 10.8.
ISTAT's latest data for the year 2022, covering the first 11 months, records 79 prison suicides - the highest in the last decade. The documented methods are the following: hanging in about 90% of cases, and the remaining cases, gas inhalation and venous injury.
In 62% of cases, individuals committed suicide within the first six months of detention, including 11% of cases that occurred within the first 24 hours of entering prison. Furthermore, it emerges that 33% of detainees had previously attempted suicide at least once, and approximately 14% of those who had committed suicide had received diagnoses of psychiatric disorders.
We describe a case of suicide from the "Genoa Marassi" Penitentiary in June 2022 concerning a 73-year-old inmate suffering from untreated bipolar disorder who had recently attempted suicide. During the psychiatric examination, preliminary to the most appropriate detention measure, delusional ideas emerged, requiring careful surveillance, and an antidepressant was prescribed. However, the man was placed in home detention, and after eight days, he entered prison with persistent delusional ideas. Despite being monitored via video surveillance, he was found dead in his own cell within the next 24 hours. At the inspection, a flap of bedsheet tied to the window bars was observed, and the corpse was lying on the floor, already removed from the suspension system. At the forensic autopsy, a soft, discontinuous and atypical skin furrow was evident on the neck. Toxicological tests were negative. The cause of death was attributed to violent mechanical asphyxia secondary to hanging as an anticonservative act.
The forensic doctor's role is crucial in the hypothetical involvement of the penitentiary structure in the commission of an anticonservative act, mainly when the inmate exhibits vulnerability traits and management complexity. Indeed, it is necessary to evaluate whether the following measures have been adopted: systematic screening procedures for inmates both upon entry and during detention to identify individuals at high risk; appropriate pharmacological and psychosocial interventions for detainees with psychiatric issues; close and continuous observation for inmates in suicidal crisis; and appropriate physical restraint means as the last mode of controlling acute self-harming patients.
In conclusion, prison suicides represent a multifactorial problem, requiring a comprehensive evaluation of the prison staff work, aiming to integrate forensic findings with information related to personnel training, overcrowding conditions, and surveillance procedures.

P03-011 | *Forensic Psychiatry*

Femicide: Why Do They Do This?

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INTRODUCTION: Femicide is the killing of a woman, in particular by a man and on account of her gender. Female homicides in which the motivation disregards gender should not be classified as femicides. In Italy, if necessary, those who have committed such an offense are

subjected to psychiatric expertise. From the medico-legal point of view, psychopathological evaluation is performed to exclude or detect the presence of mental insanity that may abolish or limit the murderer's capacity to act, excluding or reducing his criminal responsibility.

MATERIALS AND METHODS: In this paper, we present a case history of 16 female homicides performed by males undergoing forensic psychopathological evaluation between 2013 and 2022. These are: 12 cases that occurred in the context of intimate relationships, 2 cases in which the victim was the sister, and 1 case of matricide associated with murder of the sister.

RESULTS: The medico-legal evaluation revealed the following.
1 man not guilty by reason of insanity (NGRI), suffering from delusional depressive decompensation with no history of aggression who, in a state of existential despair, had killed his intellectually disabled sister.
4 subjects partially guilty by reason of insanity: 2 men, without prior aggressive history, with neurocognitive and depressive disorder who had committed uxoricide in a contest of existential intolerance; 1 man with mild mental retardation, no history of aggression, who had killed his sister as a result of persecutory interpretation; 1 man, without previous aggressive behaviors, suffering from bipolar disorder, in hypomanic state, who had committed uxoricide out of existential intolerance.
5 guilty subjects with personality disorder: 3 men, as part of an aggressive escalation, had killed their partners out of intolerance for the victim's decision to end the relationship; 1 man, in absence of previous aggressiveness, had killed his partner during an acute drugs intoxication, 1 man, with no history of aggression, had murdered his mother and sister for economic reasons.
5 guilty subjects without psychiatric disorders, who had killed their partners out of intolerance toward the victim's decision to end the relationship. 3 of these had manifested aggressive escalation and 2 had no such history.

CONCLUSIONS: Femicide is a multifactorial socio-cultural crime determined by the non-acceptance of women's right to self-determination. The relevance of neuropsychiatric disorders is limited and case-specific: some psychopathological traits may play a role but are unlikely to be relevant in terms of criminal responsibility. Our case history shows that in mentally defective individuals, pathology altered subjective experiences with pathological projections that were independent of the victim's denial. Whereas, in femicides in which the motivation was non-acceptance of the right to self-determination, no psychiatric disorders emerged.

P03-012 | *Forensic Psychiatry*

Suicide in the Elderly: A Four-Year Retrospective Autopsy Study

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INTRODUCTION: Suicidal behaviors are common and not specific to any particular age group. Elderly individuals, particularly those aged 65 and above, are at higher risk. The objective of our study was to describe the epidemiological characteristics of suicidal acts among the elderly population and the risk factors in order to deduce necessary prevention measures.

METHODS: This was a retrospective descriptive study concerning bodies that underwent a forensic autopsy at the forensic medicine department of Charles Nicolle hospital (Tunis, Tunisia) from January 1, 2019, to December 31, 2022. We included all cases of suicide where the age was equal to or greater than 65 years.

RESULTS: During the study period, we collected 45 cases. We observed a clear male predominance (64.8%). The mean age was 73 years with extremes ranging from 65 to 91 years. The socioeconomic level was moderate in half of the cases (51.1%). The majority of cases lived with family (73.3%). Nearly half of the cases (44.4%) had hypertension. 60% had a psychiatric disorder. Only two cases had neoplastic involvement (4.4%). The most common suicide method used was hanging (51.1%), followed by suicidal poisoning (20%), and defenestration (15.6%).

CONCLUSIONS: Suicide among elderly individuals is a major health issue. It represents a culmination of a complex interaction of psychiatric, psychological, and demographic variables. It is essential to develop specific actions for information and prevention of suicidal behavior in this population.

P03-013 | *Forensic Pathology*

1 Tyre Explosion – 2 Resuscitations – 4 Mechanisms

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Blast injuries from large tyres are uncommon in medical practice, and fatal cases are even rarer in the literature. In Romania, when a person dies under these circumstances, a medico-legal autopsy is performed. The injuries caused by these blasts are classified as primary, secondary and tertiary, according to specialised literature. In victims who survived and were hospitalized, additional therapeutic manoeuvres can alter the primary lesional picture, necessitating a thorough differential diagnosis.

The case of a 63-year-old man who suffered chest injuries as a result of a tractor tyre explosion is presented. The ambulance crew finds him in cardio-respiratory arrest and performs resuscitation procedures before transporting him to the hospital, where he remains in postanoxic coma for two days. A sternal and rib fracture are diagnosed. He is transferred to a higher-level hospital and survives for another three days. Resuscitation manoeuvres are performed for the second time, but without success.

The forensic autopsy revealed many traumatic injuries, including visceral ones, in addition to those recorded in the medical documents. A thorough examination was required in formulating the autopsy report's conclusions, as was a cautious interpretation of the injury mechanisms, particularly in the absence of investigative data. We assessed the injuries as primary, secondary, tertiary and related to resuscitation.

The case's particularity resides in the overlapping of the injuries of the initial trauma and those produced during the two CPRs and the need to carry out the differential diagnosis, as well as the injury mechanism.

P03-014 | *Forensic Pathology*

Early Bleeding Patterns in Traumatic Brain Injury

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Traumatic brain injury (TBI) is a leading cause of death among young individuals under 40 years of age. For lethal rotational brain injury, little is known about the early injury pattern. TBI caused by rotatory force may often show few early macro- and microscopic findings in a death investigation. Further characterization can be used to help forensic pathologists in legal matters, deepen the understanding of early response mechanisms and help clinicians optimize the treatment of TBI-patients. A first step is to investigate the early bleeding pattern.

METHODS: A validated model for rotational brain injury was used on 82 Sprague Dawley rats with high angular acceleration to simulate potential lethal force. The rats were divided into trauma or sham-operated groups with survival times of 0, 5, 10, 20 and 60 minutes. The same trauma was also applied 5 min postmortem on a separate group of rats. A randomized brain hemisphere was collected and immunohistochemistry (IHC) performed with anti-hemoglobin and anti-collagen IV, to visualize bleedings. The slides were scanned with NanoZoomer S360 and the images analyzed with the program NDPview2 to calculate the number and area of the bleedings.

RESULTS: All sham operated rats showed no bleedings and the postmortem group showed no or few small bleedings. All other experimental groups showed similar, widespread, subarachnoidal

bleedings and frequently also thin subdural haematomas. Intracerebral bleedings were typically small, and surprisingly, their numbers and sizes did not increase with longer survival intervals. The bleedings appeared in all brain regions. The bleedings were not more numerous nor larger in regions known from other studies to show DAI.

CONCLUSIONS: The hematomas develop very rapidly after rotational brain injury and do not change significantly during the first hour. Further studies should focus on characterizing brain biochemistry and axonal damages.

P03-015 | *Forensic Pathology*

Crossbow Suicides: A Literature Review on Pathological-Forensic Characteristics with a Focus on the Trigger Mechanism of the Bolt

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INTRODUCTION: The crossbow, an ancient, ranged weapon, is now primarily used in Italy for competitive sports such as hunting and target shooting. It can be freely purchased by individuals who are 18 years of age or older, without any authorization or obligation to notify the public safety authorities. However, being characterized by high damaging, even lethal power, it can be involved in cases of death, including suicides. This is even though self-infliction with this weapon may not be straightforward, considering the size of the weapon itself and the need to remotely activate the trigger to shoot the bolt. In this context, it was deemed it worthwhile to conduct a forensic literature review on suicides involving the use of a crossbow.

MATERIALS AND METHODS: A 30-year retrospective review (1993-2023) of the relevant literature was conducted, specifically focusing on cases of suicide involving a crossbow. The search was limited to articles available in PubMed database. The following combination of free-text search terms was used, individually and randomly combined using the boolean operator "AND": "crossbow," "suicide," "arrow," "autopsy," and "forensic pathology." Only reports that met the criteria were selected for further examination. Additionally, the description of relevant pathological characteristics, autopsy findings, and any available laboratory results were analysed for each selected report.

RESULTS: A total of 14 reports were identified from the analysis. All cases involved males ranging in age from 18 to 65 years, four of them had a history of depression. Injuries were located in highly lethal areas, with penetrating injuries from side to side or retained bolts. These locations were the head (temporal region, eye, mouth, submental region) in 8 cases and the chest in 6 cases (with 5 cases involving areas near the heart and only 1 case involving the right chest). Overall, each case resulted in a single lethal shot, except for one case where the victim managed to shoot two consecutive bolts, both targeting the head. In most cases, although not very detailed, the arrow activation mechanism was manually triggered by the victims themselves, who pulled the crossbow trigger with a finger. Only one report in literature described indirect crossbow activation using a modified rod to press the trigger, resulting in a chest injury. In all these reports, to properly frame the case, significant importance was given to circumstantial and medical data of the victims, particularly regarding the presence of psychiatric disorders in their medical history.

CONCLUSION: From the literature review, it is evident that crossbow can indeed be involved in cases of suicide. Therefore, in the event of a body being found shot with a crossbow bolt, studying the scene and reconstructing the crossbow activation mechanism are crucial pillars for the proper framing of the case.

P03-016 | *Forensic Pathology*

The Last Drop: A Case of an Unconventional Suicide Method

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In individuals with chronic kidney disease (CKD) stages G4 or G5 (glomerular filtration rate < 30 ml/min per 1.73m2), hemodialysis is a recommended therapeutic option. Since this process involves filtering the blood, access through vascular catheters is required.

While vascular access complications such as thrombosis and infection are well documented in the literature, lethal hemorrhage is much less common. In a healthy individual, a rapid loss of 50% of blood volume can result in death, however, in individuals on dialysis, a lower percentage of blood loss can lead to death.

The authors discuss the case of an individual with CKD requiring hemodialysis and a previous suicide attempt, that was found dead in the bathroom, with blood around the body and inside a basin. Based on autopsy findings, toxicological analysis, the police report and circumstances of death, it was concluded that the death was due to exsanguination from intentionally opened valves of a central venous catheter in a patient with chronic renal failure. The manner of death was suicide.

P03-017 | *Forensic Pathology*

Sudden Cardiac Death (SCD) During Professional Underwater Diving of an Elderly and Vasculopathic Subject

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Professional scuba diving requires a significant physical effort, for which it is necessary to obtain an annual medical suitability certification. Specifically, as it represents a stressful factor on the cardiovascular system, it's necessary to undergo an in-depth cardiological evaluation. In fact, with increasing age, the presence of cardiovascular risk factors increases. Medical Literature shows that more than half of diving deaths occur in the over 50 age group. Some pre-existing conditions, such as coronary artery disease, can impact normal diving physiology and place the individual at risk of fatal events such as SCD (Sudden Cardiac Death). SCD indicates an unexpected and unnatural death that occurs due to causes of cardiac origin. The causes can be multiple: from obstruction of the coronary and carotid arteries to undiagnosed congenital anomalies. SCD leads to death within one or a few hours of the onset of the acute crisis in half of the cases. We report the case of a 71-year-old patient who had previously undergone a double bilateral carotid angioplasty operation; in his anamnesis, there were also dyslipidemia, hyperuricemia, and arterial hypertension. His home therapy included anti-hypertensive drugs, statins and an anti-platelet agent to contain the thrombotic and cardiovascular risk. The circumstantial data showed how the subject, despite not possessing the documentation required for professional diving nor having obtained any medical suitability, had carried out repeated dives with air tanks at a depth of approximately 10 meters both on the day of death and in the previous days, for work purposes. To detect the exact cause of death and any criminally relevant responsibilities, an autopsy was carried out three days after the death. External examination showed cyanosis of the face and chest and punctate conjunctival hemorrhages. The cadaveric section revealed three-vessel coronarosclerosis, presence of metal stents in both carotid arteries, left ventricular hypertrophy and myocardiosclerosis with recent ischemic area of the left ventricle. Histological examinations highlighted bands of eosinophilic contraction in the left ventricular myocardium and myofibrocellular hyperchromasia with consensual findings of myofibrillar elongation, myocardiosclerosis and

intermyofibrillar microhemorrhagic extravasations compatible with a recent ischemic-electrical damage. The cause of death was attributed to SCD in a subject with left ventricular hypertrophy and coronary-myocardiosclerosis. Therefore, the repeated dives carried out chronologically close to death and the presence of important cardio-vascular predispositions contributed causally to trigger the ischemic pathophysiological mechanism. In all cases of underwater death, the forensic pathologist is essential to identify the cause of death, to clarify circumstances useful for justice purposes. In conclusion, periodic medical tests to assess suitability for diving represent a mandatory requirement for carrying out professional diving activities, together with careful monitoring of the risks related to employing elderly subjects and those with cardio-vascular pathologies in risky work activities.

P03-018 | *Forensic Pathology*

Hair Testing in Fentanyl Overdoses: How Hair Analysis Can Improve Forensic Pathologist Investigation

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The use of hair analysis has gained attention over the years, especially for the retrospective investigation of chronic drug abuse and the unique ability of hair to serve as a long-term storage site for xenobiotics. Urine and blood analysis provide proximate information on an individual's drug use, most relevant concerning cause of death determination. Long-term exposure history is obtainable through hair analysis due to the detection window (weeks to months, depending on the length of the hair shaft). Practically, different matrix analyses can be complementary in casework.

We present two fentanyl-related deaths in which hair analysis helped explain additional autopsy findings.

A 48-year-old man was found unresponsive in a creek bed with drug paraphernalia nearby and in his clothing. A 5.3 x 3 inches ulcer with rolled edges was on the upper aspect of the back and needle track marks were on both arms. Microscopic changes associated with intravenous drug use were seen in the lung and liver. Toxicological analysis detected morphine and fentanyl in blood and 6-monoacetylmorphine in urine. Death was ruled as fentanyl and heroin toxicity with terminal submersion in water. Hair analysis showed antemortem exposure to fentanyl (9,940 pg/mg), norfentanyl (>10,000 pg/mg), β-OH fentanyl (1,250 pg/mg), acetyl fentanyl (20.3 pg/mg), and xylazine (>10,000 pg/mg).

The second case was that of a 45-year-old homeless man who was witnessed to have difficulty breathing. He was transported to the hospital and pronounced dead. Multiple large ulcers (some with eschar formation) were on the forearms and legs and needle track marks were on both arms. The autopsy revealed an organized hemopericardium with underlying cardiac wall rupture. Necrosis admixed with inflammation and bacterial colonization was detected microscopically in the myocardium. Blood and splenic cultures grew β-hemolytic Streptococcus. Toxicological analysis revealed methamphetamine and fentanyl in blood. The cause of death was ruled as a cardiac death in the context of a septic state with toxic levels of methamphetamine and fentanyl. Hair analysis showed antemortem exposure to fentanyl (>10,000 pg/mg), norfentanyl (2,740 pg/mg), β-OH fentanyl (2,350 pg/mg), acetyl fentanyl (4.27 pg/mg), and xylazine (380 pg/mg). Given long term exposure to substances in this case, the hair findings may strongly support the determination of sepsis as the underlying cause of death rather than drug toxicity.

Xylazine detection in hair (which was notably absent in the peripheral blood) supported the presumed etiology of the skin lesions seen during the autopsy in both cases. In conclusion, analyses of drugs in postmortem hair samples yield essential information about exposure to xenobiotics before death, helping to assess the prevalence of specific substance use/abuse in individuals.

P03-019 | *Forensic Pathology*

Subdural Hemorrhage Following Spinal Anesthesia: A Case Report Highlighting Diagnostic Challenges and Legal Implications

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INTRODUCTION-OBJECTIVE: Spinal anesthesia is a widely used anesthetic technique, gaining significance in safety, efficacy, and efficiency, especially with its increased application in outpatient surgical procedures. The surge in its usage has coincided with a rise in complication reports. Rarely, subdural hematomas may develop following spinal anesthesia, mimicking symptoms of postdural puncture headache. This diagnostic challenge has led to legal actions against healthcare providers who fail to identify such cases.
This presentation aims to elucidate the etiology of a subdural hematoma in a case where the patient, initially discharged with a diagnosis of postdural puncture headache following spinal anesthesia, claimed to have experienced domestic violence at home.

CASE: A 39 weeks and 6 days pregnant woman presented to the clinic due to labor pains. An emergency cesarean section was performed due to fetal distress, and spinal anesthesia was administered. Vomiting occurred 15 hours post-delivery, and symptomatic treatment was provided. The patient was discharged on the second day after delivery, reporting a persistent headache at the time of discharge. Sixty hours postoperatively, she was readmitted with loss of consciousness, seizures, and frothing at the mouth. Emergency intubation was performed, revealing a 4x2 cm bruise on the left ear. Cranial CT scan showed a mixed-density subdural hematoma in the left frontoparietal region, with hypointense frontal and hyperintense parietal components. Hematoma drainage surgery was performed, revealing partial organized hematoma. The patient remained unconscious for approximately two months, displaying aphasia and requiring assistance for mobility. In her statement, obtained through letter selection with family assistance, she alleged her husband had hit her on the right side of the head on the day of the incident.

DISCUSSION AND CONCLUSION: Trauma is the most common cause of subdural hematomas. In this case, the presence of external traumatic signs and subdural hematoma led to a relatively severe legal prosecution. However, symptoms such as nausea, vomiting, and persistent headache 15 hours postoperatively supported the clinic's assertion of spinal anesthesia-related subdural hematoma. Additionally, the mixed appearance on the CT scan and the presence of organized hematoma during surgery suggested that the bleeding occurred before the trauma. The court ultimately acknowledged the subdural hematoma's association with spinal anesthesia in its judgment.

P03-020 | *Forensic Pathology*

Suicide by Insulin Overdose – Forensic Autopsy Report

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INTRODUCTION: Synthetic insulin is used to maintain normal glucose levels in diabetes. Excessive insulin administration can cause profound hypoglycaemia with subsequent brain damage and death. Although accidental non-fatal insulin overdose is relatively common, fatal suicidal overdose is infrequent. Postmortem diagnosis of insulin overdose is particularly challenging due to the deceased's lack of medical history and suspicion of insulin overdose, and the absence of pathognomonic findings at autopsy. Therefore, a thorough crime scene investigation is

critical as it can provide valuable information to the pathologist. At the autopsy, possible injection sites should be searched and photographed. Sampling from different matrices is essential for toxicological analyses. The aim of this case report is to highlight the main toxicological tests in these cases.

CASE REPORT: A 44-year-old man was found dead lying in the passenger seat of a car. Police gathered information from his relatives whom informed that he had sent a text message stating that he was ending his life by injecting two insulin pens. On external examination, there were no peculiar findings and no puncture marks. Histological examination revealed chronic ischemic heart disease and diabetic kidneys disease. Toxicological analyses of peripheral blood were negative for ethanol, drugs and medications. Vitreous fluid and peripheral blood were collected for glucose and insulin testing: plasma glucose levels of 583 mg/dL (reference levels: 70-105); plasma insulin levels of 1 uU/mL (reference levels: 2.6-24.9); vitreous fluid glucose levels of 1.18 mg/dL.

DISCUSSION/CONCLUSION: After death, there is a physiological decrease in glucose levels in the blood and vitreous fluid, as glucose continues to be consumed by surviving cells. However, due to hemolysis, there can be a highly erratic glucose level. Therefore, vitreous fluid provides more accurate information about blood glucose levels at the time of death. However, vitreous samples collected a day or two after death may show levels close to zero in healthy individuals (meaning they can only exclude hypoglycaemia and never confirm it). The diagnostic gold standard remains the biochemical detection of insulin in postmortem samples, but this is not always possible due to its rapid metabolism and its difficult penetration through blood-vitreous barrier. When death by insulin overdose is suspected, toxicological investigations should search for levels of insulin, C-peptide and glucose in peripheral blood and in vitreous fluid and for insulin in injection site. Theoretically, an undetectable concentration of C-peptide may suggest absence of endogenous insulin production, which hypothetical can be used to distinguish between hypoglycemia due to exogenous or endogenous insulin. A clear diagnosis is particularly difficult even when autopsy and toxicological analyses are performed. Considering all information and test results, the cause of death was considered hypoglycemia due to insulin overdose and the manner of death suicide.

P03-021 | *Forensic Pathology*

The Regional Registry of Sudden Cardiac Death in Friuli Venezia Giulia: Perspective from the First Three Years

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INTRODUCTION: Over the past 20 years, developed nations have seen a significant decline in cardiovascular disease (CVD) mortality due to preventive and treatment measures. Despite this progress, CVD still claims 17 million lives annually, with 25% attributed to Sudden Cardiac Death (SCD). The contribution of arrhythmic events to SCD remains uncertain, as only half of out-of-hospital deaths in California may be arrhythmic in nature. Death certificates often exaggerate SCD incidence due to potential non-cardiac origins. SCD risk is higher in males, increasing with age. Younger victims often succumb to channelopathies, cardiomyopathies, or drug abuse, while elderly subjects face chronic degenerative diseases. Addressing this challenge, the Friuli Venezia Region in Italy has established the Regional Registry of Sudden Cardiac Death to accurately assess incidence and enhance prevention through comprehensive data collection.

METHODS: The regional Sudden Cardiac Death Registry employs a multi-disciplinary approach in four key phases. Firstly, autopsy, involving legal and hospital pathology departments, provides macroscopic and microscopic evidence for death diagnosis. Secondly, ancillary studies include MR of the heart and toxicological and genetic analyses on collected biological fluids. Thirdly, a multidisciplinary clinical validation involves various cardiologic departments, integrating autoptic data with cardiological history for a validated diagnosis. If hereditary cardiac pathology is confirmed, alive family members undergo clinical screening. Lastly, post-screening clinical follow-up for family members is conducted through a protocol developed collaboratively by the ASUGI Cardiology department and other regional cardiology departments.

RESULTS: In the examined period of 2021-2023, 92 autopsies provided crucial insights. Predominantly affecting males (74% vs 26 % of women) with an average age of 41 ±10 years, the findings emphasized the prevalence of fatalities at home, often with no preceding symptoms. A notable 87% lacked a family history of Sudden Cardiac Death. Toxicological analyses, conducted in 83 cases, revealed positive results in 26 cases. After the autopsy and ancillary analyses, the leading causes of death included: ischemic heart disease, toxic factors, Sudden Arrhythmia Death Syndrome (SADS), and Hypertrophic Cardiomyopathy. Genetic investigations revealed pathogenetic variants in 4 cases which permit to screen the family members.

CONCLUSION: The establishment of the registry has enabled the provision of credible statistical data on causes of death in the Friuli Venezia Giulia region. The methodological examination of each case has allowed for the determination of reliable causes of death and provided intriguing data. In some instances, the Cause of Death (COD) could not be presumed based on crime scene investigation or patient history. This suggests that autopsy remains a fundamental procedure in determining the cause of death, and ancillary examinations (e.g., toxicological analyses) should be conducted in all cases.

P03-022 | *Forensic Pathology*

Rupture of Splenic Aneurysm: An Autoptic Case

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INTRODUCTION: In a small city in northern Italy, an 83-year-old obese woman (BMI 30,5) had a post-defecation syncopal episode in home resulting in a fall. In her medical history she had, arthrosis, follicular B lymphoma (clinical remission) and vertebral collapse. Transported in Emergency room, the woman presented a typical shock (hypotension, excessive sweating, tachycardia, anuria). At skull CT no alterations emerged. Abdominal CT documented a hemoperitoneum characterized by multiple blood collections; furthermore, the presence of an aneurysm of the splenic artery measuring 4-8 cm and another one in the right iliac artery measuring 5.5 cm was highlighted. Because of this, an emergency laparotomy was performed; unfortunately, the woman died during the operation and the origin of the bleeding was not found.

MATERIALS AND METHODS: An autopsy was requested and performed, including histological investigations.

RESULTS: Notably, the autopsy showed no fractures or other traumatic evidence; a large blood clot was detected in the splenic area, shaped as a cuff around the splenic vascular peduncle. Upon inspection of the sclerotic wall and voluminous periadventitial hematoma, an aneurysm measuring 4 cm in diameter was observed, located 4 cm far from the splenic hilum. At the splenic artery's longitudinal section, a thinning of the walls was observed with a longitudinal crack of 3.5 cm on the rear wall.
Histopathological examination revealed splenic artery's sclerotic wall, voluminous peri-adventitial hematoma with erythrocyte infiltration of adventitial tunica up to the external elastic limiting.

DISCUSSION: The aneurysm consists of an anomalous and permanent dilation, at least 50% of the original diameter, of the arterial or venous wall whose rupture causes internal bleeding sometimes with fatal outcome, as in the case analyzed. The origin of this vascular alteration is related to pathologies such as hypertension, atherosclerosis, connective tissue pathologies or hereditary pathologies, fibromuscular dysplasia, trauma, infections. The aneurysm of the splenic artery is more frequently found in males, pregnant women and in aged patients (over 60 years

old). This type of aneurysm is often diagnosed accidentally through abdominal CT since it is asymptomatic until it ruptures or reaches significant dimensions. The first line treatment, when surgical criteria are respected, is endovascular, convertible to open classic surgery for example in large aneurysm, as this case.

CONCLUSION: The aneurysm was found by abdominal CT, but not during surgery operations, and was confirmed and better examined during autoptic operations. Histology has further contributed to the pathological diagnosis.

This presentation will impact the forensic science community by presenting a rare pathology, whose diagnosis was not made during life but only postmortem, thanks to a complete autopsy followed by histologic examinations, that are of crucial importance in order to reach a complete framing of a clinical case.

P03-023 | *Forensic Pathology*

Two Deaths – One Gun: Histological Comparison of Gunshot Injuries (Case Report)

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BACKGROUND: 26-year-old woman shot in her head twice by a 32 year old man. She got the shots in her right temporal region and the right side of her forehead with a long-barrel gun. The murderer used an improvised silencer made of socks stuffed in a PET bottle. The perpetrator committed suicide on the spot with the same weapon by headshot without using the silencer.

MATERIALS AND METHODS: Medico-legal autopsy was performed in both cases. Histology was prepared from the shot injuries, brain, and solid organs. Formaldehyde fixation followed by HE staining, and the slides were examined by a Nikon Labophot-2 microscope. Vital signs have been used to determine the sequence of the injuries of the victim.

RESULTS:

Autopsy: Both of them were healthy young adults, natural diseases were absent. Two shot injuries could be detected on the right temporal and frontal region of the female victim. The suicide committed by one single shot in his same region – the right temple. Apart from the shots, no other injuries were found.

In case of the victim the first shot didn't penetrate the skull. The projectile fragmented on the skull base, only three fragments were found. The second bullet entered in the skull, and wedged in the opposite side temporal muscle, causing severe brain damage and intracranial haemorrhage. In the male skull no projectile were found, the bullet penetrated through, both sides of the skull, the brain, and left the body. The cause of death in both cases were the brain damage, brain edema and the intracranial haemorrhage.

Histology: Tissue damage was similar for all injuries. In case of the victim, a slighter soot precipitation was detectable. There was a blood aspiration in the lung of the victim. Another vital sign was the cytoplasmic vacuolar degeneration of the hepatocytes. These mean, that the victim survived 15-30 minutes after the first shot. The death caused by the second shot, and the consequential brain damage. Signs of prolonged survival were absent in the perpetrator, the death set in immediately because of the brain damage.

CONCLUSIONS: Comparing the injuries of the victim, and the perpetrator we can found differences in the soot precipitation as a consequence of the using of the silencer in case of the victim. It was possible to clarify the sequence of the shots of the victim by the vital signs. The results of the histological examination must be analyzed as a whole, not just the injuries and the affected area. The examination of the distant organs can give valuable information about the circumstances of the death. The histological examination allows to ascertain the time between the shot and the death, both in case the victim and the perpetrator.

P03-024 | *Forensic Pathology*

Impact of Ethnicity on Sudden Cardiac Death in Athletes: Insights from a Large United Kingdom Registry

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BACKGROUND AND AIMS: The relationship between ethnicity and cause of sudden cardiac death (SCD) in athletes is poorly understood.

OBJECTIVES: To investigate possible differences in the etiology of SCD among ethnicities in a large cohort of athletes.

METHODS: Between 1994 and November 2022, 7880 cases of SCD were consecutively referred from all over the United Kingdom to our national cardiac pathology centre; 848 (11%) were athletes. All cases underwent detailed autopsy evaluation by expert cardiac pathologists. Clinical information was obtained from referring coroners.

RESULTS: Most of athletes were white (n=758; 89%). Black and Asian athletes were 51 (6%) and 39 (5%) respectively. A structurally normal heart, indicative of sudden arrhythmic death syndrome (SADS) was the most common autopsy finding (n=385, 45%), followed by myocardial diseases (n=275, 32%) cases, atherosclerotic coronary artery disease (CAD) (n=58, 7%) and coronary artery anomalies (n=29, 3%). In most of cases, death occurred during exercise (n=737; 87%). Arrhythmogenic cardiomyopathy (AC) was more common in black athletes (25%) than in white (14%) and Asian (8%) athletes (p=0.03 between black and white athletes; p=0.04 between black and Asian athletes); in contrast, CAD was more common in Asians (15% vs 7% in whites vs 2% in blacks, p=0.02 between Asian and black athletes). Among white athletes, AC was more common in individuals who died during exercise than in the ones who died at rest (p=0.005). Such a difference was not observed in Asian and black athletes. In Asian athletes, CAD was the diagnosis at autopsy in 18% of individuals who died during exercise and in none of individuals who died at rest.

CONCLUSIONS: A structurally normal heart at autopsy and myocardial diseases are the most common findings in these athletes who died suddenly. Ethnicity has a major impact on causes and circumstances of death. While AC is more common in black athletes, atherosclerotic CAD is more common in Asian athletes. While AC appears to be a driver of exercise induced SCD in white athletes, this is not the case in black and Asian athletes, where in contrast, other etiologies such as HCM and CAD appear to be more relevant.

P03-025 | *Forensic Pathology*

Yield of Molecular Autopsy in Sudden Cardiac Death in Athletes. Data from a Large Registry in the United Kingdom

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BACKGROUND: Sudden cardiac death (SCD) may occur in apparently healthy individuals, including athletes. We report the diagnostic role of post-mortem genetic testing, molecular autopsy (MA), in elucidating the cause of SCD in athletes.

METHODS: We reviewed a database of 6860 consecutive cases of SCD referred to our specialist cardiac pathology centre. All cases underwent detailed cardiac autopsy and 748 were deemed to be athletes. Of these, 42 (6%) were investigated with MA (28 using a targeted sequencing, 14 exome sequencing). Variants were classified manually as pathogenic (P), likely pathogenic (LP), variant of unknown significance (VUS) using international guidelines. Clinical information was obtained from referring coroners who completed a detailed health questionnaire.

RESULTS: Out of the 42 decedents (average age 35 years old, 98% males) who were investigated with MA, the autopsy was in keeping with a

structurally normal heart (sudden arrhythmic death syndrome, SADS) in n=33 (78%) cases, followed by arrhythmogenic cardiomyopathy (ACM) in 8 (19%) individuals and idiopathic left ventricular fibrosis in 1 (2%). Death occurred during exercise and at rest in 26 (62%) and 16 (38%) individuals respectively. Variants that were adjudicated clinically actionable were present in 7 cases (17%). There was concordance between the genetic and phenotypic findings in 2 cases of ACM. None of the variants identified in SADS cases were previously linked to channelopathies. Clinically actionable variants in cardiomyopathy-associated genes were found in 5 cases of SADS.

CONCLUSIONS: The yield of MA in athletes who died suddenly is 17%. In SADS cases, clinically actionable variants were found in cardiomyopathy-associated genes and not in channelopathy-associated genes. ACM is a common cause of SCD in athletes and one in four decedents had a clinically actionable variant in FLNC and TMEM43 genes.

P03-026 | *Forensic Pathology*

Strangulation with Self-Locking Cable Ties – Case Report of a Suicide by an Unusual Method

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Most cases of death by asphyxiation due to strangulation by ligature are homicidal. In unusual cases, such as the one we report, self-locking devices are used, which, once activated and blocked, allow the pressure of the ligature on the cervical structures to be maintained, even after the victim's initial loss of consciousness, thus achieving the suicide.

We report a case of a man in his fifth decade of life found inanimate, lying in the living room of his home, with self-locking cable ties placed around his neck. The death was verified at the scene. According to the information, the deceased suffered from an unspecified psychiatric condition and previously tried to commit suicide using the same method, failing due to material failure. There were no signs of a break-in at the residence or signs suggesting a crime had occurred at the location.

In the medico-legal autopsy, six plastic self-locking cable ties were seen connected two by two, tightened and locked, arranged horizontally around the neck, making three loops, giving rise to three grooves, located above and below the laryngeal prominence. There were no traumatic injuries to the neck. In the remaining external examination, subconjunctival haemorrhage, periorbital ecchymosis and millimetric abrasions on the elbows were seen. There were no defense injuries seen. In the internal examination, areas of blood infiltration were found in the cervical muscles, and next to the hyoid bone. No fractures of the thyroid cartilage or hyoid bone, nor cervical vascular or nerve injuries were found. On the head, a discreet blood infiltration was visible in the scalp of the right parietal-temporal region, as well as a very thin layer of subdural blood in the right cerebral convexity. No other signs of traumatic or organic injuries relevant to exitus letalis were found.

A complementary toxicological examination was carried out, which showed the presence of several psychotropic drugs in the blood at concentrations within those usually considered therapeutic in the literature.

In this case, the cause of death was strangulation by self-locking cable ties. The biggest challenge was determining the manner of death, as suicidal strangulation is uncommon, with few cases described in the literature. Considering the circumstantial information regarding the place where the body was found, the victim's psychiatric history, information about a previous suicide attempt by the same mechanism, the absence of fingernail marks or other traumatic injuries to the neck and hands, as well as the toxicological results, it was possible to determine this as a suicidal death.

P03-027 | *Forensic Pathology*

Contribution to Tissue Donation Post-Mortem by the Institute of Legal Medicine and Forensic Sciences of Catalonia 2016-2023

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There are multiples factors that make tissues donation difficult in Catalonia, such as the aging of the population, the capacity to establish agile screening mechanisms in hospitals and the increase in the need for post-mortem tissues for therapeutic purposes, it makes necessary to look for new donation sources.
In Catalonia, a new out-of-hospital and multidisciplinary circuit was implemented in order to respond to society. The project was carried out at the Institute of Legal Medicine and Forensic Sciences of Catalonia, a technical entity at the service of the Administration of Justice, and in charge of carrying out medico-legal autopsies.
In 2015, the Catalan Health Service issued Instruction 4/2015, providing for the integration of the donation network through collaboration with the Donor Centre of Catalonia (DCC). This facilitated the signed of an agreement between the Blood and Tissue Bank, the Department of Justice of the Generalitat de Catalunya, the Medical Emergency System and the Hospital Clínic of Barcelona for the acquisition of tissues at the Institute of Legal Medicine and Forensic Sciences of Catalonia (IMLCFC).
The internal circuit at the IMLCFC for obtaining tissue donors from judicial autopsies begins with the screening of all corpses that enter the Forensic Pathology Service of our Institute. The screening is carried out by the forensic doctor in coordination with the DCC nurse who is in our Institute, following strict inclusion criteria for obtaining post-mortem tissues, which includes reviewing the medical history and obtaining the consent of the family through a telephone interview. And finally, the corresponding judicial authorization is necessary to proceed with the extraction of the tissues.
The project of IMLCFC began in 2016, with the extraction of ocular tissue (corneas), and from 2017 the extraction of the rest of the post-mortem tissues was implemented.
Results obtained: 152 corneas donors in 2016 (10,7% of the annual contribution in Catalonia), and 133 (9% of the annual contribution in Catalonia) in 2018. The same year, a total of 76 musculoskeletal tissue donations were obtained (20.65% of the annual contribution in Catalonia), 22 skin donations, and 25 vascular tissue donations (14% and 19% respectively). In 2022, 100 musculoskeletal tissue donations were obtained, which represented 29.15% of the annual contribution in Catalonia, and in 2023, 66 skin donations (24.6%), 21 vascular tissue donations (22%) and 12 valvular tissue donations (5.7%) were obtained.
We concluded that the Institutes of Forensic Medicine and Forensic Sciences may be centers for the extraction of tissues from post-mortem donors. The IMLCFC has been a pioneer in Spain in the implementation of tissue donation from judicial deceased. Actually, the IMLCFC has become the fourth largest contributor of corneas to the catalan tissue donation network and the first contributor of musculoskeletal tissues and skin.

P03-028 | *Forensic Pathology*

Suicide, Accident or Homicide? The Issue with Determining the Manner of Death

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Determining the manner of death is important, both for medico-legal purposes such as police investigation or in terms of insurance policies, as well as for statistical purposes, which is fundamental for the implementation of health policies. In addition to necropsy findings, it is important to obtain as much circumstantial information as possible, including police information, family interviews and clinical information. The authors present a case of carbon monoxide poisoning that raised doubts about the manner of death.

CASE: 85-year-old female victim, with a previous suicide attempt. She was found without vital signs, lying in bed with her daughter, with a camp stove with unlit ashes inside the room and Styrofoam sheets insulating the windows. Her daughter died under the same circumstances, and according to family statements, both the fact that she was sleeping with her mother and the presence of the camp stove inside the room were unusual. A suicide letter from the daughter was also found, asking for her mother to be taken care of. The necropsy examination of the mother revealed cherry red lividity, subungual cyanosis in the upper limbs, cherry red muscle tissue, and bilateral pulmonary edema, without other macroscopic changes of particular importance. The toxicological analysis was positive for alprazolam at a therapeutic concentration and carboxyhemoglobin at an estimated concentration of 65%, considered a lethal dose. The authors concluded that the cause of death was carbon monoxide poisoning in both cases; however, despite the clear involvement of a third person in the older victim's death, combining the circumstantial elements and the necropsy findings, it was not possible to establish a differential diagnosis between an accidental or homicidal medico-legal etiology.

With this case, the authors seek to open a discussion about the difficulty in determining the manner of death even when the cause of death is known and all possible circumstantial information is available, particularly when it concerns the intentionality of an agent.

P03-029 | *Forensic Pathology*

Hanging – Uncommon Cervical Lesions

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In hanging, asphyxia is secondary to the compression or constriction of the cervical structures with a ligature, with complete or incomplete suspension of the body. The most frequent mechanism of death is the compression of the neck blood vessels, although obstruction of the airways can also occur. Fracture of the neck vertebrae is rare in nonjudicial hangings, although it can take place in cases of advanced degenerative cervical pathology in combination with other risk factors such as complete suspension of the body, sudden falls, and, frequently, obesity.
In this context, the authors present two cases of suicide by hanging in which cervical traumatic injuries were observed.

CASE A: 53-year-old male victim, with no prior psychiatric diagnosis. He was found with no vital signs in lateral left decubitus in a farming plot, next to a building, with a ruptured rope in his vicinity and the other rope extremity tightened to a truck located on the first floor. In spite of the intact cutaneous surface observed in the cervical region, the internal examination revealed: extensive laceration of all the muscle planes of the anterior cervical and of the left lateral cervical regions; left common carotid artery laceration; hyoid bone and thyroid cartilage fractures; bilateral pulmonary blood aspiration; atlantooccipital fracture-dislocation, and atlantoaxial fracture, with distraction of the bone fragments; medullary lesion at the same level.

CASE B: a 56-year-old male victim with no prior psychiatric diagnosis. He contacted police officers after allegedly murdering his partner. He was found hanging with complete suspension at a height of approximately 3 meters. The autopsy revealed: transverse laceration of the subcutaneous and muscle tissues and of the blood vessels of the anterior and left lateral cervical regions; laceration of the tyro-hyoid ligaments, with avulsion of the hyoid bone; fractures of the thyroid cartilage and of the vertebral body of the 4th cervical vertebra, with subdural hemorrhage at the same level; atlantooccipital dislocation.

In both cases, the authors observed uncommon cervical lesions in the absence of underlying degenerative pathology.
These cases demonstrate that uncommon cervical lesions can be observed in nonjudicial hangings, so that their autopsy requires a careful and appropriate technique to record all possible traumatic findings.

P03-030 | *Forensic Pathology*

Unusual Suicide with a Hot-Glue Gun: A Case Report

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In 2019 suicide accounts for approximately 1.3% of deaths worldwide (more than 700.000 deaths worldwide). The suicidal phenomenon, which is extremely complex, includes a wide range of possible scenarios, some highly unusual. In this regard, fatal injuries caused by a hot glue gun have never been reported in literature.

We report a case of an Italian woman found dead on her bed, lying beneath the covers. During the initial investigation procedures, the policemen discovered traces of blood near the body. Blood traces led to an adjacent room, where a hot glue gun was discovered. No signs of a forced entry were detected, and the house was tidy. In the woman's clinical records only a history of previous drug addiction was reported. Lately, the woman had an initial suicidal ideation. A forensic autopsy was performed, followed by histological examinations. The external examination showed remote signs of a drug injection (scars in the right elbow) and, at the left inguinal region, a recent oval-shaped wound (2.5x2.4 cm) covered by a thin and very dark dehydrated layer of skin. This wound/discontinuation of the skin (2.6 cm) deepened in the soft tissues for 2.6 cm, surrounded by partially coagulated blood. The vascular-nervous complex of the right hip was analyzed as well, showing a lesion of the femoral artery (diameter 1 cm), right before his bifurcation, surrounded by a hemorrhagic infiltrate (no other damage of the vascular system was detected). No further traumatic injuries were detected during the autopsy.

At the histological examinations, the skin section showed several erythrocyte and inflammatory cells (mostly lymphocytes) in the fibrous connective and muscular tissues. A vital interruption of the three anatomic layers of the arterial vessel was detected as well, with a coherent haemorrhagic and inflammatory infiltration.

On the basis of all the postmortem investigations performed, the cause of death was identified in a hemorrhagic shock due to a thermic wound of the left femoral artery. The shape and the size of the skin wound matched with the characteristics of the tip of the hot glue gun seized by the police. The peculiarity of the present case is mostly related to the tool used for suicide, which is extremely rare and, to our knowledge, never reported in the literature. Nevertheless, it is extremely important to report, share and make known even these rare conditions. Suicide, that is actually a Public Health problem, in fact, is a phenomenon far from being reduced and with the increase in suicide rates, inevitably, the use of atypical and unusual means will increase too. Moreover, some tools that may appear not hazardous can be used to commit suicide and therefore their availability should be limited in some contexts, for instance psychiatric disorders and previous suicidal ideation.

P03-031 | *Forensic Pathology*

Putting the Pieces Together: A Case Report on Human Remains Identification Starting from Tattoos

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The dismemberment of a corpse is a relatively uncommon phenomenon in forensic pathology, serving the dual purpose of obstructing victim identification and concealing the corpse itself. Consequently, the discovery of human remains presents intricate challenges to the medical examiner, with a primary emphasis on identifying these remains. In this poster presentation, we report a case in which the presumptive identification of human remains was achieved through the observation of tattoos during autopsy. Indeed, a significant portion of the facial skin was excised, and the face itself was partially charred, rendering facial recognition impossible. Gender and an estimated age range were established. Other characteristics used for identification included height, weight, complexion, hair color, as well as well-maintained and nail-polished fingernails and toenails. Despite fingerprint analysis, no identification was possible, as the woman was not registered in law enforcement databases. Additionally, no useful information emerged from missing persons reports. The tattoos, documented during the autopsy, were carefully recorded after thorough cleansing of the skin from contaminating substances and combustion residues, and following the anatomical reconstruction of the cadaver. Some areas of the skin appeared charred, and others were excised, suggesting the perpetrator's intention to conceal the tattoos, thereby further complicating the recognition of the remains. Therefore, a decision was made, through a press release from the Carabinieri, to publicly disclose a list of eleven tattoos found during the autopsy on the cadaveric remains. This led a member of the public to come forward with a hypothesis about the victim's identity. Subsequently, definitive identification was established by means of DNA comparison between the victim's genetic profile and that of her alleged biological mother.

P03-032 | *Forensic Pathology*

Combined Suicide by Gunshot and Hanging: Is it Possible?

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The presence of hole injuries in a body, in cases of homicide or suicide, always represents a challenge for the Forensic Pathologist called upon to answer the questions asked by the Judicial Authority. In January 2024, in Northern Italy, a 64-year-old man was found in his home with a rope around his neck, tied to a ceiling beam. Next to the body, there were a ladder and various tools such as iron wires, a plier, a hammer, and a captive bolt pistol. The man also presented, on the forehead, a bullet-like hole with a sort of muzzle imprint mark. In his medical history, the man had stage 4 colorectal cancer with widespread lung, liver, and bone metastases; recently he was told that there were no more active treatments to try for his disease and that he would undergo palliative care. After crime scene investigations, we performed a complete autopsy, during which samples of biological material, including the skin of the ligature neck mark and the area around the hole, were collected for histopathological and toxicological analyses. The external examination revealed a V-shaped ligature mark around the neck with ecchymotic skin ridges, blisters, and abrasions. In the forehead, there was a 1-cm-large-circular hole, with regular margins and an abrasion rim all around it. There was no soot staining, burning of the skin or singeing of hairs. Necrosection examination revealed: haemoventricle, subarachnoid, and cerebral parenchymal haemorrhage, especially in the frontal lobes, where bone fragments were found; moderate congestion and oedema of the lungs; metastatic cancer spread to the lungs, liver, and omentum. Lesions of the carotid intima (Amussat's sign) and haemorrhages below the anterior longitudinal ligament in the dorso-lumbar segment (Simon's sign) were also found. The histopathological examinations confirmed the tissue viability of the furrow and the sodium rhodizonate test of the skin around the hole was negative. The preliminary toxicological screen was negative too. The results obtained allow us to establish the cause of death as an acute traumatic encephalopathy, caused by a blunt instrument, combined with acute asphyxia. At first glance, the case might have seemed like a murder, committed with a firearm followed by suspension of the corpse, but it turned out to be a case of combined suicide carried out using a captive bolt pistol (slaughterer's gun) associated with hanging. Probably the man climbed the ladder that was found next to him, wrapped the rope around the beam, put the noose around his neck and shot himself, so that the weight of the fallen body could accomplish the hanging mechanism.

This case report wants to demonstrate that the forensic pathologist assessment takes on extreme importance in establishing the cause and the means of death.

P03-033 | *Forensic Pathology*

Unusual Autopsy, Unusual Tissue, but a Useful Genetic Profile

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The autopsy of the non-fresh cadaver is characterized by inherent difficulties as it requires the adaptation of histological and toxicological investigation techniques to the specific case. Suppose the cadaver has been treated with preservative agents, such as anti-putrefactive liquids, e.g. formalin. In that case, it may not be easy to identify suitable tissue for genetic investigation to enable personal identification. In the case we present, the genetic profile of the 'autopsied-and-preserved' cadaver, which had already undergone autopsy in a different country and then been treated with preservative liquids for intercontinental transport (formalin) was extracted from three different tissue matrices: eyeball, iliopsoas muscle and liver. The data obtained were useful for obtaining a consensus genetic profile. In the extraction of the genetic profile, it was interesting to assess the quality of the three different matrices, which were in various ways in contact with formalin and from which resulted an extracted genetic profile that, in some cases, needed replication, according to the guidelines of Italian Forensic Geneticists (Ge.F.I.). Despite the difficulties associated with the cadaver and the treatments performed on the corpse, thanks to a multidisciplinary approach involving the forensic pathologist and the forensic geneticist, it was possible to obtain useful information.

P03-034 | *Forensic Pathology*

William Can't Tell: Case Report of a Suicide by a Crossbow Arrow Injury

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The crossbow is an ancient, ranged weapon consisting of a bow-like component mounted horizontally on a main frame. A crossbow has a locking mechanism to maintain the draw, limiting the shooter's action to pulling the string taut into the lock and then releasing the shot by pressing a trigger. To date, the modern crossbow continues to be used in sports and recreation and can be purchased and used in Italy by anyone over the age of 18.

We hereby present the case of a man found deceased in a field in northern Italy during summer. Upon inspection, the corpse was lying on the ground in the prone position. It was in the emphysematous-colliquative stage of putrefaction, which was most evident on the face (loss of eyeballs, nasal cartilage and lips) and displayed a significant degree of larval colonization. On the frontal region of the head the examiner appreciated a roundish cutaneous discontinuity, from which an arrow emerged. The arrow terminated in a three-bladed steel tip,

which was firmly adherent to the head. At a distance of about 4 metres from the corpse, a crossbow was found and further arrows were found a short distance away. Between the corpse and the crossbow, the dirt and grass displayed soiling of haematic nature.

During the autopsy, following the arrow removal, the medical examiner revealed a hole in the cranial theca, which was round in shape and displayed three small incisions on the endocranial surface about 120° apart. Furthermore, a through-and-through wounding track was revealed, the entrance wound of which was located in the submental region and the exit wound in the frontal region. Its path crossed the tongue, the posterior portion of the hard palate and the ethmoid bone. The brain was extensively liquefied and confined within the dura mater. The cause of death was identified as cranio-meningo-encephalic lesions sustained as a result of a single arrow shot transfixing the head.

Upon the suspicion that the corpse might have belonged to the owner of the field in which it was found, it was identified by genetic profiling and comparison with the profiles of his alleged close relatives. His identity was confirmed as corresponding to a young man with a long history of untreated mental disorders.

In the light of the investigations carried out and the circumstantial data it was possible to define, with a high probability, a suicidal manner of lethal injury. Although the use of crossbows is limited to specific contexts, the reported case demonstrates the great wounding potential of this weapon compared to its ease of access.

P03-035 | *Forensic Pathology*

Sudden Death – A Rare Complication of Laparoscopy

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Endoscopic surgical procedures are routine today. They are used in various areas of surgery, such as orthopedic surgery, thoracic surgery and, above all, abdominal and gynecological surgery. The latter includes laparoscopy. For the patient, this means minimally invasive procedures and small skin wounds. All of this is related to the rapid healing of surgical wounds and accelerated rehabilitation after the procedure. During laparoscopic surgery, a trocar is inserted, and CO2 is blown into the abdominal cavity. The camera and surgical instruments are then inserted. Four small incisions are required for the procedure. As with any procedure, complications can occur. The most common complications occur when the trocar is inserted blindly into the abdominal cavity. The intestine, another hollow organ or even a larger vessel such as the inferior vena cava or even the aorta can be injured. Of course, many other rare complications are also possible. In the following article, I would like to describe a death that can be attributed to a rare complication of CO2 insufflation into the abdominal cavity.

A 61-year-old female patient was admitted to the gynecology clinic for elective laparoscopic hysterectomy and adnexectomy due to endometrial carcinoma. The preoperative treatment did not reveal any particular abnormalities. The induction of anesthesia was uneventful and without complications. A sudden cardiac arrest occurred when the abdominal cavity was insufflated with CO2. The doctors began resuscitation, which was continued by the anesthesiology emergency team. The patient was connected to ECMO. Despite intensive treatment, the patient died. An autopsy was performed. A post-resuscitation condition with rib fractures was diagnosed. A central venous cannula and ECMO tubes were inserted. The macroscopic and microscopic findings of the autopsy were inconclusive. Histology revealed no abnormalities of the internal organs. We ruled out a pneumothorax and an air or gas embolism as well as damage to the abdominal veins and other hollow organs. The tryptase level was just above the upper limit (35.20 µg/L), so that an allergic reaction could be ruled out.

Based on the exclusion, we concluded that the most likely cause of the patient's cardiac arrest was bradycardia or asystole as a vagal reflex caused by the rapid distension of the peritoneum during CO_2 insufflation. This complication is rare but is described in the literature. Bradycardic arrhythmias can also occur during CO_2 insufflation at a pressure of about 12 mm Hg (insufflation pressure is normally between 12 and 15 mm Hg). The pathophysiological mechanism is that a vagal cardiovascular reflex occurs when the peritoneum is suddenly distended during insufflation of the abdominal cavity with CO_2. The latter can only lead to bradycardic cardiac arrhythmias, but these can be successfully corrected. In the worst case, as in our case, cardiac arrest occurs.

P03-036 | *Forensic Pathology*

Post-Mortem Diagnosis of Anaphylactic Shock in a Farmer Suffering from Mastocytosis

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Post-mortem diagnosis of anaphylaxis is generally reported as complex from literature. Mast cell tryptase blood levels, a marker of mast cell degranulation, can provide a crucial support for the diagnosis. We report a case of a 41-year-old Caucasian man died following a hymenopter sting, after a short stay in intensive care. After the hymenopter sting, the man became dyspnoeic, but he had time to call for help; when the rescue team healthcare staff arrived at the site, found him in cardiovascular arrest with PEA, administered a dose of adrenaline, did resuscitation and transported the patient to intensive care. The ECMO device was placed in intensive care unit. However, the severity of metabolic acidosis and neurological post anoxic lesions did not allow further therapeutic procedures, and, on the same day, death was confirmed. Autopsy was performed 6 days after and demonstrated cerebral oedema, congestive oedema of lungs and dilated heart chambers. At histology, lungs congestion with inflammatory nodules, hypercellularity of the bone marrow, inflammatory infiltration of the skin, were observed. The cause of death was attributed to anaphylactic shock. The medical history was positive for mastocytosis and the tryptase assay on blood carried out 5 hours after the onset of symptoms demonstrated a value of 8955 ug/L (normal value: 1.7-8.5 ug/L). The peculiar aspect of this case is represented by the availability of the peri-mortem tryptase value, which was crucial to confirm and support the diagnosis of anaphylactic death.

P03-037 | *Forensic Pathology*

A Case of Maternal and Fetal Death by Idiopathic Spontaneous Intraperitoneal Hemorrhage in a Nulliparous Pregnant at the Second Trimester

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Spontaneous intraperitoneal hemorrhage is historically known as “abdominal apoplexy.” This condition, rare and potentially fatal, refers to the non-traumatic and non-iatrogenic rupture of one or more small splanchnic vessels; the cause of bleeding may be idiopathic or related to various pathologies. Generally, the presence of pseudo-aneurysms or aneurysms predisposes to bleeding, although in 30% of cases the cause of bleeding is not identifiable. Arterial rupture is not necessarily preceded by an aneurysmal stage. This clinical entity is also reported during pregnancy and in the post-partum period. The first case of spontaneous hemoperitoneum in pregnancy was reported in 1909 by Maurice, who described the case of a patient who underwent laparotomy on the second day postpartum due to progressive abdominal distention and hemodynamic instability, concluding that the cause was spontaneous rupture of an unidentified vase. The mechanism is unknown, postulated hypothesis is that the repeated distension of the vessels during pregnancy, in the presence of defects or thinning of the vascular wall, predisposes to its rupture (this case is called "spontaneous hemoperitoneum during pregnancy"), causing significant bleeding in the abdominal cavity, the origin of which in the majority of cases remains unknown. Predisposing factors are considered endometriosis, nulliparity and in vitro fertilization. According to some authors, in the

absence of an identifiable cause of bleeding, the spontaneous rupture of an artery (especially a branch of the celiac axis) remains the most probable hypothesis. In most cases the diagnosis is intraoperative or at the autopsy table. The mortality rate in the case of spontaneous idiopathic hemorrhage during pregnancy is around 8.6% if the cause of the bleeding is identified, otherwise the mortality exceeds 50%.

We present a case of a 33-year-old, otherwise healthy e no traumatic history, primigravida 23 weeks pregnant, that suddenly developed a shock status, while a dinner in public place. At Emergency Service's arrived she was already dead. A forensic autopsy was decided, in suspect of a rescue delay. The full autopsy showed a massive hemoperitoneum with 4350 cc of blood. Careful exploration of the abdominal vessels did not reveal the origin of hemorrhage; the examination of abdominal cavity, uterus and foetus was normal, placental abruption was ruled out.

A complete histological examination was also performed using haematoxylin-eosin staining (H&E) confirming the typical aspect of a hypovolemic shock, lack of blood in all organs with hypoxic-ischemic suffering in particular of the gastric and intestinal mucosa. The study of placenta and foetus after formalin fixation was unremarkable.

In conclusion, the cause of death was attributed to a hypovolemic shock due to idiopathic spontaneous intraperitoneal haemorrhage with no evidence of gross vessel's lesions, in a 2nd trimester pregnant woman and any responsibility in Rescue Emergency was excluded.

P03-038 | *Forensic Pathology*

Suicides Among Young and Elderly People in Estonia in 2005-2023

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During the study period 4156 suicides were recorded in Estonia, the number being highest in 2005 (n=273) and lowest in 2016 (n=183). The mean suicide rate per 100,000 deaths was 16,3 and in study groups, young and elderly people altogether 21,3.

The study group of young people was aged 10–19 years (the youngest child was 10 years old) and the total number of suicides during this period was 192. Majority of the victims were boys, but from 2017 the number of girls increased remarkably. 26% of the deceased had consumed alcohol prior death. The main cause of death was mechanical asphyxia from strangulation, during last 8 years this has slightly decreased and the number of deaths by injuries and poisonings increased.

The total number of suicides registered in the group of elderly people (aged 65+ years) was 1197, approximately 1/3 of the deceased were female and 2/3 were male, the oldest person was 100 years old. The main cause of death was mechanical asphyxia from strangulation. Of all causes of death, suicides comprise 0.4–0.6% in this age group.

In both age groups the number of suicides increased in 2020–2023. In comparison with our neighbouring countries (Baltic countries, Finland, and Sweden) in age groups of 15–19 years and 85+ Estonia had the highest mortality rate by suicides in 2020.

The study is based on data collected from Estonian Forensic Science Institute, Statistics Estonia, and Eurostat databases.

P03-039 | *Forensic Pathology*

Biological Significance of Renal Tubular Lipid Droplet Formation in Hypothermia

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BACKGROUND: Postmortem examination has suggested that elevated blood free fatty acids (FFA) and the formation of lipid droplets in the renal tubules are hallmarks of accidental hypothermia. Since the kidneys do not physiologically store many lipids, renal tissue would not form lipid droplets unless there is a pathological background of chronic hyperlipidemia. It is presumed that blood FFAs during hypothermia are taken up by renal tissue as an energy source and form lipid droplets, but this is an extremely rare situation in such a rapidly progressive disease state. However, the significance of these findings remains unclear. In this study, we aim to analyze the biological significance of lipid droplets by lipidomic and transcriptomic analyses using specimens from hypothermic mice.

METHODS: C57Bl/6 mice were exposed to an ambient temperature of 4°C for 12 hours, and their rectal temperature was decreased to 15°C to model hypothermia. After euthanizing, we collected kidneys and blood from them. We performed lipidomic analysis and enzymatic assays using the plasma samples to measure the concentration of FFAs and triglycerides (TGs). The kidneys were utilized for histopathological analysis and Mass spectrometry imaging (MSI). RNA samples isolated from the renal tissues were used for sequencing.

RESULTS: Lipidomic analysis detected more FFAs of various lengths from 14 to 22 carbons in the plasma of hypothermic mice than in controls. In contrast, plasma TG concentrations were lower in hypothermic mice. Oil Red O staining of kidney sections showed no detectable staining in normal mouse renal tissue. But marked lipid droplets were observed in the renal proximal tubular cells of hypothermic mice and transmission electron microscopy revealed that lipid droplets were in contact with mitochondria. According to MSI, diacylglycerols (DG) and TGs were predominantly found in the cortex of the kidneys of hypothermic mice. RNA-sequencing of the kidney samples indicated that genes associated with lipid uptake and utilization, such as PPARα, FATP1, PLIN5, CPT1A, and CPT2, were overexpressed in the hypothermia conditions.

CONCLUSIONS: This study shows that hypothermic stimulation enhances FFA uptake from the blood and also promotes β-oxidation by increasing gene expression for fatty acid uptake, accumulation, and supply to mitochondria in the renal proximal tubules.

P03-040 | *Forensic Pathology*

A Case of Guillotining by Train

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INTRODUCTION: We report the case of a 19-years-old male who was found decapitated on railroad tracks. The victim's passport photo was found in his pocket, detached from the ID. No other personal items have been found. The corpse was lying in a prone position, transverse to the tracks, between the railway track and the platform. The head, detached at the neck, was laying between the two tracks, while the body was found between the track and the platform.

MATERIALS AND METHODS: on-site inspection and cadaveric external examination.

RESULTS: The corpse inspection revealed a clean and circumferential neck severance, located at the level of C2 vertebra, with cutaneous discontinuances delimited by ecchymotic edge, sharply in the front and on the right side, and indented in all other portions. It was also found a complete spinal cord resection. All the remaining bone structures appeared intact, except for fractures located at the mandible and left upper limb, accompanied by mild bruises at the face and at the left upper limb.

From the surveillance cameras it appeared that the man, after removing his shoes, moved frantically on the platform and threw himself on the rails two seconds before the train arrival.

CONCLUSIONS: Train-related suicides are frequent. Usually, the victim throws himself under a moving train or stands in front of it, provoking skeletal and visceral severe injuries or sometimes corpse fragmentation. Cases of decapitation by train have been rarely reported in literature. The few reports in literature describe victims lying-down with their neck atop a railroad track. The distinctive trait of this case was that, despite the victim threw himself against a moving train, he was guillotined.

P03-041 | *Forensic Pathology*

Cardiovascular Morphometric Analysis in Heroin-Related Sudden Deaths: A Case-Control Study on Myocardial and Interstitial Connective Tissue

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Sudden deaths associated with substance abuse and overdose, particularly heroin, pose a significant public health concern. This case-control study focuses on the morphometric analysis of myocardial and interstitial connective tissue in 10 long-term heroin addicts (8 men, 2 women, aged 18-48), whose sudden deaths were attributed to heroin abuse. Whether administered intravenously or by sniffing, the study reveals cardiomyocyte hypertrophy and interstitial/perivascular fibrosis in the heart muscle through standard histological examinations. Additionally, 30% of cases exhibited histological patterns indicative of acquired cardiomyopathy. The findings suggest a potential link between acute heroin intoxication, altered cardiac morphology, and the occurrence of sudden deaths, even at non-lethal doses, emphasizing the need for further investigation into the cardiovascular implications of heroin abuse.

P03-042 | *Forensic Pathology*

Postfunerary Disturbance of Corpses – A Study on Exhumation

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The word "exhumation," which comes from the Latin "from the ground," simply refers to the removal of human remains—including cremated remains—from any location where they have been buried. Religion of Islam has its own reservations regarding exhumation and autopsies of dead bodies. Exhumation is defined as" Lawful digging out of a buried body from its grave. It is necessary for.

1. Purpose of body identification.
2. To determine the cause of death when foul play is suspected.
3. For second autopsy when first is ambiguous.
4. Reburial at different place.

AIM & OBJECTIVES:

1. To analyze and evaluate the findings seen in exhumed bodies such as duration of pathological findings persisting after burial and the factors which play role in decomposition of a corpse,
2. To correlate the demographic details and pathological findings seen on exhumation.

MATERIAL & METHODS: A two-year retrospective study was conducted on exhumed dead bodies of different age, sex and religion in different districts of Sindh, Pakistan. A team consisting of magistrate, police and medical officer reached the place of burial. Sampling including earth, cloth and wood of coffin and earth were collected from above beneath and both sides of coffin, and control samples were taken from the area in cemetery, away from the grave. Autopsies were performed directly after exhumation or the following day at the latest.

RESULTS & DISCUSSION: A total of fifty-three (53) dead bodies were exhumed during our study period. Out of them, 34 thirty-four were males and nineteen 19 were females. Only 2 cases were below ten years, 28 cases age group was between 20-30 years, and five cases were more than 40 years of age. Only 12 out of fifty-three were Non-Muslims.

Total of fifty-three dead bodies exhumed the different forensic findings were analyzed from the available records.

Exhumation was carried out for the graves after two months to two years of dead bodies burial, in the presence of judicial body, on legal demand.

- Most of the dead bodies were in advance state of decomposition.
- Due to advance stage of decomposition, mark of violence at soft tissue, were lost.
- Organs were also in state of putrefaction, so histopathology did not give too much about cause of death.

CONCLUSIONS: Exhumation is the process of removing a deceased person's remains from their original resting place. It is also possible to conduct an exhumation to identify the deceased or determine the cause of death. Facial identification is only possible in cases who were exhumed between 1 month, otherwise facial identification is lost. Forensic finding of violence is lost after two to three months due to autolysis.

P03-043 | *Forensic Pathology*

Ischemic Changes of Cerebellar Purkinje Cells in Japanese Cases of Sudden Death During Bathing

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Japanese people like taking baths, with shoulder-depth immersion in bathtubs filled with approximately 40°C water. Fatal accidents during bathing, especially among elderly people, commonly occur, particularly during winter. Cases of mortality devoid of morphological disease findings might be attributed to cerebral ischemic events occurring when individuals stand up from the bathtub, subsequently falling and drowning by aspiration.

Cerebellar Purkinje cells (PCs) are highly vulnerable to acute hypoxic or ischemic conditions. Calbindin-D28k, a protein belonging to the EF-hand calcium-binding protein-family, is expressed in the cytosol of neurons in most brain regions. It is also found in PCs. Oxygen availability is also important for regulating hypoxia inducible factor-1α (HIF-1α) and vascular endothelial growth factor (VEGF), which are necessary to maintain homeostasis in hypoxic conditions. Using immunohistochemical analysis, we conducted our study identifying and characterizing ischemic changes in the cerebellum. [Materials and Methods] We examined data of forensic autopsy cases conducted at Kitasato University School of Medicine during January 1, 2010 – May 31, 2021. These cases included 31 of sudden death during bathing, 21 of acute asphyxiation, and 21 of circulatory system diseases, with 21 control cases of multiple trauma. Paraffin blocks of the cerebellum collected at autopsy were thinly sliced for immunohistochemical examination using Calbindin-D28k, HIF-1α, and VEGF antibodies as primary antibodies. At high magnification, 100 cerebellar specimens were counted. The positivity rate was expressed as a percentage: a case with more than 50% positive cells was defined as positive. In the cerebellum, the graduation of necrotic change of the PCs (cell swelling, autolytic necrosis with shrinkage, acidophilic behavior, and dark cell degeneration) were classified in H&E-staining, as described by Hausmann. [Results] Immunohistochemistry using anti-Calbindin-D28k antibody revealed that 88.8% of cases of sudden death during bathing were positive for organic and non-organic diseases. Additionally, 84.6% were positive for aspiration of drowned water. Among control cases, 90.4% were positive for multiple trauma, 68.4% for acute asphyxia, and 76.2% for cardiovascular diseases. The control acute asphyxiation cases exhibited significant difference of $p>0.05$ compared to the other groups, but no significant difference was found for HIF-1α or VEGF antibodies. From comparison of sudden death during bathing cases /control groups, no significant difference was found in the number of PCs or in the proportions of intact Purkinje cells. [Discussion] The positivity rate of

Calbindin-D28k antibody was low within the control acute asphyxiation group, indicating ischemic changes in Purkinje cells. Cases of sudden death during bathing showed high incidence of positive Calbindin-D28k antibody in cerebellar Purkinje cells, with no observable ischemic change. This finding suggests that deaths in these cases likely occurred because of aspiration of drowning water preceding cerebral ischemia.

P03-044 | *Forensic Pathology*

"Winter Is Coming": A Case Report of Fatal Hypothermia

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We present the case of L.R., an 82-year-old woman who was found dead in her house, with history of psychiatric disease and hard palate cancer. At the examination of the scene of death she was wound under a closet in her bedroom, lying on the ground completely naked. The body showed initial signs of putrefaction: discoloration of the lower abdominal wall and insects' eggs on the eyelids.

Different plausible causes of death were hypothesized: natural death due to the neoplasia, asphyxia due to confinement, psychiatric drugs overdose or even a possible homicide.

A full autopsy was carried out, showing advanced cachectic state, larvae inside the mouth, neoformation on the left hard palate, small excoriations at her right upper limb, acrocyanosis and frost bites on the distal phalanges of both hands, discoloration of the lower thoracic and abdominal walls, fine reddish spotting of liver, lungs, spleen and uterus. Moreover, the gastric mucosa showed numerous "Wischnewsky spots", histologically confirmed. Toxicological analysis was negative for drugs use.

These pathological findings led to identifying as the cause of death a condition of fatal hypothermia.

This hypothesis was supported by different circumstantial evidence: hide and die behavior, paradoxical removal of clothes, the advanced age of the woman which predisposes to inadequate body thermogenesis, the cachectic state with lack of adipose tissue (which acts as a thermal insulator, preventing heat loss), organic comorbidities (hard palate neoplasia) and the climatic conditions in which death occurred (although the place of discovery was an indoor space, the windows were open and the ambient temperature was 17 °C).

This case showed the importance of a full autopsy together with the study of clinical records and circumstantial evidence in the distinction between different plausible causes of death which is useful not only in medico-legal practice but also in the collection of epidemiological data.

P03-045 | *Forensic Pathology*

The Forensic Value of the Gastric Content in Head Trauma Injuries: A Case Report

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We present the case of a 69 years old man who was hit by a car while crossing the road. A CT scan of the skull and brain showed fracture of the left occipital bone, bilateral hemispheric subarachnoid hemorrhage, right frontal-temporal-parietal subdural hematoma with a shift of midline structures of 18 mm and complete obliteration of the third ventricle. He showed signs of anisocoria, absence of mobility of all 4 limbs and was immediately intubated and admitted to intensive care. The neurosurgeon was immediately consulted. He underwent drainage of subdural hematoma and two decompressive craniotomies but died 15 days after the initial trauma. At autopsy, the stomach was full of a greenish poltaceous material. This gave us vital information in reconducting the actual brain death of the man to the immediacy of the investment, helping in the process of ruling out any possible profiles of professional liability.

P03-046 | *Forensic Pathology*

An Autopsy Case of Undiagnosed Malignant Lymphoma

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INTRODUCTION: Malignant lymphoma, also called blood cancer, is a general term for tumors (cancer) that arise from tissues of the lymphatic system. There are various types of disease, but in general, there are two main types: "Hodgkin's lymphoma" and "non-Hodgkin's lymphoma." The diagnosis of malignant lymphoma is done according to the WHO classification of haematolymphoid tumours. Malignant lymphoma is often discovered as swollen lymph nodes, mainly in the neck, armpits, and groin. It is not uncommon for it to be discovered by chance during a medical checkup. Although malignant lymphoma can lead to death, autopsy cases of untreated malignant lymphoma with multiple metastases are rare.

SUMMARY OF CASE: A man in his 80s had been living alone for the past 14 years after his wife was hospitalized. His daughter, who was notified by the security company that there was no response from the motion sensor, entered the house using a duplicate key and found the deceased in a prone position in the hallway. She found dried tar-like feces and wiping marks on the bed of the deceased. He had contracted COVID-19 a month earlier, but had recovered fully about three weeks ago, and before the COVID-19 he was going out four times a week to play table tennis. At the request of the relatives, an autopsy was performed to investigate the cause of death.

AUTOPSY FINDINGS: The deceased was 164.5 cm tall and weighed 49.5 kg. His body mass index (BMI) was 18.3. Postmortem lividity was slightly dark, and both the left and right cardiac blood contained clots. The coronary arteries showed calcification in all three branches, 60% to 70% stenosis in the left anterior descending branch, and histological findings suggestive of an old myocardial infarction. Two small fist-sized white masses were found in the retroperitoneum in the ileocecal region. Similar masses were also found in the inferior border of the liver, under the posterior capsule, on the ventral side of the diaphragm, mesentery, peritoneum, and posterior side of the right second intercostal muscle, and were fused in part and extremely numerous. There was a 150-mL accumulation of light reddish-brown turbid fluid in the abdominal cavity. Histologically, all the tumors had diffuse proliferation of tumor cells with narrow sporangia and nuclei of unequal size with round or fissionable nuclei. Immunohistochemically, the tumor was diagnosed as diffuse large B-cell lymphoma.

DISCUSSION: The deceased had a history of hypertension and cerebral infarction, and was receiving regular prescriptions from his family physician, but had not been diagnosed with malignant lymphoma and was untreated. Although the possibility of tumor death cannot be completely ruled out, the cause of death was judged to be exacerbation of ischemic heart disease.

P03-047 | *Forensic Pathology*

Challenges in the Assessment of Traumatic Deaths During Pregnancy: A Case Report in Forensic Practice

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In fatal automobile accidents, the autopsy aims to determine the cause of death, whether it resulted from the traumatic injuries sustained in the accident, and to identify or rule out any underlying natural diseases or factors that could have precipitated or contributed to the accident, documenting all relevant findings.

Traffic accidents account for more than half of all cases of trauma complicating pregnancy. The consequences of a car accident are related

to the speed and mechanism of collision. In severe cases, multiple fatal injuries often occur, with the most common causes of death being head injuries and multiple internal injuries, resulting in maternal exsanguination and, consequently, intrauterine fetal hypoxia. However, death may be related to other causes such as alcohol and/or drug consumption or natural diseases of the driver, which are rare but require thorough investigation during the autopsy.

This report describes the case of a 30-year-old pregnant woman who apparently died as a result of a car accident while she was 28 weeks pregnant and under proper monitoring. Before the pregnancy, she sought the emergency room due to abdominal pain and received symptomatic treatment. In the third month of pregnancy, she returned to the emergency room due to fetal bradycardia.

During the autopsy of the mother, severe craniocerebral injuries were observed. Internally, the main macroscopic findings included generalized pallor, shocked kidneys, and the presence of a brown hepatic mass, suggestive of intralesional hemorrhage. A post-mortem cesarean section was performed, resulting in the removal of a female fetus from the uterus. Examination of the placenta and necropsy of the baby revealed no relevant macroscopic findings. Comprehensive histopathological samples from the mother and the fetus were examined, revealing maternal hepatic cavernous hemangioma, with no hepatic or abdominal hemorrhage, and placental hemorrhage with signs of acute and chronic placental circulatory failure. Toxicological analyses for alcohol and drugs returned negative results.

This abstract and title emphasize the challenges involved in assessing traumatic deaths during pregnancy, providing a detailed insight into a specific case and its forensic implications.

P03-048 | *Forensic Pathology*

Statistical Analysis of Skull Thickness and Biomechanical Properties in Japanese Children

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The structure and strength of a child's skull are important in accurately determining what and how external forces were applied when examining head injuries. The aims of this study were to measure skull thickness and strength in children, evaluate sex differences, and investigate the correlation between skull thickness and strength and age. Skulls were obtained from 42 Japanese dead bodies under 20 years of age. During the autopsies, bone samples were taken from each skull. The length, width, and central thickness of the skulls were measured using calipers. Three-point bending tests were conducted, and bending load and displacement were recorded. Bending stress and bending strain were calculated, and Young's modulus, 0.2% proof stress, and maximum stress were obtained. In cases under 1.5 years old, 14 out of 46 male samples and 20 out of 40 female samples did not fracture during the three-point bending test, though no significant sex differences were detected. No significant differences in age, sample thickness, Young's modulus, 0.2% proof stress, or maximum stress were detected between the sexes. The sample thickness, Young's modulus, 0.2% proof stress, and maximum stress increased significantly and logarithmically with age (R^2 = 0.761–0.899). Although age correlated with thickness, Young's modulus, and maximum stress more in females than in males, 0.2% proof stress correlated slightly better in males than in females. The skulls of preschool children, in particular, are thin, have low strength, and are at high risk of fracturing even with relatively small external forces. Unlike adults, no significant sex differences in skull thickness or strength were observed in children.

P03-049 | *Forensic Pathology*

Forensic Medical Differentiation of the Volume of Blood Loss by Analysis of Circular Dichroism Maps of Images of Biological Tissues and Blood

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Acute blood loss is one of the most urgent and dangerous medical situations that can occur under various circumstances and is an important subject of research in the field of forensic medical examination. Now there is an increase in cases of injuries and accidents that can lead to blood loss and death, including in situations related to armed conflicts, terrorist acts, accidents, etc. Establishing the exact volume of blood loss allows solving a number of investigative questions, however, existing methods are often not sufficiently accurate and objective. Therefore, the development of new methods is promising.

THE PURPOSE OF THE WORK: To develop modern criteria for forensic medical diagnosis of the volume of blood loss on the basis of Müller-matrix polarization tomography.

MATERIAL AND METHODS: The collection of muscle, skin, spleen, kidney, brain and blood was carried out from 86 dead people with different degrees of blood loss from 0 mm3 to 3000 mm3. The research was carried out by using the method of Mueller-matrix tomography with algorithmic reproduction of circular dichroism maps of histological sections of biological tissues.

RESULTS: It was established that the histograms of distributions of circular birefringence values of histological tissue sections of the deceased from blood loss are characterized by a smaller average value and the range of dispersion of random values of circular dichroism in comparison with similar distributions for samples without blood loss. That is, the main factor in the formation of the coordinate structure of circular dichroism is the concentration of formed blood elements. The intensity of circular birefringence is directly proportional to the concentration of such optically anisotropic molecular structures. Therefore, with an increase in the degree of blood loss (a decrease in the concentration of formed blood elements), the level and magnitude of the coordinate distribution of circular birefringence decreases.
For all studied biological drugs, the range of sensitivity of the method to changes in the volume of blood loss of the deceased is the maximum level of 0мм3 - 2500 мм3. The accuracy of the method of differential Mueller-matrix tomography of the circular dichroism of the polycrystalline component of biological samples ranges from: ΔV=0mm3-2500 mm3 ↔ 86%-96%

CONCLUSIONS. The obtained results demonstrate the effectiveness of the proposed approach, which will allow to expand the understanding of this problem and opens up new opportunities for a more accurate and objective analysis of blood loss at the level of tissues and cells.

KEYWORDS: Forensic Medicine, Biological Tissues, Blood Loss, Mueller's Matrix, Polarimetry

P03-050 | *Forensic Imaging*

Postmortem CT Angiography of the Myocardium: An Experimental Approach on Two Cases

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INTRODUCTION: Postmortem imaging of sudden cardiac death is a common practice nowadays. Yet, postmortem coronary angiography is challenging as it requires certain manipulation of the body (change of posture while in a rigid state etc.) to be successfully performed. Here we

suggest as alternative an ex-situ angiography of the heart applied in two cases.

MATERIALS AND METHODS: Two cases of sudden cardiac death (one with 3 bypass grafts and one with suspected coronary disease) were selected for this study. Both bodies underwent unenhanced postmortem CT. The hearts were removed from the body during autopsy, were fixed in a position with the ascending aorta aligned with the vertical axis and submitted to ex-situ angiography. In case 1, contrast was infused in the bypass grafts and in case 2 directly in the coronary vessels. Last histological examination of the myocardium, coronary vessels and grafts was performed.

RESULTS: Unenhanced postmortem CT revealed atherosclerotic lesions of all coronary vessels. Ex situ angiography revealed no obstructions on the grafts. Ischemic lesions in the distribution of the right coronary artery were noted in both cases. Coronary stenosis was quantified in both cases. Histological examination of the heart revealed chronic ischemic lesions in the form of myocardial "scarring" and recent ischemic lesions in the form of wavy myofibers in both cases. Coronary stenosis was found in agreement with ex-situ angiography assessment. In conclusion ex-situ angiography was found to be extremely helpful but unable to absolutely differentiate between recent and chronic ischemic lesions.

DISCUSSION: Ex situ angiography was attempted as the means to overcome problems on full body Postmortem CT. In our cases the contrast agent allowed the inspection of both coronary vessels, grafts and myocardial walls and gave encouraging results. More experimental studies are needed to further explore the full potential of ex-situ angiography in the investigation of natural deaths and for establishing appropriate protocols.

KEYWORDS: Postmortem Angiography, Myocardial Ischemia, Autopsy, Forensic Histopathology, ex-situ coronary angiography

P03-051 | *Forensic Odontology*

Save Your Face: Guidelines for Prevention of Orofacial Trauma

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BACKGROUND/AIM: Orofacial trauma is drastically increasing during childhood and adolescence and can affect, isolated or not, several anatomic regions such as teeth, jaws, face, and temporomandibular joint. In serious situations, it may involve the skull, leading to long-term consequences that can significantly impact quality of life. The aim of the present work was to present prevention strategies to decrease accidents involving children and consequently the burden of orofacial permanent disability. This burden is an urgent public health challenge with social, economic, and environmental impacts.

MATERIAL AND METHODS: A literature review was performed using sources such as PubMed, Sci-hub, Scopus, Cochrane, and Web of science.

RESULTS AND DISCUSSION: Etiology of orofacial trauma and consequent injurie pattern can be associated. Intra-oral lesions are more likely to happen during free time activities, in school breaks or at home. It is well known that biologic features, such as Angle type II occlusion can increase the risk of dental trauma. Extra-oral lesions are frequently associated to road traffic accidents, sport activities and different types of violence.
The present guidelines formulate preventive measures primarily focused on the identification, comprehension, and management of risk factors and are directed to dentists, doctors, teachers, sport staff and parents. These recommendations include first aid measures in orofacial trauma and they not only facilitate an early treatment but also make the treatment outcome more predictable.

CONCLUSIONS: Prevention campaigns should be conducted by national commissions, in order to reduce the burden associated with orofacial trauma and the bio-psycho-social consequences namely in children.

P03-052 | *Forensic Odontology*

An Evidence-Based of TMJ Permanent Disability Evaluation – A Critical Reflection of European Guidelines

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INTRODUCTION: Table guides intend to be an equitable tool for medico-legal expertise in disability assessment of the victims. Evidence-based knowledge in the field of TMJ trauma and in temporomandibular joint disorders diagnosis and treatment, provides the necessary data for medico-legal assessment. This study aimed to perform an evidence-based critical reflection of medico-legal damage evaluation in relation to TMJ trauma, in different medical law contexts.

MATERIAL AND METHODS: An observational, cross-sectional study was performed within the database of the National Institute of Legal Medicine and Forensic Sciences, between 2000-2017, regarding TMJ trauma injury-frame and sequelae-frame. Descriptive and statistical analysis was made.

RESULTS: The majority of TMJ trauma reports encompassed criminal law practice followed by reports in civil law and labour law. Civil law reports were similarly distributed among sex and were mainly due to road traffic accidents, labour reports had a male predominance and the majority were work-related, criminal reports had a male predominance and the majority were due to interpersonal violence.

DISCUSSION: The evidence-based supported critical reflections on TMJ trauma disability assessment, in relation with European guidelines analysis. Civil compensation issues were related with asynchronous procedures as well as an heterogeneous evaluation of permanent disability regarding the sequelae-frame findings in TMJ trauma.

CONCLUSIONS: According to the Portuguese evidence-based study presented, it is clear that the European guidelines for TMJ disability evaluation should be reviewed. A European reference table should be adopted for a standardized medico-legal deliverable.

P03-053 | *Forensic Imaging*

CT Scan of the Clavicles: Experience in Forensic Age Assessment in Living Individuals in Barcelona

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Forensic age estimation in living individuals in Spain is assessed by a medical examination, an X-ray of the left hand and an orthopantomography. In cases with a complete ossification of the hand, but a non-evaluable orthopantomography or doubtful cases, the practice of a CT scan of the medial epiphysis of the clavicles is indicated.

OBJECTIVE: To show the characteristics of forensic age estimation reports in Barcelona in which clavicular CT was performed.

MATERIAL AND METHODS: Retrospective descriptive study of forensic age estimation reports issued in Barcelona from 1/1/2011 to 12/31/2023, in which a clavicular CT was included. Cases with Schmeling-Kellinghaus stages 3c, 4 and 5 were considered to be older than 18 years.

RESULTS: Of the 4695 age estimation reports issued, a sternoclavicular CT scan was performed in 35 cases (0.74%): 30 from the Juvenile Prosecutor's Office, 3 from an Examining Court and 2 from a Criminal Court.
In 33 cases a CT scan was requested because the orthopantomography did not show third molars that could be evaluated. In two cases, all three tests were performed requested by the Prosecutor's Office.
In terms of sex, 97.14% were male, only a woman was included.
In terms of geographic area, 48.57% were North Africans (13 from Morocco and 4 Algerian), 14 Sub-Saharans (40%) (half of them from

Gambia), 3 Asians (8.57%) (2 from Pakistan and 1 from Afghanistan) and 1 European (2.86%) (from Albania).
Regarding ossification of the hand, most of them showed a 19-year-old standard of Greulich-Pyle, except for the female, one case with 18-year-old standard, and one case with 15.5-year-old standard (in this one, the CT scan was wrongly indicated in the absence of third molars, and a Schmeling stage 1 was found).
23 individuals (51.43%) were assessed as adults, most of them (42.86% of the total) showed a stage 3c. Only in one case (2.86%) the ossification stage could not be determined because of a bilateral anatomical shape variant ("fish-mouth-like").
The lowest calculated minimum age was 14 years (Schmeling stage 1) and the highest was 26.6 years (stage 5).

CONCLUSIONS:

1. Clavicular CT is rarely used in forensic age estimation in Barcelona (0.74%) but provides relevant information when there are doubts resulting from the radiological study of the hand or orthopantomography.
2. In our series it was mostly performed on sub-Saharan and North African males.
3. Qualified forensic physicians are essential for the accurate interpretation of these cases.
4. The clavicular CT scan lets us apply the minimum age concept and allows us to conclude an age without doubt.
5. We should apply the AGFAD recommendations in all cases in which the ossification of the hand is complete.

P03-054 | *Forensic Imaging*

Assault or Accidental Trauma? The Helping Role of the Radiological Investigation in Order to Clarify the Dynamics of Death

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Establishing the compatibility of a certain lesion with an assault or accidental trauma is a real challenge for the forensic pathologist. The question arises whether and in what terms the radiological examination can help the forensic pathologist to "win" this challenge.
We report on a case of a woman, with a history of hypertension, thrombocytopenia, and alcoholic cirrhosis, who died after transport to the nearest hospital due to a head trauma with the onset of epileptic seizures and widespread ecchymotic lesions, especially of the left hemisome.
The dynamics of the woman's death immediately appeared unclear as a complex social condition emerged, as she served as a carer for a gentleman to whom she was romantically linked and whose son periodically attacked her. Furthermore, the testimonies given to the police appeared conflicting: the woman's partner claimed to have seen the latter fall from a chair hitting her skull, while the first responders stated that when asked specific questions about a possible attack the woman nodded implying that she had been attacked. The Judicial Authority ordered a post mortem investigation in order to clarify the compatibility of the death with accidental trauma or an attack.
During the autopsy examination, various ecchymotic lesions were highlighted, especially on the left hemisome, which did not present a clear chromatic difference between them, and which therefore could be considered contextual. Furthermore, a large left frontal intraparenchymal hemorrhage with hemotetraventricle, bilaterally disseminated subcortical hemorrhagic foci and subarachnoid hemorrhage was documented at the encephalic level.
During the radiological examination, conducted by an expert forensic radiologist, the location of the intraparenchymal hemorrhage involving the left anterior nucleocapsular region was better described. Furthermore, the CT examination highlighted recent fractures of the left scapula, from the fourth to the eighth left rib, of the first and second lumbar vertebrae and of the base of the second metacarpal of the left hand.
On the basis of the radiographic report, it was possible to hypothesize that the site of the gross left intraparenchymal hemorrhage (anterior nucleocapsular site) was "typical", i.e. related to a hypertensive etiopathogenesis. As a result, the left anterior nucleo-capsular intraparenchymal hemorrhage with hypertensive etiology could probably have occurred first and then the fall from the chair with the subsequent further traumatic lesions highlighted. Obviously, as there is no indicator capable of discriminating with certainty the productive dynamics of women's injury, it is therefore impossible to state with scientific rigor whether the injuries found are compatible with an attack or accidental trauma. What we intend to underline is the need to subject similar cases to a radiological examination, conducted by an expert forensic radiologist, in order to investigate the numerous etiopathogenetic hypotheses to better clarify the dynamics of death.

P03-055 | *Forensic Humanitarian Action*

Victims Identification in Israel: Feedback on Experience

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On 7th October 2023, Hamas launched an offensive against Israel, notably with rocket attacks from the Gaza Strip (Operation Al-Aqsa Flood). Israeli military responded to these attacks. Thousands of civilians and soldiers were killed in Israel and in the Gaza Strip, with numerous wounded people on both sides.

On 12th October, Israeli authorities addressed an official request to Switzerland, asking for assistance to identify the victims of the attacks. In response, the Swiss Confederation recruited a team of five forensic experts (including three forensic pathologists and two police officers), all members of the Swiss DVI group, and sent them to Tel-Aviv where they worked alongside the Israeli experts for this engagement.

This presentation aims to explain the organization of this mission and the work of the Swiss team regarding the identification and examination of the victims that were investigated by this group.

P03-056 | *Forensic Humanitarian Action*

Enhancing Forensic Humanitarian Action: Methodology and Best Practices for Cemetery Assessments in the Context of Migration in Greece

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The International Committee of the Red Cross (ICRC) through its Forensic Humanitarian Action (FHA) promotes and supports forensic best practices, to address the needs of affected people.
An essential objective of the FHA is to bolster local capacities for conducting proper and culturally sensitive burials in accordance with the rites, beliefs, and religion of the families of missing persons. This ensures adherence to best practices in documentation and the respectful disposition of bodies, ultimately aiming to maintain traceability while upholding the dignity and respect of the deceased.
The forensic efforts extend to conducting comprehensive assessments of existing cemeteries and burial conditions. In the context of Greece, cemetery assessments seek to understand prevailing practices and administrative procedures, especially concerning cases related to migration. The primary goals are to identify needs, propose interventions for decision-makers, and offer support when necessary to maintain traceability of remains.
The methodology for a cemetery assessment encompasses several phases, including pre-assessment preparations, data collection employing well-defined design, methods, and tools, subsequent data analysis and interpretation, and comprehensive reporting. A preliminary survey of available information and the cemetery's needs precedes the

assessment, with the scope varying based on established goals and available resources.
The assessment involves posing a set of working questions to gather pertinent data, elucidating the cemetery's usage, procedures, capacity, conditions, types of burials, and archiving/documentation systems. The field visit component includes documenting the cemetery's condition and boundaries, graves, and their surroundings through photographs, collecting information/data through observations from the grave site (grave marker inscriptions), interviews, existing archives and registrations, and recording of the precise location.
The collected data should be analyzed and interpreted based on facts, figures and stakeholders' perceptions.
The outcome is an assessment report comprising an executive summary, collected information, analysis, conclusions, and recommendations for future response. Ethical guidelines and data protection standards should be observed, and the report includes visual aids such as images, maps, diagrams, and illustrations to comprehensively represent assessed aspects.
Mandatory elements in the report include a mapping of existing graves, ensuring future traceability of remains. Careful planning, documentation, mapping, and information retention regarding burial sites are imperative to enable the tracing of bodies in the future. This comprehensive methodology underscores the commitment to humanitarian values and respect for the dignity of the deceased within the context of forensic activities.

P03-057 | *Forensic Humanitarian Action*

A Review of the Methodology and Challenges Related to the Identification of Dead Bodies Recovered from Shipwrecks in Tunisia

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INTRODUCTION: Every year, thousands of migrants try to reach the European continent without authorization from states. Hundreds of bodies are recovered every year in the Tunisian coasts related to migrants who tried to cross illegally the borders, as Tunisia represents a perfect departure point due to its geographical location. One of the major problems lies in the identification of the recovered bodies, as migrants are from various African countries.
This study aims to review the methodology used in the Tunisian context to identify the bodies recovered from shipwrecks, and, to highlight the different challenges faced by the forensic scientists in order to address identity of dead migrant recovered from the sea.

METHODS: We conducted a cross-sectional study of unidentified decedents over 23-year period (2000-2023) in the coastal region of Tunisia: Monastir and Mahdia. Autopsy reports were examined to extract the methods used for the identification.

RESULTS: A total number of 129 reports were examined throughout the study. Findings showed the use at least of one of the primary identification methods in all cases. DNA samples were taken in 94.6% of all the cases. Sampling consisted of all DNA extractable tissues (muscle, bone and cartilage structures, blood) in 46.5% of the cases while, the use of cartilaginous and bone structures was noticed in 20.9% of the cases. Visual recognition was used in 28.7% and fingerprints were used in 15.5%. Ante Mortem and Post Mortem forms were not used when dealing with unidentified dead bodies from shipwrecks. Anthropological methods for estimation of the age were used in 66.7% of the cases. Among the used methods, an elaborated method by the anthropology laboratory of Monastir, combining methods of McCormik (1988), Barrès et al (1989) and Durigon, and using sternal chest radiology, were used in 30.2% of the cases. The same method combined with Lamendin method was used in 10.1% of the cases. Concerning the estimation of the sex, visual recognition of the remains of an external genital organ was judged sufficient to estimate the sex in 75.2% of the cases. At the end, only 43 bodies were identified.

CONCLUSION: This study may provide some food for thought for forensic scientists and even authorities so that they understand the real issues related to forensic identification of the dead migrants and try to find efficient solutions.

P03-058 | *Clinical Forensic Medicine*

Simultaneous Non-Violent Demise Indoors: A Forensic Rarity

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BACKGROUND: Simultaneous demise of two persons living inside home and with little contact from outside are a challenge. Especially defining the time of death of both people, generally relatives to each other, and the sequence of events, might be extremely important from criminal and civil rights perspective. Once excluded the possibility of a homicide-suicide, or a double homicide, a careful scrutiny of all possible causes of death is required.

CASE REPORT: The mother and her daughter, aged respectively 74 and 52 years old, were found dead in a peripheral town of Albania. The daughter was caring for the hemiplegic mother since several years, when probably she had herself a sudden death. Autoptic findings were compatible with a massive pulmonary embolic event, while the woman was under treatment for diabetes, hypertension and had a severe obesity. The mother logically succumbed within the next day, while bedridden and nobody to take care any longer. With no signs from inside, neighbors called the police, and the scene was uncovered approx. two days from the double demise.

DISCUSSION: Autoptic findings and toxicology are highly important for complex occurrences, although in our case no external signs of violence were seen. Nevertheless, a thorough histology and toxicology might be needed to rule out deliberate self-poisoning, and to clarify the sequence of the events.

P03-059 | *Forensic Anthropology*

Examining the Difference Between Physical and Virtual Linear Measurements: A Study Focusing on Bones of the Upper Limb

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In the field of anthropological sciences, conventional osteometric methods are commonly employed. A preliminary investigation into the potential differences between virtual calculations and direct physical measurements was conducted on a small-scale study, focusing on the second thoracic vertebrae of 24 individuals. The present study addressed the same inquiry but extended its scope to measurements taken from bones of the upper limb, specifically the scapula, humerus, ulna, and radius on both anatomical sides. The study followed the same methodology and utilized 25 individuals of both sexes from the same skeletal collection of the Forensic Anthropology Unit of Medical School at the National and Kapodistrian University of Athens, Greece. The objective of this study was to assess the discrepancy between methods initially designed for dry bones to 3D models. Measurements were conducted on the aforementioned skeletal elements through direct measurements using a digital caliper and measurements on high-resolution 3D surface models. The numerical outcomes obtained from the two measuring techniques were subsequently subjected to various statistical analyses, assessing inter-method precision through Bland-Altman plots, TEM, %TEM, and paired samples t-test. Both intraobserver and interobserver tests were carried out. While certain statistical analyses revealed a notable difference between the two measuring techniques, the %TEM suggested that the results fall within the threshold of statistical significance.

In conclusion, the findings of this study endorse the adoption of virtual linear measurements. Additionally, it is suggested to explore other skeletal elements with more intricate structures, as their complexity may pose challenges to virtual measurements.

P03-060 | *Forensic Anthropology*

Identification of Body Segments Related to the Collapse of a Tailings Dam in Brumadinho Which Killed 270 People in 2019 – Civil Police of Minas Gerais, Brazil

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On January 25, 2019, the Córrego do Feijão Mine Dam collapsed, in Brumadinho, Minas Gerais, Brazil. The tailings mud traveled approximately 10km in approximately 1 minute, devastating everything in its path. 270 people were killed. 2 women were pregnant, and their fetuses also died. Thus, it is considered that 272 victims died. To date, 1023 body segments have been sent to the Instituto Médico-Legal, in Belo Horizonte, Minas Gerais, Brazil, to be autopsied by the Civil Police of Minas Gerais. 267 victims were identified by papiloscopy, forensic anthropology, forensic dentistry or by DNA. 151 segments were not human. 123 cases were inconclusive. 22 DNA tests are still ongoing. 88 bodies were recovered complete. The bodies of the remaining 179 victims were fragmented. The search at the site of the rupture continues under the responsibility of the Minas Gerais Fire Department. Of the 727 bodies identified by the Minas Gerais Civil Police, 410 are still being held at the Legal Medical Institute for subsequent inhumation by the victims' families. Some families chose to wait for the location and identification of new segments before proceeding with the burial. 3 victims have not yet been located or identified. With each passing day, contamination, and degradation of materials of human origin make it difficult to carry out exams. No materials are discarded. The Civil Police of Minas Gerais continues to carry out DNA tests seeking to identify all recovered segments.

P03-061 | *Forensic Anthropology*

Forensic Age Estimation of the Knee and Clavicle by Post-Mortem CT

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Forensic age estimation of deceased individuals may be carried out when establishing a biological profile. Such a profile may then be compared with data on missing persons. Numerous methods exist for estimating age and the choice of method varies depending on, inter alia, which age group the deceased belongs to. Common for most methods is establishing a staging method for specific age-related traits, such as bone growth. By using appropriate reference data sets for the specific method, a given stage may then be translated into an age-interval. Age-related bone changes have not least focused on imaging of epiphyseal growth and closure at various bone ends, such as the clavicle medial end, and the femoral, tibial and the fibular knee joint ends. Post-mortem CT (PMCT) is increasingly used in age estimation in connection with Disaster Victim Identification (DVI) and single identification cases. Reference data sets exist for the clavicles, but not the knees. The aim of this study was to seek to create new reference data sets for age estimation in DVI cases based on the knee joint ends on the femur, tibia, and fibula, compared with the clavicle.

This retrospective study included 221 PMCTs of individuals from 10 to 25 years of age. The epiphysis of the clavicle and the knee were assessed in blind trials using the staging method by Schmeling et al. (stages 1,2,3,4,5) and Kellinghaus et al. (substages 2a,2b,2c,3a,3b,3c). Intra- and interobserver tests were also performed. We found good agreement, as determined by kappa-statistics, between the observers for all the bones except for the tibial bone in which case it was only fair (Femur K = 0.80, Tibia K=0.40, Fibula K=0.648, Clavicle K=0.789).

For the clavicle, we found reference values roughly in line with those in other studies previously reported. For the bones of the knee stages, 4 and 5 are seen within a narrow age range and may be suitable for age estimation of individuals in the age range 15-25 while stages 3a, 3b and 3c are present in individuals from the age range of 11-25 and therefore not suitable.

In conclusion, this study showed that age estimation for DVI purposes can be problematic if based on the tibia, femur, and fibula alone. The results for the clavicle were more promising but for a more reliable age estimation, future development should focus on the combination of these bones.

P03-062 | *Forensic Anthropology*

Multiple Sharp Force Trauma on Extremities: Evidence of Torture, Overkilling or Defense?

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INTRODUCTION: The identification and interpretation of trauma on skeletal remains is one of the biggest challenges for forensic practitioners. Taphonomy can greatly alter the appearance of the injuries or even mimic trauma, thus hindering the examination process. The present study focuses on a case of perimortem blunt force (BFT) and sharp force trauma (SFT), complicated by taphonomy.

MATERIAL AND METHODS: The skeletonized remains of a young adult male, found in a prone position in a clandestine burial in Eastern Crete, were recovered. The skeleton is thought to date back to the Second World War but information on the chronology of the site is not reliable up to date. The completeness of the skeleton was recorded to be over 75%. Upon examination, evidence of perimortem BFT was identified on the cranium and evidence of perimortem SFT on both upper and lower extremities. A CT scan of the entire skeleton was acquired, and digital models of the long bones were created using photogrammetry for better visualization of the lesions.

RESULTS: Fractures and lesions were assessed both visually and through the examination of CT scans and digital 3D models. The fracture pattern on the right occipitoparietal region, exhibiting radiating fractures and plastic deformation, was consistent with perimortem BFT. An additional circular depression ~1 cm in diameter was identified on the left temporal bone, also exhibiting plastic deformation. A total of 17 V-shaped cortical lesions were identified on the extremities, all directioned roughly perpendicularly to the long axis of the bones. Edge morphology, coloration, radiating fracture lines and hinging were assessed for all lesions. Out of those, 12 were considered to be the result of SFT whereas the rest were attributed to taphonomical alterations, such as scavenging.

DISCUSSION: Due to the fragmentation of the right cranial vault, assumptions cannot be made regarding the blunt instrument used, however the cranial trauma is considered to be related to the cause of death. The morphology of the incision wounds points towards the use of more than one sharp weapons. It is not clear whether the cut-marks constitute defense injuries if they are signs of torture or overkilling. The multiple sharp force injuries and their distribution could indicate that the victim was unarmed. This case highlights the challenges induced by taphonomy in skeletal analysis especially in absence of other contextual information.

P03-063 | *Forensic Anthropology*

Reconstructing the Sequence of Events by Interpreting Patterns of Skeletal Injuries: A Case Report

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When faced with skeletonized remains discovered under suspicious circumstances, forensic anthropologists play a crucial role in estimating demographic parameters, identifying pathological or traumatic conditions, and reconstructing events leading to death. Especially, the assessment of multiple injuries found on skeletal remains enables the identification of the injury mechanism, as well as the number and sequence of traumatic lesions. This study focuses on the forensic examination of human remains found in a travel bag at the bottom of a ventilation shaft of an abandoned mine in Sounio, Greece, offering insights into a homicide that occurred approximately eight years prior. The anthropological analysis revealed a male individual aged 50-60 years with a height of 170 to 176 cm. The absence of cut marks ruled out postmortem dismemberment of the body prior to placement in the bag. Multiple perimortem fractures, including two gunshot wounds, one on the cranium and another on the right femur, along with extensive blunt force trauma on the cranium, the T12, the sacrum and the right innominate were observed. The unique fracture patterns allowed for the reconstruction of events, suggesting the victim was shot twice from behind. The first gunshot, directed downwards towards the posterior side of the right knee, indicated the victim was standing or moving away from the assailant. Subsequently, a loss of balance led to a fall from standing position, resulting in a linear fracture on the right side of the cranium, followed by a second, execution-style, gunshot to the back of the head while in a prone position. Analysis of the crime scene topography and the absence of fractures on the upper extremities that would suggest an attempt to break the fall, supported the conclusion that these injuries occurred postmortem, after the assailant placed the body in the bag and threw it down the ventilation shaft. This resulted in significant blunt force trauma on the T12 and the pelvic region, typical fracture patterns observed during a fall from a height. Subsequently, rodents gnawed and scattered the remains, leaving tooth marks on the epiphyses of the long bones. The analysis highlights the importance of forensic anthropologists in observing, recognizing and interpreting patterns of skeletal trauma and postmortem modifications in order to accurately reconstruct the events surrounding violent deaths. It emphasizes the necessity of careful consideration of crime scene details for accurate interpretation and highlights the importance of forensic practitioners in ensuring precise documentation during the recovery process.

P03-064 | *Forensic Anthropology*

Micro-CT Evaluation of the Sterno-Clavicular Joint for Age-At-Death Estimation – A Quantitative Microstructural Analysis

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INTRODUCTION: The sterno-clavicular joint plays an important role for age-at-death estimation in forensic anthropology, especially through the evaluation of the medial clavicular ossification stage, which, however, can only be applied in young individuals under 30 years of age. For age estimation in older subjects many different innovative methods have been developed and applied over the previous decades by forensic anthropologists such as the macroscopic evaluation of morphological degenerative alterations affecting the joint's clavicular surface and the histomorphometric and microtomographic analysis of clavicle's trabecular microstructure.
This study extends a prior investigation that employed micro-CT to analyze degenerative morphological alterations on the external surface of the sternoclavicular joint according to a modified "Falys-Prangle method", showing a positive correlation with age. However, given the limitations of qualitative analysis, which is highly operator-dependent, the current work aims to conduct a quantitative morphometric analysis, evaluating, through micro-CT, age-related trabecular and cortical microstructural alterations of the sternoclavicular joint in order to establish a more reliable and objective analytical method for age-at-death estimation in adults.

MATERIALS AND METHODS: A total of forty-one sterno-clavicular joints from deceased individuals (31 males and 10 females), divided into three age-at-death ranges (<40 years, 40-59 years, ≥60 years), were acquired through a Micro-CT scan. Microstructural parameters of trabecular and cortical bone structures were assessed on both clavicular and sternal bones, including bone mineral density (BMD), bone volume fraction (BV/TV), specific bone surface for a given volume (BS/BV), connectivity (Conn), mean structure thickness (St.Th), intertrabecular spacing (St.Sp), and degree of anisotropy (DA).

RESULTS AND DISCUSSION: While morphometric analysis on cortical bone microstructure of both clavicle and sternum did not prove useful in distinguishing among the three age categories for most of the analyzed parameters, the evaluation of trabecular bone microstructure, on the other hand, proved to be extremely promising in this regard. Specifically, BMD and all trabecular morphometric parameters, except for DA, showed a statistically significant correlation with age on both clavicular and sternal bones, with an increase of BS/BV and St.Sp and a reduction of BMD, BV/TV, Conn and St.Th as age increased. In addition, some parameters (BS/BV, BV/TV, St/Th, St.Sp) analyzed on sternal trabecular bone showed a stronger correlation with age than those evaluated on clavicular bone, showing greater discriminatory ability between the various age groups.

CONCLUSION: Micro-CT evaluation of age-related trabecular microstructural alterations of the sternoclavicular joint proved to be a valid and promising aging method. It could be applied alongside the evaluation of degenerative morphological alterations on clavicular and sternal articular surfaces as qualitative-quantitative integrated approach. This method aims to obtain a more objective and reliable age-at-death estimation in adults.

P03-065 | *Criminalistics*

Death Related to BDSM Plays: A Case Report Clarifying the Role of Forensic Medicine in Criminalistics

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Although BDSM fatalities (bondage and discipline, dominance and submission, sadism and masochism) are rare, they always raise medico-legal issues. We report a case of a 45-year-old male found dead in his apartment. He was naked, lying on his bed in a prone position. A belt was found on his neck. Despite the advanced state of putrefaction, forensic doctors conclude that asphyxia by strangulation was the cause of death. The context of a BDSM play was highly suspected.

This report explains the methodology behind defining the context, the cause of death, and assessing the manner of death from a forensic perspective. Every forensic doctor should not only rely on autopsy findings but also make use of crime scene investigation data, especially in these cases where the responsibility of the sex partner is questionable.

KEYWORDS: BDSM, crime scene investigations, autopsy, asphyxia

P03-066 | *Clinical Forensic Medicine*

Brain-Dead Donor on Biventricular Assist Devices: Medico-Legal and Clinical Implications

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Mechanical circulatory support systems, including extracorporeal membrane oxygenation and ventricular assist devices, provide cardiac/respiratory support in critical patients affected by conditions like end stage heart failure. Despite their effectiveness, these systems are also associated with the risk of severe complications like hemorrhages/hemolysis, thromboembolism, infections and long-term organ disfunction. In particular, cerebral complications may cause brain death, a condition that must be certified after a multidisciplinary evaluation/observation lasting for at least 6 hours pursuant to Italian Law. We present a case of brain death evaluation in a 39-year-old male patient who was hospitalized at the Careggi University Hospital (Florence, Italy). About 15 years before, the patient had undergone aortic valve replacement and reconstruction of the left ventricular outflow tract for a retroaortic aneurysm. Instead, at the last admission, he presented cerebral septic embolization secondary to a bacterial aortic endocarditis. Because of an infective pseudoaneurysm, he underwent aortic surgery (Bentall procedure) and the left ventricular outflow tract reconstruction was revised. A month after this surgery, since the persistent biventricular failure, a heart transplant was indicated and then a biventricular assist device (Bi-VAD) was implanted. After three days from the implantation, cerebral complications occurred. Because of the severe neurological condition (coma, absence of brainstem reflexes, absence of respiratory drive) and the eligibility for liver donation, the multidisciplinary team for brain death assessment (also composed by an expert in Legal Medicine) was activated. To the best of our knowledge, there is very scarce evidence about this kind of condition in scientific literature. Hence, we want to discuss the particular technical complexity of the case, mainly due to the mechanical circulatory support system, and its implications for the risk assessment for the donated organ procurement and for the medico-legal assessment/certification of brain death.

P03-067 | *Clinical Forensic Medicine*

WITHDRAWN

P03-068 | *Clinical Forensic Medicine*

Advances in Legal Medicine Practice in India: An Evidence-Based Examination to Unveil Progress

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BACKGROUND: This study examines advancements in legal medicine practice in India, situating them within the global context. Recent years have witnessed significant progress in both regions, albeit with distinct trajectories. Notably, India has undergone a decade of legal and policy reforms alongside advancements like the establishment of multiple National Forensic Sciences Universities, the first of its kind in this region.

AIM AND OBJECTIVES: This study examines critical factors driving advancements in legal medicine practice in India, contextualized within the broader global landscape. To examine the current state of legal medicine, identify key drivers of progress, assess existing disparities compared to global standards, evaluate the stakeholder roles, and propose evidence-based recommendations to enhance the overall quality of legal medicine practice.

METHODOLOGY: A thorough literature review was conducted, gathering relevant research articles, books, reports, and government documents. Thematic analysis and comparative analysis were employed to identify common themes, trends, and contrasts between Indian and global practices. Key informant interviews with stakeholders and semi-structured interviews provided valuable insights into factors driving advancements and challenges faced in legal medicine practice. The findings were synthesized and triangulated from multiple sources to ensure credibility and validity. Peer review by experts further validated the methodology and findings. Ethical considerations, including informed consent and confidentiality, were prioritized throughout the study.

RESULTS: The study identified inequalities in forensic education and practice across different regions linked to variations in resource distribution and policy implementation between central and state governments. The study further highlights a disparity in innovation, with Forensic experts leading in innovation compared to legal and police academia. Some regions lack standardized protocols due to a lack of resources and administrative apathy. Non-uniformity is observed in systematic interdisciplinary collaboration and global standard protocol implementation among stakeholders in forensic practice. Hence, the lack of standardized protocols in certain regions has emerged as a critical barrier to progress.

CONCLUSION: This study revealed significant advancements in legal medicine driven by legal reforms and technological innovations. Despite progress, challenges, such as disparate forensic education and resource allocation, persist. Stakeholder collaboration and increased support are vital for addressing these challenges and further enhancing the role of legal medicine experts in delivering justice and protecting human rights.

KEYWORDS: legal medicine, forensic science, India, comparative analysis, legal reforms

P03-069 | *Clinical Forensic Medicine*

Intimate Partner Violence – Physical Abuse and Torture Against Man

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Torture and violence are significant public health issues. Torture is defined as the act of deliberately inflicting physical or psychological pain on another person (or animal). By this malicious act, the torturer exerts influence and control over the victims. Different might be the reasons for the torture – punishment, revenge, interrogation to extract information or a confession, or simply the sadistic gratification of those carrying out the torture. The infliction of pain is a well-known phenomenon from ancient times - it has been used in armed conflicts, police stations and prisons, and many other facilities. We present the case of a man in his 20s – who was systematically tortured by his wife and her mother. He explained that they consistently injured him by hitting him, trying to strangulate him, jumping over his chest, or by using different sharp objects, most of the time with knives, by cutting different parts of his body – thorax, extremities, and even in the anogenital area.

Additionally, he explained that they had injured his anal region with an ice pick. They forced him to stay home and did not allow him to contact his family. Finally, following three months of torture, he managed to call his brother. He was admitted to the hospital for a checkup and surgical treatment of the sustained injuries since some of them were infected. Rib fractures (old and new ones) were observed. Apart from the usual findings, such as bruises and abrasions, multiple elongated scars were noted over his body in a different healing stage during the forensic examination. The affected areas were the thorax – posterior and anterior aspects, distal part of the upper extremities, and anterior surfaces of both thighs. Multiple linear scars and wounds in a stage of incomplete healing were observed in the anogenital area – including the penis and the anus. According to the World Health Organization, Intimate partner violence refers to behavior within an intimate relationship that causes physical,

sexual, or psychological harm. Primarily, such type of violence is associated with women being the victims and rarely the perpetrators. The current case not only presents intimate partner physical abuse against man, but it shows continuous, deliberate acts of torture intending to cause severe pain, exert control, and humiliate the victim.

P03-070 | *Clinical Forensic Medicine*

Men as Victims of Intimate Partner Violence: Risk Factors and Impact

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INTRODUCTION: Intimate partner violence is an important worldwide problem. In general, men are considered perpetrators of this type of violence, but they can also be victims. The experience of men as victims of intimate partner violence is not well described and characterized. Hence, the aim of our study is to identify the characteristics of such phenomenon and the risk factors, in a medico-legal and forensic perspective, emphasizing psychological impact.

METHODOLOGY: This is a retrospective, descriptive study during a period of 10 years, from January 1st, 2012 to December 31st, 2022. We included the cases of intimate partner violence against men examined under judicial requisition in the Department of Legal Medicine of Farhat Hached University Hospital of Sousse, Tunisia.

RESULTS: During the study period, we collected 9 cases of intimate partner violence against men. The average age of the victims was 47.6 years with extremes between 37 and 63 years. The victims declared that they suffered repeated episodes of violence for a period between 3 months and 7 years. Three victims were unemployed, one victim had a low income, three had an average income and the other two had an income considered good. According to the victims, two main factors contributed to the violence: the age difference between the spouses and the difference in educational level.
Men were subject to different types of violence. Four victims reported physical violence inflicted by their wives. One victim experienced physical assault including scratching, pinching, biting and attempted strangulation. Another victim was hit by a blunt object. The other two victims suffered from confinement and interdiction from accessing their homes. Verbal abuse was mentioned by all the victims. Psychological violence was reported by the victims mainly through threats and provocations. Four victims mentioned intentional sexual deprivation from their partners. The medical examination of the victims revealed minor physical injuries in four patients with average period of temporary incapacity of 3 days. The most identified psychological symptoms were fear, concerns about insecurity and post-traumatic stress states.

CONCLUSION: Although intimate partner violence against men is a less frequent phenomenon, it is important to understand how men experience victimization from an abusive partner. It would be desirable for preventive measures to be further developed and for special help to be made available to affected men in a similar way to a female victim.

P03-071 | *Clinical Forensic Medicine*

Iatrogenic Injury Reflections on Orofacial Temporary Personal Damage

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INTRODUCTION: The assessment between orofacial clinical status and temporary personal damage is linked to (i) the severity of the injuries from traumatic events, which includes characteristics of the acute condition affecting soft and hard orofacial tissues, (ii) time extension and (iii) the performance of therapeutic plans. Medical intervention carries the risk of iatrogenic injuries, impacting on the initial prognosis.

OBJECTIVES: This study aims to explore the iatrogenic injury arising from the tooth extraction procedure and its correlation to acute and chronic conditions, specifically focusing on the timeline adequacy of the procedure and its impact on orofacial damage.

METHODOLOGY: A prospective longitudinal study was conducted at the Clinical Academic Center of Coimbra (FMUC/CHUC), with approval from the Ethics Committee (CE-20/2017). A sample of adult individuals undergoing tooth extraction was divided into acute conditions (n=50) (soft tissue inflammation and pericoronitis) and chronic conditions (n=50) (cystic lesion and risk of adjacent tooth mutilation). The iatrogenic injuries were identified and characterized in each condition. Statistical analysis was performed by cross-reference and standardized exclusion adjustments.

RESULTS: Iatrogenic injuries were identified in 7.1% of the sample, with no statistically significant differences in mean values between cohort patients. Acute conditions were less associated with temporary affectation of the inferior dental nerve (paresthesia) (p=.001) and atypical fractures of the mandible (p=.013), compared to chronic conditions.

DISCUSSION AND CONCLUSIONS: Chronic conditions tend to require an extended recovery period compared to acute infections, exacerbating the time extension of the temporary damage. Although orofacial injuries are not prioritized in a first-line intervention, in a polytrauma patient, they require immediate attention by a healthcare professional. The risk of iatrogenic injuries can increase the severity and the extension of temporary personal damage.

KEYWORDS: Third Molar; Medical Errors; Postoperative Complications; Nervous System Trauma; Iatrogenic

P03-072 | *Clinical Forensic Medicine*

Female Genital Mutilation in Lisbon in the Last 10 Years – A Retrospective Analysis

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Female Genital Mutilation (FGM) is a form of gender-based violence and an attack on the rights and freedoms of girls and women in several countries of the world.
FGM is defined as the partial or total removal of external female genitalia for non-therapeutic reasons. This practice is deeply rooted in culture, with social or religious obligation and marriageability considered to be the most important reason for its continuation. FGM is traditionally practiced in African and Middle Eastern countries, and some parts of Asia and South America. Due to globalized migratory processes, FGM has spread to other countries, including countries in Europe, such as Portugal.
The Portuguese penal code includes penalties for those who perform, aid, or abet the practice. The legal framework aims to protect girls and women from the physical and psychological harm caused by FGM.
Our goal is to characterize and assess the evolution of FGM, in the last 10 years, in the Lisbon area -Portugal, using data from medico-legal cases carried out at Instituto Nacional de Medicina Legal e Ciências Forenses, from 2013 to 2023.
This study focuses on the characteristics of the victim (age, nationality), the type of procedure done and its prosecution, throughout this decade.

KEYWORDS: Female Genital Mutilation, Women's Health, Human Rights

P03-073 | *Artificial Intelligence in Forensic Sciences*

Exploring Forensic Identification Assessment through Digital Records, Scans, and Tomography

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INTRODUCTION: While clinical dentistry has seamlessly integrated the digital revolution, there is a bridging in the technological gap in forensic dentistry.

OBJECTIVE: The study aimed to analyze the superimposition accuracy of two different three-dimensional record formats, intraoral scanner, and cone beam computer tomography, in the scope of forensic identification.

METHODS AND MATERIALS: A quasi-experimental study was performed in the Faculty of Medicine at the University of Coimbra, Portugal. Ten adults (n=10) of both sexes aged between 20 and 50 were randomly selected. Data acquisition was performed by Medit i700 wireless scanner and iCAT Tomograph. Three-dimensional records, in STL format, were analyzed through dental landmarks and superimposition was obtained using Medit software to optimize the precision of identification details.

RESULTS: Reproducibility was evaluated with Intraclass Correlation Coefficient (ICC) for intra-examiner agreement and Technical Error of Measurement (TEM) for inter-examiner error, with $P < 0.05$. The results showed that obtaining an accurate comparison and identification of an individual through the superimposition of dental records is possible. Excellent intra-examiner agreements and acceptable inter-examiner errors were found for variables. The reproducibility was confirmed, validating its applicability in forensic purposes.

CONCLUSION: This method was able to differentiate between positive and negative matches in tested cases, offering a potential solution and overcoming great difficulties in human identification.

KEYWORDS: Digital Technology; Intraoral Scan; Cone-Beam Computed Tomography; Forensic Dentistry; Legal Medicine; Computed Simulation; Virtual Patient

P03-074 | *Clinical Forensic Medicine*

Patterned Lesions in Clinical Forensic Medicine – A Selection of Cases

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Patterned injuries are particularly important as they may indicate the object or surface involved in their production. Their accurate analysis and interpretation are crucial in the forensic setting, especially in suspected physical abuse or when the explanation does not match the injuries. This project illustrates some interesting cases.

- 62-year-old female, 'bited' on the right forearm. Upon physical examination, a slightly arc-shaped abrasion with dehydrated blood crust, over a bruise and oedema. Around it, a pale area surrounded by a purple-yellowish bruised halo.
- 11-year-old boy, reported to have been assaulted by his legal guardian with a wooden spoon. During the forensic evaluation, he didn't provide any explanation for the observed injuries. Upon physical examination, multiple reddish tramline bruises were found in the upper quadrants of both buttocks. The largest one measured 7cm, with a central pale region, and a circumferential reddish bruise, with a pale centre.
- 59-year-old female, 'bited' on the left forearm. Upon physical examination, two areas with dehydrated blood crust were observed, each containing four parallel abrasions. These abrasions were arc-shaped with internal concavity, arranged semi-circumferentially, with a bruised halo over the entire proximal half of the lateral aspect of the forearm.
- 63-year-old male, assaulted with a slap in the dorsal region. Upon physical examination, an area of reddish punctate bruising was observed, with a configuration resembling a handprint.
- 3-year-old boy, allegedly assaulted by the caregiver. Upon physical examination, in the left frontal region, there was a red bruised area, with a pattern resembling a coarse mosaic. The mother suspected it might have been caused by an impact from one of the child's toys (a plastic dinosaur).
- 5-year-old boy, admitted to the Paediatrics department and brought for forensic assessment without information. Upon objective examination, a patterned injury was observed on the face, which he claimed was caused by his cat.
- 33-year-old male, assaulted with a bite on the left shoulder. Upon physical examination, an area with multiple abrasive abrasions, covered by a reddish crust, arranged in an arc with lower concavity, was observed.
- 3-year-old boy, admitted to the emergency service after an 'accident', with no further case details provided, while with his siblings, aged 10 and 7, and mother. Upon physical examination, a figurative burn injury was observed, consistent with a burn from a steam iron.
- 30-year-old male, assaulted with 'scratches' to the face and a 'bite' on the back. Upon physical examination, two symmetrical abrasions were observed, with dried serohematic crust, forming opposing concave arcs in an oval complex.
- 22-year-old male, assaulted by police officers with a baton on the lower limbs. Upon physical examination, a bruise with a purplish colour, yellowish areas, spared central region, and the presence of haemorrhagic crests, was observed (tramline injury).

P03-075 | *Clinical Forensic Medicine*

Natural Death and Cessation of the Right to Pensions: Amyloidosis as Sequelae of an Occupational Accident

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The Portuguese Labor Law stipulates, in Article 152, the expiration of the right to occupational accident pensions after the worker's death. In this scenario, the Public Prosecutor's Office needs to determine whether the death resulted from the accident. Establishing a medico-legal connection in such cases can be intricate, as seen in the present case, where the deceased cause of death arose from a rare complication of relatively common sequelae.

The deceased, a carpenter, experienced an occupational accident at the age of 25 in 2001, resulting in the fracture of three dorsal vertebrae, leading to a state of paraplegia with a neurogenic bladder and sphincter incontinence. In this context, a Permanent Partial Disability of 80% and Permanent Incapacity for Usual Work were established in court.

In 2021, the individual passed away in a hospital, with the cause of death identified as septic shock secondary to acute peritonitis in the context of hollow viscus perforation due to intestinal ischemia.

The Labor Court requested an opinion on the existence of a causal connection between the accident's sequelae and the individual's death.

Upon scrutinizing all post-accident clinical documentation, it was discovered that in 2018, chronic kidney disease secondary to AA amyloidosis was diagnosed, demanding hemodialysis. A clinical study of the aetiology of secondary amyloidosis determined that it resulted from the chronic inflammatory state associated with recurrent urinary tract infections that the individual endured due to the sequelae of the work accident with a neurogenic bladder.

During the discussion on the causal connection, it was necessary to clarify the relationship between a condition of paraplegia and neurogenic bladder with sphincter incontinence and the risk of developing recurrent urinary tract infections. Factors such as bladder distension, vesicoureteral reflux, or large post-void residuals, common in patients with a neurogenic bladder, favour the repeated occurrence of

urinary tract infections, triggering the inflammatory cascade that can culminate in the development of AA amyloidosis.

In certain cases, amyloidosis can be associated with intestinal involvement, particularly with focal ischemia, and is also linked to cardiovascular complications, such as bradyarrhythmia, orthostatic hypotension, decreased cardiovascular reflexes, and autonomic dysreflexia, all of which facilitate the occurrence of intestinal ischemia.

This case serves to illustrate the importance of a comprehensive analysis of all clinical elements in pension expiration incidents, even when the absence of a causal connection between the event and the individual's death seems apparent. The intervention of a medico-legal expert is crucial in establishing a physiopathological relationship and explaining these findings to a court, usually without sound medical knowledge.

P03-076 | *Clinical Forensic Medicine*

Salivary Cortisol in Forensic Medicine: A Parameter of Peri-Mortem Stress

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PURPOSE: The level of experienced stress premortem is often unknown. The biomarker cortisol is an objective reliable and valid parameter for the determination of experienced pathophysiological stress. With the possibility to measure cortisol in saliva by liquid chromatography-tandem mass spectrometry (LC-MS/MS), a non-invasive, sensitive method has become available for use in forensic medicine. This study aims to investigate whether it is feasible to determine salivary cortisol reliably in the deceased. In addition, the differences in the measured levels of salivary cortisol in postmortem cases categorized according to the manner of death (natural vs non-natural) were studied.

METHODS: A consecutive number of postmortem cases registered for routine forensic investigations were included (n=133) in the period February 2020 and May 2021. During these investigations, saliva sampling was performed. Salivary cortisol was subsequently determined by LC-MS/MS.

RESULTS: In 100 out of the 133 cases (75%) salivary cortisol could be determined, ranging from 1 – 2755 nmol/L. The remaining 33 samples contained an insufficient amount of saliva for a proper determination. There was no significant difference in postmortem salivary cortisol levels between people deceased due to a natural cause (38 nmol/l (range 1-1818)) compared to those with a non-natural cause of death (111 nmol/L (range 2- 2755)).

CONCLUSION: Our study shows the feasibility of salivary cortisol measurements post-mortem. We found no significant difference in salivary cortisol between cases who died from a natural versus a non-natural cause of death. Future research might further explore the potential contributory role of salivary cortisol in determining the cause of death. Furthermore, we suggest an alternative way to categorize the cause of death.

P03-077 | *Clinical Forensic Medicine*

Neuropathology of Brainstem in the Pathogenesis of the Sudden Infant Death Syndrome (SIDS)

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BACKGROUND: Multiple neuropathologic studies in SIDS victims have supported the concept that SIDS infants are not entirely “normal” prior to death; instead, these infants possess some form of underlying vulnerability exposing them to an increased risk for sudden death. Interest in investigation of the brainstem in SIDS began with the findings of Naeye (12), who reported astrogliosis in this region in 50% of SIDS cases, with hypoxia thought to be the underlying cause. Further, research by Lavezzi et al. al. showed hypoplasia/agenesia of the Arcuate Nucleus and parabrachial/Kolliker-Fuse complex. Based on these observations, we conducted research on brainstem neurotransmitter nuclei, specifically neurons located in the medulla oblongata, that control respiration, chemosensitivity, autonomic function, and arousal in a series of 39 autopsies of deceased subjects suddenly "sine materia" in the first year of life.

CASES: From 1990 to 2023, 153 autopsies were carried out at the University Sector of Palermo on subjects who died suddenly in the first year of life (SUDI) from natural causes. In 39 (25.4%) cases the cause of death was unexplained (SIDS) while in 109 (74.6%) cases it was explained.

At autopsy histomorphological examination showed: diffuse hemorrhages, 22 (56.4%); pulmonary edema, 12 (30.7%); cerebral edema, 39 (100%); extramedullary hematopoiesis, 7 (18%); renal immaturity (presence of metanephrogenic blastema) 5 (12.8%); adrenal immaturity (cortical fetal type), 20 (51.2%); anomaly of the central autonomic nervous system, 3 (7.7%); lymphoid hyperplasia and thymo-lymphatic state, 25 (64.2%); acute emphysema, 39 (100%); aspiration of milk into the lungs, 13 (13.3%).

RESULTS: Central autonomic nervous system anomalies were observed in 3 subjects aged 1 day, 3 and 3 ½ months respectively. No. 2 subjects were female and one was male. In one case SIDS was preceded by an episode of highs. In all cases there was agenesis/hypolasia of the arcuate nucleus, associated in 1 case with anomalies of the cerebellar dentate nucleus and the nuclei of the parabrachial/Kolliker-Fuse complex.

CONCLUSION: Neuropathological investigations have identified significant abnormalities in the development and function of homeostatic networks in the brainstems of SIDS infants. However, there is a need to broaden the scope of SIDS neuropathology research in order to investigate the interaction of multiple neurotransmitters in the brainstems of infants, in addition to further developing animal models. This will be the challenge of the future in order to prevent SIDS deaths from occurring.

P03-078 | *Child Abuse*

Epidemiological and Forensic Medical Profile of People Assisted by the Humanized Protocol for Victims of Sexual Violence (PHAVVS) – Civil Police of Minas Gerais, Brazil

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Sexual violence is a serious public health problem, and proper assistance with a chain of custody of traces has forensic repercussions, reduces revictimization, and guarantees the production of a well-founded legal report. Medico-legal examinations are of particular relevance to court decisions regarding the criminal liability of the accused. This study aimed to describe and discuss the epidemiological profile of victims assisted by PHAVVS in the capital of Minas Gerais, Brazil, based on indirect reports produced by the medical examiners of the Forensic Sexology Service of the Instituto Médico Legal André Roquette in 2023. Previously, concerning the data related to 2019, young, female, brown-skinned victims were predominant, with the occurrence of rape on Sundays, at dawn. Younger victims suffered violence mainly by family members regardless of gender ($p<0.001$). The mean age of male victims was considerably lower than that of female victims ($p<0.001$). Complementary exams proving violence were more often positive in female victims than male victims ($p<0001$). The average time to seek care was 4.7 days, and the exam was positive in 32,5% of cases. The greater the spacing between the violent act and the service, the lower the chance of positive exams ($p<0.001$). No exam was positive with spacing greater than ten days ($p<0.001$). The prevalence of sexual violence

against young women is one of the most serious expressions of gender inequality. The data found previously demonstrated the relevance of humanized care through the PHAAVS, pointing to the need for an earlier collection of traces systematically to ensure the preservation of material evidence and the consequent criminal liability.

P03-079 | *Child Abuse*

Tunisian Legislation Concerning Child Protection in Medical Practice

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BACKGROUND AND AIMS: What characterizes the child, it is his youth and vulnerability. So, the child has to be the object of a particular interest and a specific protection from all types of maltreatment and abuse. In this perspective, texts proclaiming the protection of the child and his rights were adopted.
Our aim is to analyze the different Tunisian legislation concerning children in the medical field, to highlight its limits and to compare it with other countries' legislations.

MATERIALS AND METHODS: It is an overview of pieces of legislation concerning children welfare in Tunisia compiled from many sources such as the Personal Status Code, the penal code, the child protection code and the medical deontological code.

RESULTS: Is considered at risk by the child protection code, any child whose a victim of neglect or abandonment, privation of education, sexual and economic exploitation or any other maltreatment.
The doctor's mission is to detect children who are at risk, treat them and report any abuse to the Child Protection Delegate.
We studied the text of law that concerned child protection in private medical practice and hospitals for communicable diseases, organ and blood donation, bone marrow sampling, vaccination, contraception, induced abortion, biomedical research and drug addiction.

CONCLUSION: Children, young and immature, are easily exploited. Though, their welfare is a priority for Tunisian legislator, more attention needs to be paid for this vulnerable group.

P03-080 | *Child Abuse*

Child Sexual Abuse in Tunisia: Forensic Approach

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INTRODUCTION: Child sexual abuse (CSA) represented a stigmatized issue in Tunisia, owing to social and religious reasons. In Tunisia, before the Jasmine Revolution of 2011, few data were available on this subject.
Our study aimed to provide prevalence estimates, determine patterns and characteristics of the child sexual abuse, identify possible risk factors and review physical findings.

MATERIAL AND METHODS: a retrospective study of all children victims of sexual assaults presenting to the forensic medicine department at Fattouma Bourguiba University Hospital was conducted during ten years. Descriptive statistics were reported. Univariate and multivariate analyses were calculated to determine potential risk factors.

RESULTS: During the period of study, 299 children aged 17 years and below, were examined for suspected sexual abuse. More than the half of victims was males. Low to medium socio-economic level was found in most cases (140/299). Different types of abuse were observed: anal intercourse was the most predominant one. Genital Injuries were observed in 47.8% of the victims (143 cases). Physical abuse was associated in 18 % of cases. We found to be significant risk factors in the multivariate model the Gender and the history of child abuse.

CONCLUSIONS: The clinical assessment of a child suspected of abuse is difficult: physical signs of sexual abuse are non-specific and the examination can be normal. Gender, the history of abuse and the year of abuse represents the main risk factors.

P03-081 | *Artificial Intelligence in Forensic Sciences*

Clavicle Bone Radiomics as Potential Age Markers in Forensic Anthropology

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INTRODUCTION AND OBJECTIVES: Age estimation is an essential component of biological profiling in cases of unknown human remains in forensic or humanitarian contexts but also in cases of living individuals without legal documents. With this in mind the current research employed Radiomics analysis of compact bone tissue from both antemortem (AMCT) and postmortem computed tomography (PMCT) scans to estimate age, aiming to provide a new reliable technique for forensic purposes.

MATERIALS AND METHODS: AMCT examinations of 79 individuals (Dataset 1) and PMCT examinations of 150 individuals (dataset 2) over 18 years old were retrospectively evaluated. Only right clavicles were employed for consistency. The cortical bone of the clavicles was segmented automatically with the total segmentator plug-in of the open-source software 3D Slicer and radiomics features were extracted with the use of PyRadiomics. Data were divided in training (70%) and validation (30%) groups. Significant features were selected with the Boruta algorithm and were used to train an XGBoost regression model, which was optimized with "random search". Model performance was evaluated in the validation set with root mean square error (RMSE), R2, mean absolute error (MAE), and mean squared error (MSE).

RESULTS: The mean age of individuals was 42.27+/-10.99 years for dataset 1 and 57.3 ± 20.5 years for dataset 2. Boruta extracted 14 significant features, which were used for further model development. XGBoost regression achieved a high performance for dataset 2 with RMSE: 11.164, R-squared: 0.655, MAE: 8.909 and MSE: 124.646. Dataset 1 performed significantly worse with RMSE: 8.9617, R-squared: 0.171, MAE: 6.893 and MSE: 80.3121. This remarkable difference in the behavior of the two datasets could be attributed to the differences in sample size or distribution among others.

CONCLUSIONS: It has been suggested that Radiomics biomarkers exhibit a high degree of consistency and thus could be used effectively in forensic scenarios. This method tested both AMCT and PMCT radiomics for age estimation and resulted that only the postmortem dataset performed well. The discrepancies in the behavior of the two datasets should be further explored and more antemortem data should be collected for further testing.

KEYWORDS: Bone Radiomics, Forensic Medicine, Forensic Anthropology, Forensic estimation, age estimation, reliability.

P03-082 | *Bioethics & Medical Law*

Abortion Rights: The Solution Focused on Women

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The decision by the US Supreme Court to overturn Roe v. Wade has ignited a profound political debate and raised concerns across the United States. The Court's ruling in Dobbs v. Jackson Women's Health Organization, delivered on June 24, 2022, overruled not only Roe v. Wade but also Planned Parenthood v. Casey, returning the question of federal abortion legality to state legislatures. The absence of explicit constitutional language on abortion has resulted in a patchwork of state laws, creating chaos in the legal landscape. Various states swiftly responded with different legislative measures, some imposing total abortion bans, while others included exceptions for circumstances such as saving the mother's life, or pregnancies resulting from rape or incest. This legal upheaval poses significant challenges for women and the clinician-patient relationship. Firstly, the access to termination services becomes increasingly challenging especially for abortion patents with limited financial resources. Some clinics relocate to more supportive regions as a response to restrictive laws. Besides, restrictive abortion laws risk turning healthcare providers into adversaries as they are compelled to enforce bans. The case of a woman in Texas facing arrest for a self-managed abortion underscores the potential breach of trust in the clinician-patient relationship. The bioethical and biolegal dilemma highlights the need for protecting women's health and preserving the integrity of the physician-patient relationship. The clinician-patient relationship must be truthful and ethical, as it plays a pivotal role in ensuring informed consent and empowering women to explore all viable options. Comparatively, Europe has advocated for ethical principles such as autonomy, dignity, integrity, and vulnerability in biomedical development. In Italy, where legal principles are rooted in continental civil law, the right to abortion is protected by Law 194. This law, enacted in 1978, recognizes the social value of maternity while permitting abortion within the first 90 days for the physical or mental health of the woman. The legislation maintains the clinician-patient relationship, requiring a 7-day waiting period after counseling, and involving the father only with the woman's consent. This model underscores the centrality of the woman's right to choose, emphasizing the medical nature of abortion and upholding principles of bioethics and biolaw. The conclusion drawn from this analysis is that social protection of motherhood requires safeguarding women's health through comprehensive information and adherence to biolaw principles. The ongoing debate on abortion rights in the United States underscores the critical importance of preserving women's health and the clinician-patient relationship.

P03-083 | *Bioethics & Medical Law*

Organ Procurement in Forensic Deaths: A Retrospective Analysis of the Italian Context with a Focus on the Puglia Region Virtuous Experience

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BACKGROUND: Organ transplantation provides an essential contribution to social health since it may represent a unique therapy for terminal organ failure. However, in cases of forensic death, two different needs coexist: preserving the integrity of the evidence (including the body) and saving as many human lives as possible. Thus, organ recovering cannot be performed until the judicial authority has issued a specific approval.
Since 2015, inspired by other national experiences (i.e., USA, France, and Spain), Puglia Region (Southern Italy) drew up a memorandum of understanding between judicial authorities and the Organ Procurement Coordination Centres. Specifically, the role of legal medical doctors (LMDs) has been empowered in the decision-making processes regarding on whether and when body investigations should be carried out on the potential deceased donor.
This study aims to analyze the organ procurement trend in cases of forensic deaths managed in Puglia before and after 2015 and to compare the regional data with the national ones.

METHODS: The study has been based on a retrospective analysis of cases of potential deceased donors of organs and tissues under medico-legal jurisdiction contained in the paper and digital archives of both Puglia Regional and Italian National Transplant Centre, covering the period 2009-2021. These data were collected in an Excel file, where any opposition from the Public Prosecutor's Office has been reported. To obtain a normalized value to compare regional statistical data with the national ones, the percentage of Prosecutor's Office opposition was calculated based on the registered number of requests to obtain authorization for organ and tissue procurement, according to the following formula: Or (%) = (Or/Rr)*100, where Or (%) stands for the percentage of the Prosecutor's Office's oppositions in the Puglia Region, Or stands for the number of oppositions, and Rr stands for the total number of authorization requests. A similar formula was applied to compare national data with the regional ones.

RESULTS: Data collected from the medical records of the Puglia Regional Transplant Centre made it possible to identify 142 potential deceased donors at the disposal of the Judicial Authority in the period 2009-2021, of which there were eight cases of Public Prosecutor's Office opposition to organ procurement. Of these, six cases occurred before 2015 and 2 after. Instead, at a national level, there was a non-linear increase of oppositions in the considered timespan.

CONCLUSIONS: From the above retrospective analysis, it has been deduced that the 2015 Puglia Region initiative may represent a starting point for the development of national protocols which can meet the objectives of health and justice in the common interest.
Finally, it is advisable to enrich the scientific literature with as much international evidence as possible to stimulate the comparison and the presentation of successful operational models.

P03-084 | *Bioethics & Medical Law*

Is Justice-Decided Care Always Fair Care? Ethical and Medical-Legal Analysis of End-of-Life Care in Pediatric Settings

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This paper begins as a starting point of a news story that has gained international attention because of the sensitivity of the issue involved. It is the case of an 8-month-old English girl suffering from a rare hereditary mitochondrial disorder with an ominous prognosis. The story of little Indi Gregory, the name of the little patient, is comparable, given due distinctions, to that of two other little patients: Alfie Evans and Charlie Gard, compatriots of little Indi and protagonists of as many stories that held the world in suspense until the decisions issued on the discontinuation of treatment. Starting from the examination of three distinct cases from a comparative perspective, the aim of this research paper is to highlight the universal aspects of the bioethical principle of justice and the levee imposed by the British decision-making system, in which it is Justice that decides on treatment. The ethical dilemmas that characterize the subject of end-of-life applied to the pediatric setting impose an objective analysis of facts, circumstances, and implications in terms of health professional responsibility and principles considered prevailing by English decision-making bodies in a case-by-case approach marked, by the so-called best interest of the child. A comparison with the pediatric end-of-life discipline in Italy is also offered. The results that emerged from the comparison of the three clinical cases make it possible to draw a clear line between the values that guide the Justice called upon to decide on treatment and the ethical cornerstones of "fair care."

P03-085 | *Bioethics & Medical Law*

End of Life in Italy: Ethical Issues and Related Medical-Legal Aspects

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The debate on euthanasia and physician-assisted suicide remains a complex issue, laden with ethical, moral and legal implications, which has aroused strong emotions and conflicting opinions both in Italy and around the world. In Italy, the legal environment surrounding euthanasia and medically assisted suicide is still characterized by an absence of specific rules regulating these practices. This has led to a situation in which the end-of-life discussion remains open, and the practice of euthanasia remains illegal, being allowed, at present, only the interruption of life-support treatments as provided by L. 219/17. Similarly, there is no specific rule regarding physician-assisted suicide but only conditions identified by case law that make this practice non-punishable in particular cases. In this sensitive context, the role of the medical examiner is of paramount importance in ensuring that these practices are carried out in a legal manner that respects the dignity of the patient. Starting with a description of the relevant legal context, we review the cases in the news that have been characterized by adding, from time to time, a piece to make up the current legal framework, drawing, of these, analogies, and similarities.

P03-086 | *Bioethics & Medical Law*

Assessment of Residents' Knowledge And Attitudes Towards Confidentiality in Hospital Care

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BACKGROUND: The doctor-patient relationship requires discretion on the part of the caregiver with regard to everything that the patient has entrusted to him. This is the medical secrecy. The purpose of medical confidentiality is to protect the patient's privacy. It is an obligation of every health professional dictated by the law, the deontology, and the ethics of the health care professions. The development of medical specialties and the appearance of third-party payment have brought about the notion of shared secrecy. The introduction of new information and telecommunication techniques in medicine has generated new problems related to the confidentiality of medical data.

OBJECTIVE: This study is designed to explore residents' knowledge of medical confidentiality at Monastir's Fattouma Bourguiba University Hospital, and to observe their behavior and attitudes on this subject. The aim is to determine their level of understanding of medical secrecy and to see how they apply it in their practice. In addition, we will examine their actions related to the confidentiality of patients' medical information in order to determine best practices and identify any gaps.

METHODS: This is a descriptive and analytical study based on a questionnaire to assess the knowledge and attitudes of residents practicing in a university hospital. The questionnaire was developed based on data from previous studies. To achieve this objective, the study used a questionnaire to collect the opinions of residents of different services of the Fattouma Bourguiba University Hospital.

RESULTS: The survey collected 129 questionnaires, with 40.3% of respondents being family medicine residents, while the remainder were evenly distributed among other specialties. In addition, the majority of physicians surveyed had less than three years of residency. The study found that 91.5% of respondents observed routine situations where confidentiality was breached in the referring hospital. In addition, the questionnaire included a section on physicians' attitudes and behaviors toward confidentiality in various situations. The results showed that these attitudes and behaviors scored slightly lower than the residents' medical knowledge. In addition, significant differences were observed between professional practice years, with more inadequate attitudes noted among surgical residents. Finally, respondents recommended that the most important action the hospital could take to improve confidentiality practices is to educate physicians on aspects of health law and ethics.

CONCLUSION: Overall, this study highlights the importance of maintaining patient confidentiality in medical practice and identifies potential areas for improvement in physician training and attitudes toward confidentiality.

P03-087 | *Bioethics & Medical Law*

Improving Dentist-Patient Relationship by Knowing Patients' Expectations

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INTRODUCTION: Patients' expectations play a major role in assessing the final results of the treatments applied to them, both in general medicine and in dentistry. Different authors have tried through their studies to identify the weak points that make the expectations of the patients regarding dental treatments and their actual results not to correspond, which can pave the way for disputes between the dentist and the patient.
Material and method. The authors of this paper performed a prospective, quantitative, questionnaire-based study, with 34 multiple-choice questions, addressed to patients who were examined for the first time in one of the dental practices involved in the study.
The aim of this study was to evaluate the expectations that patients have regarding different aspects of the doctor-patient relationship (e.g., information, involvement in the decision regarding the treatment plan, decisions in case of unforeseen situations, possibility of contact the dentist outside of appointments), in order to improve them.

RESULTS: The study included 205 patients who presented themselves at 11 dental offices in 3 counties of Romania. The average age of the patients was 37 years, most of them were women, married, the distribution of living in rural and urban areas being approximately equal. Chi-square statistical analysis showed that age and level of education correlate positively with the language and amount of information that patients want to know from the dentist (both regarding the explanation of treatment and measures of hygiene and dental health, as well as regarding the associated costs), with the duration of the visit and the time required for rescheduling, with the time interval required for the consultation in case of an emergency, as well as with the performance of the procedures only by the dentist they requested and with the continuation of the dental treatment in case of the need for unforeseen procedures.

CONCLUSIONS: The results of this study show that age and level of education correlate positively with many of the patients' expectations. Knowing the characteristics of patients and their expectations regarding the dentist-patient relationship and the services offered by dentists contributes to increasing the quality of the dental medical care and the patient satisfaction and, implicitly, to the prevention of complaints directed against the dentist in case of patient dissatisfaction

P03-088 | *Bioethics & Medical Law*

Analysis of Medical Complaints in a Population Setting: 2019-2023

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INTRODUCTION: Catalonia, an Autonomous Community located in the north-east of Spain, with 8 million inhabitants, has a unique professional liability insurance policy that is unique in Europe, as the insurance policy encompasses both the public health system (CatSalut) and the individual policy of doctors for their private practice managed by the Consell de Col·legis de Metges de Catalunya (CCMC). Since July 2017, this policy has been awarded by public tender to Relyens (formerly SHAM), a French mutual insurance company.

METHODOLOGY: This study was carried out with the aim of finding out the number, evolution and characteristics of the claims filed under both policies. Although the start of underwriting began in July 2017, the number and evolution were analysed from 2019 onwards because a considerable volume in 2017 and 2018 were still managed by the previous insurer.

RESULTS: In the study period, 5,144 claims were reported (70.4% CatSalut and 29.6% CCMC), with no significant trends observed between the years 2019-2023 (overall p=0.870; p CatSalut=0.867; p CCMC=0.473). The population increased over the study period from 7,555,830 in 2017 to 8,005,784 in 2023 (p=0.054). Claim rates per million population of 94.95 were observed, showing no significant trend (0.720). The initial complaint route was out-of-court in both areas. In CatSalut, 5 specialities accounted for 50% of complaints: Orthopaedic surgery and traumatology (13.6%), Gynaecology and obstetrics (10.3%), Internal medicine (9.7%), Family and community medicine (9.2%) and Digestive surgery (7.1%). The distribution in the CCMC was slightly different, with plastic surgery (17.9%), orthopaedic surgery and traumatology (16.1%), gynaecology and obstetrics (12.9%), Digestive surgery (7.1%) being the main specialities requested.
In the case of CatSalut, the average time between the act complained of and the lodging of the complaint was 19 months (75th percentile = 20 months), while in the CCMC the average time was 24 months (75th percentile = 32 months).
In the case of CatSalut, at the time this study was carried out, 41% of the claims were closed. Of these closed claims, 30% were compensated, either by conviction or out-of-court settlement. In the CCMC, 57% were closed and the compensation rate was 34%. In the case of CatSalut the average compensation was 49,827€, while in the CCMC this cost was lower (32,377€).

CONCLUSIONS:
- This study provides a population-based understanding of the impact of medical claims, an exploration that has been little analysed in the scientific literature.
- In the present study, no trends in claims were observed, despite the "almost significant" increase in the population.
- The distribution of the most frequently claimed specialities is very similar to that studied in other fields and healthcare systems.
- The average cost of compensation was lower than in other areas studied.

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Diatom Test vs Pathohistological Findings in the Diagnosis of Drowning

Emina Dervišević[1], Nina Čamdžić[2], Ermin Mašić[3], Aida Bešić[4], Zurifa Ajanović[5], Lejla Dervišević[5], Adis Salihbegović[1]
[1]Departrment of Forensic Medicine, University of Sarajevo, Faculty of Medicine, Bosnia and Herzegovina; [2]Department of Pathology, University of Sarajevo, Faculty of Medicine, Bosnia and Herzegovina; [3]Department of Biology, University of Sarajevo, Faculty of Science, Bosnia and Herzegovina; [4]Veterinary Clinical Pathology, University of Sarajevo, Veterinary Faculty, Bosnia and Herzegovina; [5]Department of Human Anatomy, University of Sarajevo, Faculty of Medicine, Bosnia and Herzegovina

INTRODUCTION: There is no specific diagnostic procedure that could help in determining the cause of death and the diagnosis of drowning because the microscopic signs are very similar and non-specific. The aim of our study is to recognize and prove the presence of diatoms in organs from a forensic aspect in Bosnia and Herzegovina, and to examine which is the more specific method in the diagnosis of drowning, the diatom test or the pathohistological finding.

METHODS: Thirty-two adult albino rats (weighing 250g to 300g) were included in the experiment. Adequate nutrition was given to animals ad libitum. The rats were divided into five groups of 6 rats each, as follows: Group A (COD: not drowning, but mechanical asphyxia, submerged for 1 hour after death) (n=8); Group B (COD: not drowning, but mechanical asphyxia, submerged for 72 hours after death) (n=8); Group C (COD: drowning, autopsied immediately after death) (n=8) and Group D (COD: drowning, post-mortem 24hrs after death, remained submerged in water until PM) (n=8)

RESULTS: During the diatom analysis, four species of diatoms, Diatoma vulgaris, Melosira varians, Epithemia adnata and Cymbella sp, were successfully recovered from the stomach. Microscopic analysis did not detect diatoms in the kidneys and brains of rats, while the pathohistological changes were relatively uniform, which in each of the samples included a certain degree of congestion, in the kidney samples of all groups of rats signs of hydropic and vacuolar degeneration were visible, while the brain tissue samples of all groups rats show a lower or higher degree of edema.

CONCLUSION: Our results suggest that the diatom test is a valid tool to support the diagnosis of drowning in the forensic-pathological analysis of the cause of death. This experimental study is a starting point that guides us towards the optimization of tests and sampling in cases of unexplained etiology.

KEYWORDS: forensic, diatom, microscopic, kidney, stomach, brain

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Unveiling STRs Instability in a Colorectal Cancer FFPE Sample

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In forensic genetics, sometimes formalin-fixed paraffin-embedded (FFPE) biopsy material taken during life is the only biological sample available for individual identification or paternity testing.
In most cases, this biological tissue is characterized by the presence of tumor cells whose nuclear DNA may have undergone more or less significant modification phenomena generally involving a change in the number of repeats of short sequences, known as instability and/or loss of heterozygosity of microsatellites (MSI/LOH) compared to the DNA present in cells of healthy tissue.
In clinical practice, the observation of MSI and LOH is an important prognostic and predictive factor for tumors; in contrast, in forensic genetics, this introduces significant problems in interpreting genetic profiles acquired from DNA extracted from tumor tissue, especially when the change in genotype, compared to the expected one, involves more than a single STR.
Several studies have shown that using biopsy tissue characterized by tumor cells in forensic genetics investigations is questionable, mainly when dealing with gastrointestinal and colorectal tumors, which are more burdened by MSI and LOH phenomena.
In this case report, two FFPE samples from the same male subject were available for genetic investigation: one sample with colorectal cancer tissue and the other with healthy tissue (no cancerous histopathological features).
After DNA extraction from both tissues and amplification with five kits, including three for autosomal and two for gonosomal STRs (PowerPlex® Fusion System, AmpFLSTR™ Identifiler™ PCR Amplification Kit, Investigator HDplex Kit, PowerPlex® Y23 System, and Investigator Argus X-12 QS Kit), the comparison of the genetic profiles obtained from DNA extracted from healthy tissue with that of colorectal cancer showed in the latter the presence of three genomic instability phenomena affecting FGA, CSF1P0, D21S2055 loci, located on three distinct autosomal chromosomes, and one duplication phenomenon affecting the

DYS438. Therefore, due to the MSI/LOH phenomena, the genetic profile acquired from the tumor tissue was distorted and thus generated a fictitious genetic profile, not corresponding to the subject's real one (healthy tissue free of tumor cells).
If healthy biopsy material had not also been available, there would have been no possibility of comparison to confirm the acquired genetic profile, and such a profile would have been used for individual identification or the search for biological paternity, for which the certainty of the exclusion of the parental relationship requires a minimum number of at least two STRs to exclude it, leading to the formulation of erroneous conclusions.
It would therefore be desirable that before subjecting biopsy material of a suspected nature to forensic-genetic analysis, a histopathological investigation of the tissue should be carried out to isolate and eliminate the possible tumor component from the healthy one, which remains the only component that can be used for forensic purposes.

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Sexual Assault Counselling: A Thirteen-Years Experience Methodology Review

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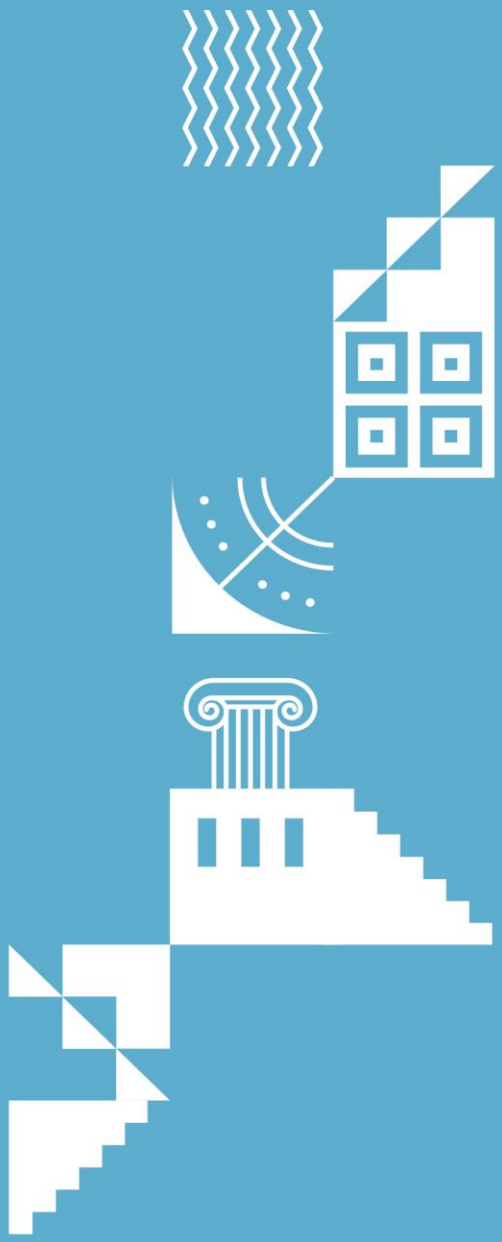
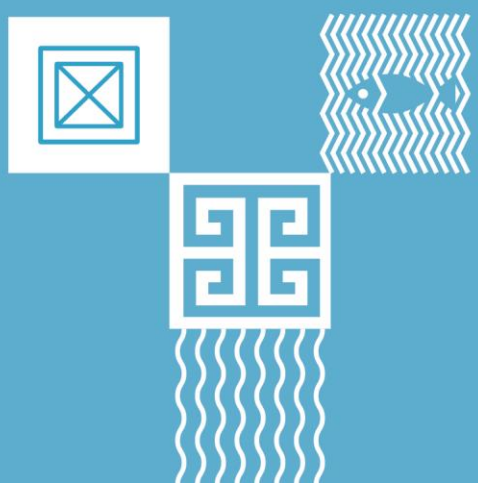
In this work sexual assault counselling carried out by the forensic genetic experts affiliated to the Laboratory of Forensic Genetics of the Brescia Institute of Legal Medicine have been analysed. Specifically, from January 2010 to June 2023, 49 technical laboratory investigations were carried out for medico-legal purposes. The aim was to diagnose the nature of the traces, to identify the evidence of genetic profiles, as well as to interpret the results based on the National and International Recommendations regarding forensic analysis. In this review, for each counselling any critical issue was detected and divided as belonging to pre-analytical, analytical or post-analytical phase. The preliminary results show that majority of errors are concentrated in the pre-analytical phase, characterised by the collection of evidence by non-medico-legal professionals, with inevitable repercussions on the subsequent phases involving the forensic genetic experts.

Society Sessions





SOCIETY SESSION 1: Forensic Aspects of Ballistic and Blast Trauma: Multidisciplinary Approaches

SOS1-1

Introduction to Ballistics: Firearms, Ammunition and Experimental Testing in Tissue Simulants

Nikolaos E. Tsiatis
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There are different types of firearms, a variety of calibers, as also many brands that produce ammunition. The way of firearms` operation provides information about the effectiveness of bullets while moving towards a target. A further research is based on gunshot wounds caused by different types of guns. The aim of this presentation is also an approach to confirm the autopsy findings resulting the wounds. Such an understanding can be derived from test shootings into tissue simulant materials, as ballistic gelatin and ballistic soap, using different types of guns and appropriate projectiles.

Through CT technology, projectiles` performance and behavior can be evaluated. This analysis provided an opportunity to observe and calculate the characteristics of wound channels in a highly accurate numerical analysis and to evaluate the effectiveness of the used projectiles. The created wound paths represent the amount of energy that is transferred into the human body, which in turn can often be associated with the traumatic results. A proportionality between the kinetic energy deposited in the used materials and the resultant cavities in them, could be visible.

In forensic pathology, it is very important to understand the injurious effects on the human body by the type of projectile associated with the victim's gunshot wounds and be able to record this through wound documentation and measurement at the time of autopsy. Any subsequent effort to reconstruct the shooting using tissue simulants has been found to be useful in the wound ballistics studies and enables us to document and record the wound track that a projectile follows in a simulation of the human body.

The application of CT technology renders our objective easier, as any deflection, the total path length and the final resting point of the projectile can be observed with great accuracy. The results show that a highly accurate numerical analysis of the created cavities produced by experimental shootings is possible using the 3D digital imaging capabilities of CT scanning.

A high-speed camera was also used and several of the shootings were recorded.

Tissue simulant materials which simulate the soft tissues and the real shape of the human body like ballistic gelatin torso are useful for wound ballistics studies. Through similar experimental shootings, we can model and approximate the behavior of bullets striking and penetrating the soft tissues of the human body and their actual performance at measured impact velocities.

SOS1-2

Wound Ballistics on Tissue and Bone – Autopsy and Experimental Findings

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Gun violence and firearm-related fatalities constitute a frequently encountered phenomenon for forensic practitioners. Shotguns, handguns, hunting and military rifles are often used in firearm-related deaths such as suicides and homicides especially in countries lacking strict Gun Control Legislation. Hence, ballistic trauma is a critical subject of forensic investigations. Trauma patterns are fundamental evidence for elucidating the circumstances of death and defining the manner of death. The aim of this presentation is to effectively describe gunshot wound characteristics on skin, soft tissue and bone in different circumstances of firearm-related incidents. More specifically ballistic trauma is presented and grouped according to different factors such as type of firearm, type of ammunition, distance, direction and angle of shot, anatomical region inflicted and degree of decomposition. Material is drawn from real-cases of 30 years of experience at the Forensic Medicine Unit of the University of Crete and experimental testing conducted for research purposes. Typical and atypical autopsy findings, evidence via imaging modalities and controlled ballistic experiments are combined and contrasted to provide a comprehensive summary of ballistic trauma.

SOS1-3

Blast-Related Injuries in Skeletal Remains: Lessons Learned from Post-Conflict Contexts

Konstantinos Moraitis
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Blast-related injuries arise from a wide range of incidents, all of which can cause similar effects on the skeleton. Forensic anthropologists are now playing a more prominent role in criminal, humanitarian, and conflict-related investigations involving human remains. Their involvement extends beyond assisting in the personal identification of individuals to interpreting skeletal injuries caused by explosive weapons, which have been prevalent in recent wars and terrorist events. This presentation aims to share with the audience the author's experience in working with human skeletal remains exhibiting blast injuries, excavated from post-conflict contexts, as a means to understand and recognize fracture patterns associated with blast trauma. The dynamics of blast propagation and its interaction with the human body, along with the mechanisms of primary, secondary, tertiary, and quaternary blast injuries, each characterized by distinct patterns of tissue damage, are presented. When studying blast trauma, consideration must also be given to the type and amount of explosive and fragments, the location of the explosion, the existence of structures or intermediate targets, the proximity of the victim relative to the blast, the age, weight, and health of the victim, and the size and shape of fragments. The diagnosis of skeletal blast injuries necessitates a basic understanding of explosive devices and the potential injury patterns they produce. This requires a thorough examination of the observed skeletal injuries through both macroscopic and X-ray analyses and careful interpretation of their distribution over the entire skeleton. Macroscopic examination reveals fracture patterns associated with blast trauma, while X-ray imaging can aid in visualizing subtle skeletal injuries, including fractures and any shrapnel embedded within bone. In addition, it is crucial to take into account various factors affecting skeletal trauma, such as the type of bone, the location of the injury, and any pertinent contextual or investigative details. The identification of shrapnel injuries and their differential diagnosis from gunshot wounds is discussed too. Distinguishing between these two types of trauma requires a careful examination of wound morphology, trajectory analysis, and the presence of ballistic evidence. While shrapnel injuries often exhibit irregular or asymmetrical margins and metallic fragments embedded in bone, gunshot wounds typically display more symmetrical and patterned characteristics consistent with the diameter of the bullet. Finally, through a presentation of documented cases, attendees can gain insight into the varied challenges faced in analyzing and differentially diagnosing skeletal blast injuries from other types of trauma in human skeletal remains.

SOS1-4

PMCT and 3D reconstruction of cases involving gunshot injuries.

Chiara Villa, Niels Lynnerup, Christina Jacobsen
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Postmortem CT (PMCT) scanning is widely recognized as a valuable complement to traditional autopsy. One significant advantage of CT scanning is its capacity to generate detailed 3D models of various anatomical structures, including bones, internal organs, skin, as well as metal objects such as projectiles, and gunshot pellets. Additionally, it facilitates 3D visualizations of bullet paths. These 3D models represent the victim's proportions and the precise locations of injuries and can be animated to reconstruct probable postures at the time of the incident.

In our presentation, we will present several cases involving gunshot injuries with varying degrees of complexity, ranging from single head injuries to multiple lesions throughout the body caused by different weapons. We will show how 3D visualizations have proven instrumental in presenting medical evidence in a more intuitive manner. Furthermore, we will demonstrate how the application of 3D animation techniques, along with integrating the victim's 3D model into the representation of the actual crime scene, assisted us in reconstructing probable ante-mortem postures and gaining a better understanding of the dynamics of the event. The advantages and challenges of this approach will be also discussed.

SOCIETY SESSION 3: Forensic Odonto-Stomatology Session

SOS3-2

Dental Age Assessment Procedures: Theory and Practice in Age Estimation in the Living

Cristiana Palmela Pereira
Faculty of Dental Medicine, University of Lisbon, Portugal

Currently, the high increase of foreigners who travel, whether legally or illegally, to European countries increases the need for confirmation of the identity and age of these individuals. This presents a growing need for more reliable methods of control of who enters any country to promote safety. With this in mind, age assessment plays a crucial role for living individuals in various scenarios such as criminal responsibility determination, adoption processes, birth certificate unavailability, sexual abuse/human trafficking, pornography, and murder. Age is an essential element of a child's identity. The correct identification of an individual as a child or as an adult is crucial to ensure that children's rights are protected and guaranteed as well as to prevent adults from being placed among children in order to take advantage of additional rights or safeguards (such as access to education, appointment of a guardian/ representative) that are not afforded to them. The best interest of the child must be primarily considered in all actions concerning children. They are, therefore, to be applicable from the moment that it is considered that the applicant may be below 18 years of age, throughout the assessment of the age, if such assessment is necessary, and until conclusive results indicate that the applicant is an adult.

A holistic and multidisciplinary approach combines or involves several academic disciplines or professional specializations in an approach to a topic or problem. According to the European Asylum Office, a multidisciplinary approach for the purpose of age assessment would imply the exploration of different aspects or factors such as physical, psychological, developmental, environmental, and cultural ones. What are the accurate medical methods? Can the dental age assessment as a medical method be applied without other medical methods? Is the dental age assessment an accurate method? Is the p-value of the research involving dental age assessment reliable? What is the effect size? Is the effect size important for dental age assessment?

The extraction of maximum useful information from statistical research data on dental age assessment helps the forensic expert to interpret the results of age estimation. Effect size estimates describe the observed effect and approaches to the practical relevance of the study: presenting the results of age estimation to the court. The main goal, in terms of the statistical significance test, is the emphasis of the power of the tests and the reduction of random errors of a mere sample variation. Generally, the larger the size, the larger the effect and impact caused by the dental age assessment methodology in age estimation. Effect size is a measure involving the concept of forensic significance, while the p-value involves that of statistical significance. Even though there are several methods for calculating the effect size, its major objectives for age estimation by dental approach are to validate the statistical significance test, and to allow for a comparison of results from different studies with each other. It is important to combine effect size and p-value to enhance interpretation and prevent misinterpretation of data and promote forensic decisions based on evidence-based studies for dental age assessment.

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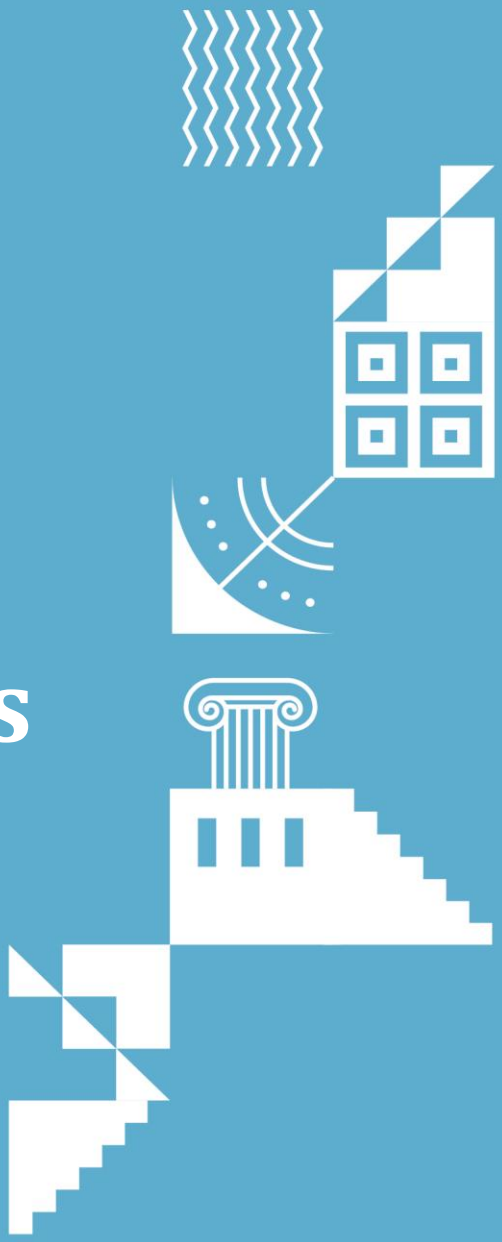
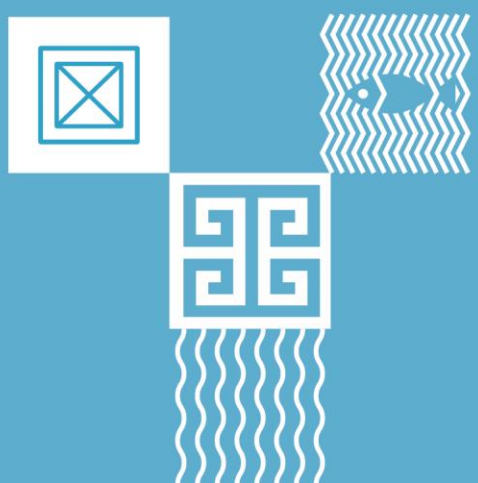
Special Sessions & Lectures





SPECIAL SESSION 1: International Journal of Legal Medicine (IJLM)

SPS1-1

100 Years of Legal Medicine through the Lens of the Journal

Tony Fracasso[1], Andreas Schmeling[2]
[1]Centre Universitaire Romand de Médicine Légale (CURML), Geneva, Switzerland; [2]Institute of Legal Medicine, Münster, Germany

In 2022 the International Journal of Legal Medicine celebrated a century of existence. On this occasion, four articles were published, analyzing the works from distinct periods: 1922-1944, 1948-1969, 1970-1990 and 1990-2022. This comprehensive analysis of 8094 articles presents a unique opportunity to observe the discipline's evolution over a span of 100 years. The forthcoming presentation will highlight the most significant aspects of this evolution, along with recent trends.

SPS1-2

IALM Survey for the International Journal of Legal Medicine

Andreas Schmeling[1], Tony Fracasso[2]
[1]Institute of Legal Medicine, Münster, Germany; [2]Centre Universitaire Romand de Médicine Légale (CURML), Geneva, Switzerland

The International Journal of Legal Medicine is the official journal of IALM. The journal was planning a topical collection dedicated to the publication of recommendations, guidelines, best practices, and protocols in various fields of legal medicine. A questionnaire was sent out to 474 IALM members in order to gain their insights regarding existing sources and the emerging needs within the field. The questionnaire consisted of 17 questions. 97 IALM members participated in the survey. We present and discuss the results of the survey

SPS1-3

The Requirement for Harmonised Standards and Recommendations in Forensic and Legal Medicine Investigation Procedures, Training and Teaching

Denis A. Cusack[1,2,3]
[1]European Council of Legal Medicine (ECLM). www.eclm.eu; [2]Coroner Service, Ireland. www.coroner.ie; [3]Forensic and Legal Medicine, Medical Bureau of Road Safety, University College Dublin, Ireland. www.mbrs.ie

Specialists and Practitioners in Forensic Medicine and Pathology have onerous duties and obligations in the examination of both the dead and living victims of alleged criminal assault and injury and also in examination of the alleged perpetrators of criminal actions. Forensic physicians and pathologists work in close collaboration with scientific colleagues and law enforcement agencies and present their independent and unbiased findings to the criminal, civil and coronial courts to assist in the administration of justice.

Approved and established forensic standards for reporting and certifying investigations and conclusions are core prerequisites for the maintenance of evidential credibility and scrutiny and of justice. Judges, Investigating Magistrates, Coroners and Lawyers as well as Government Departments of Justice and Health are recipients of such expert results and testimony in framing their respective tasks for society within their countries' legal frameworks. The ECLM has published collaborative papers on international standards and guidelines for forensic examinations by forensic physicians and pathologists of deaths and injuries in the areas of: accreditation of pathology services; on-site scene and corpse investigation; examination of victims of sexual assault and of elder abuse; and also in undergraduate and postgraduate forensic teaching and training, in pursuit of international harmonisation.

SPS1-4

Forensic Medicine in Germany – Service, Research and Teaching

Knut Albrecht[1,2]
[1]Brandenburgisches Landesinstitut für Rechtsmedizin (BLR), Germany; [2]Medizinische Hochschule Brandenburg (MHB), Germany

INTRODUCTION: Forensic medicine is a medical speciality that applies its knowledge primarily for the purposes of justice. It covers a wide range of activities for the public, the judiciary, the clinical sector and public health. In addition to routine activities, student teaching and research are particularly important. The majority of German-speaking institutes are part of universities and usually include special departments of forensic pathology, toxicology and genetics, which are completely independent of the police and the judiciary.

MATERIAL AND METHODS: The structure of forensic medical institutions in Germany is presented.

RESULTS: Forensic medicine is a combination of forensic pathology, clinical forensic medicine and laboratory activities. The corresponding services are offered by a total of 40 institutes in Germany (Austria 5, Switzerland 9 and Luxembourg). Respective medical associations regulate the training as a forensic pathologist. Scientific teaching is offered in the form of annual congresses organised by the specialist associations (e.g. DGRM, GTFCh), including regular meetings of working groups, with guidelines and scientific results being published in various specialist journals.

CONCLUSION: Forensic medicine, as a link between medicine and justice, is an important part, respectively the basis of forensic sciences. In most cases, professional activities are embedded in an accredited format, with standard procedures carried out according to guidelines. In addition, forensic medicine is an integral part of the curricular teaching and basic research.

SPS1-5

Current Developments in Clinical Forensic Medicine – German Situation and (International) Challenges

Sibylle Banaschak
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The examination of living persons has become an important aspect of forensic tasks constituting the field of Clinical Forensic Medicine. The inspection of the skin combined with imaging procedures to detect inner injuries (especially fractures) is a relevant tool to reconstruct events and to help the jurisdictional system judge about possible offences occasioning bodily harm. The necessary examinations may be sorted by the age of the subject (examination of children and adults; elderly people) or the possible offence (bodily harm, sexual offences). Another aspect is the context in which the examination takes place (clinical treatment, victim support, legal inquiry). All these factors lead to the situation that even in one country (Germany) the conditions for the examinations may be different. There are some international guidelines (e. g. the Istanbul Convention), but the national implementation varies widely.

Regarding the scientific issues that may be connected to Clinical Forensic Medicine one has to keep in mind that the reconstruction of events by the examination may be used at court and information to the anamnesis (or better: connecting facts in a criminal trial) may be biased. Furthermore, one has to be cautious in regard to circle reasoning (the result of the examination is used at court and the judgment is used to confirm the result of the examination). The comparability of result may be restricted by different national laws and by different definitions that were used for the context (child abuse, sexual offence). Typical scientific methods that are trusted are experiments or blinded study groups. Both settings are impossible in Clinical Forensic Medicine. Case reports which are restricted in some scientific journals are still relevant in Forensic

Sciences (not only Clinical Forensic Medicine). A typical publication is the overview about X years of examinations in a special institution regarding a special question. But how often can we publish this data and: what for?

The presentation will deal with these issues from a German perspective, trying to give an overview about some special aspects and to suggest future scientific activities.

SPS1-6

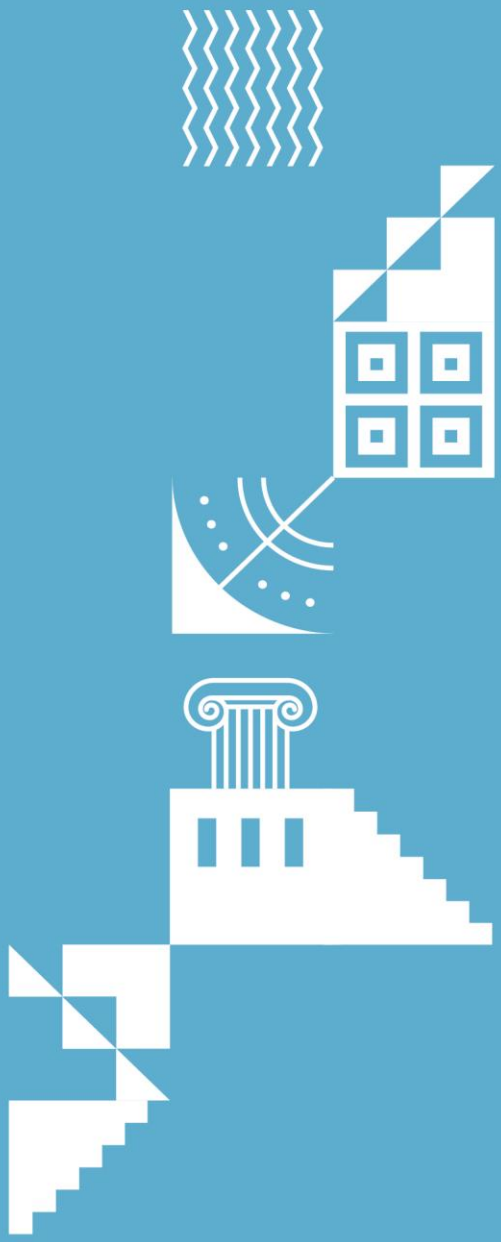
Predatory Publishers: Understanding the Phenomenon and the Risks for Legal Medicine

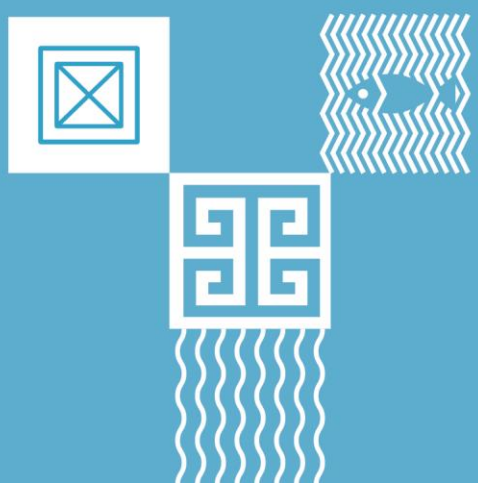
Tony Fracasso

Centre Universitaire Romand de Médicine Légale (CURML), Geneva, Switzerland

In the traditional publishing model, authors submitted their work for peer-review to be published in a paper-based journal. Costs were covered by subscription fees to the journal, and access to articles was restricted to subscribers. At the beginning of the 2000s, the Open Access (OA) model was introduced, in which authors pay a publisher an article-processing fee for the publishing services of a journal, including editing, distributing, hosting the article and peer-reviewing, and articles are freely available. Predatory journals represent an aberrant form of OA; they aim to publish as many articles as possible without providing any or little publishing services including peer review, primarily to maximize their revenues. This presentation will describe the phenomenon of predatory publications, its evolution over time as well as the risks inherent in legal medicine.

Authors Index





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