Balkan Academy of Forensic Sciences

BALKAN ACADEMY OF FORENSIC SCIENCES

12TH ANNUAL SCIENTIFIC MEETING
24 - 26 SEPTEMBER 2021

ABSTRACT BOOK

ISBN: 978-605-74387-2-0

BAFS 12TH ANNUAL SCIENTIFIC MEETING

Balkan Academy of Forensic Sciences
12th Annual Scientific Meeting
Abstract Book

Editor: Sotiri Kalfoglou

Published by:
Istanbul Yeni Yüzyıl University

A free on-line edition of this book is available at:
https://bafs2021.yeniyuzyil.edu.tr/

Balkan Academy of Forensic Sciences 12th Annual Scientific Meeting Abstract Book 2021
Edited by Sotiri Kalfoglou

ISBN: 978-605-74387-2-0

2021

Balkan Academy of Forensic Sciences

BALKAN ACADEMY OF FORENSIC SCIENCES

12TH ANNUAL SCIENTIFIC MEETING

24 - 26 SEPTEMBER 2021.

ORAL PRESENTATIONS

PLENARY SESSION

CURRENT TRENDS IN FORENSIC EDUCATION AND PREPARING FOR THE FUTURE

Professor Peter Vanezis[1]

1OBE, MB, ChB, MD, PhD, FRCPath, FRCP (Glasg.), FFFLM, FCSFS, FAFMS (UK), DMJ(Path).

The forensic sciences by their very nature reflect the employment of many different scientific disciplines in the pursuit of justice. It is thus entirely understandable why the application of such a broad church of forensic knowledge is taught mainly from a narrow perspective and regarded as a subspecialty of other larger all-inclusive disciplines or taught within a restricted interdisciplinary forensically orientated structure. I discuss the current teaching trends, starting from grass root level to the experienced forensic practitioner, and whether they aspire to satisfy the requirements for high quality practice which society expects.

I also discuss whether forensic students and practitioners are prepared for the exciting developments that we see now, and expect to see in the future These include, for example, the increasing use in forensic practice of different modalities of imaging, the application of many aspects of information technology as well as the role of molecular and other biological sciences, all of which are likely to radically influence the investigation of crime in the 21st Century.

Balkan Academy of Forensic Sciences

BALKAN ACADEMY OF FORENSIC SCIENCES

12TH ANNUAL SCIENTIFIC MEETING

24 - 26 SEPTEMBER 2021.

FORENSIC PATHOLOGY SESSION

FORENSIC PATHOLOGY SESSION

MEDICO-LEGAL ASPECTS OF DOG BITES AND JURIDICAL INTERPRETATION IN ROMANIA

***Perju-Dumbrava Dan*[1]**, *Iuliu Fulga*[2], *Carmen Radu*[3], *Codrin Rebeleanu*[4]

[1] University D Cantemir Bucharest, Romania, Faculty of Law Cluj-Romania
[2] Univ Dunarea de Jos Galati, Faculty of Medecine-Romania
[3] UMFST Targu-Mures, Romania, Disciplina Medicina Legala-Romania
[4] UMF Cluj-Napoca, Disciplina Medicina Legala-Romania

Man' s best friend attacks on humans can be extremely serious, even fatal sometimes. Emergency rooms and data from hospital discharge papers describe the public health impact of dog bites. All lesions provoked by dog attacks must be confirmed for judicial issues in Romania by a Medico-legal certificate, signed by a doctor with a degree in Legal medicine. In several cases, dog bites leave lasting wounds, and even long-lasting psychological effects.

The authors analyse the forensic aspects of dog bite cases, including the diagnosis of the wounds, the odontological bite mark analysis, the examination of the photographs, the time required for the bite lesion to heal, and the importance of the anatomical site of the wound. In a legal context, if a dog bite affects the health of a person, the owner can be eligible for compensation to cover the treatment. Recent developments in the judicial system in Romania has seen an additional compensation for psychological impairment.

The authors present two notorious recent cases of dog bite legal issues, both judged in the County of Cluj, Romania, and make a retrospective study of the principal literature revue.

RECENT TRENDS IN AUTOPSY RATE IN SLOVAK REPUBLIC

***Jozef Šidlo*[1,2], *Ľubomír Mikuláš*[1,2], [3]*Michal Kováč*[3], *Lukáš Hamerlik*[4], *Roman Kuruc*[1,2]

[1]Institute of Forensic Medicine, Faculty of Medicine, Comenius University in Bratislava, Bratislava, Slovak republic
[2]Department of Forensic Medicine, Health Care Surveillance Authority, Bratislava, Slovak republic
[3]Department of Forensic Medicine, Health Care Surveillance Authority, Banská Bystrica, Slovak republic
[4]Department of Forensic Medicine, Health Care Surveillance Authority, Poprad, Slovak republic

Background and aims: Role of the autopsy in the system of quality assessment in health care and in establishing the cause of death in so called non treated population and in the cases of violent deaths is irreplaceable. Over the last decades of the 20th century and the first two decades of the 21st century we have been witnesses of a decreasing autopsy rate at global, European and national levels. The objective of this paper is to explain recent trends in development of autopsy rate in Slovak republic.

Methods: There was made an analysis of the development of autopsy rate in the years 1995 – 2020 and development of absolute numbers of performed autopsies according the "type" of autopsy in the years 2005 - 2020. The statistics data for the purpose of this analysis were acquired from the Statistical Office and the Health Care Surveillance Authority.

Results: Autopsy rate decreased in the years 1995 – 2004 from 18.3% to 12.5%. In the years 2005 – 2020 autopsy rate ranged from 18.1% to 12,8%. The total number of autopsies in the years 2005 – 2020 in absolute numbers decreased from 9,677 to 7,595. The number of medico-legal autopsies decreased from 4,438 to 3,697. The number of pathological-anatomical autopsies decreased from 3,724 to 3,167. The number of autopsies ordered by police and connected with expert opinions decreased from 1515 to 731. There was relative increase of the rate of medico-legal autopsies in comparison with the total number of all performed autopsies from 46% to 49% due to considerable decrease of number of pathological-anatomical autopsies.

Conclusion: In spite of the fact that a new institution centrally managing performance of autopsies was established, a current development in this field shows that a tendency of autopsy rate decrease is progressive and permanent also in Slovak republic.

THE STANDARDIZATION OF THE AUTOPSY RULES IN THE EUROPEAN UNION COUNTRIES

Calin Scripcaru[1], *Diana Bulgaru Iliescu[1], Anton Knieling[1], Andrei Scripcaru[1]*

[1]Institute of Legal Medicine, Iasi, Romania

Our paper has the purpose to show the important differences between the techniques and methods of autopsy in different European countries. It is desirable that an autopsy report conceived in the west part of Europe to be identical with the same autopsy report in the east and vice versa.

There are many factors which contribute and spread diversity starting from tradition, religion, finances, laws and scientific level of every country. We studied the experience of several European countries and we found that the differences are not essential.

In the next years an international model of autopsy report will be created and used all over Europe.

A BULLET INJURY: RICOCHETED OR NOT?

Saime Gizem Tezgel[1], *Şeyma Tuğçe Ünaldı[1], Nadir Arıcan[2], İ. Özgür Can[1], Çağlar Özdemir[3]*

[1]Dokuz Eylül University Faculty of Medicine Forensic Medicine Department, İzmir, Turkey
[2]Istanbul University Faculty of Medicine Forensic Medicine Department, İstanbul, Turkey
[3]Erciyes University Faculty of Medicine Forensic Medicine Department, Kayseri, Turkey

Aim: During a shooting incident in an indoor or outdoor urban environment, different types of target surfaces can be hit. When hitting a surface, the bullet might penetrate, perforate or ricochet. This case was presented to emphasize the importance of crime scene investigation and reconstruction on the claim of bullet ricochet.

Case: A 32 years old woman was brought to the emergency unit due to a gunshot injury, a bullet entry was observed under the left zygoma, CT scan showed fragmented displaced fractures in the mandibular, temporal, occipital and parietal bones and a bullet under the scalp. The death was reported at the 28th day of her treatment and an autopsy was performed. The suspect claimed that the gun was shot spontaneously, when he was putting the gun down on the floor while they were sitting face to face with the victim at the corridor. Crime scene investigators reported a suspicious floor defect that may be associated with a ricochet.

Conclusion: The main point of the case that it was a ricochet or not. As mentioned by DiMaio, the maximum ricochet angle detected in shots made with 9 mm diameter bullets at hard concrete surfaces with an incident angle of 10 to 60 degrees is 5 degrees. Bullets, fired with an incident angle above 30 degrees mostly tend to fragment or penetrate, and also lose 80% of their energy by an impact with an incident angle over 50 degrees. 3D crime scene reconstruction of the case revealed that ricochet angle may be 63 degrees minimally, and it isn’ t possible to ricochet off with this angle and penetrate mandibular, temporal and occipital bones with its retained energy. Considering all evidences together, it was thought that the incident didn’ t occur as a result of the bullet ricocheting off.

DEATH CAUSED BY GENERALIZED THROMBOSIS DUE TO AN INCOMPLETE ABORTION: A CASE REPORT

***Oana-Maria Isailă*[1,2]**, *Sorin Hostiuc*[1,2], *Lăcrămioara Luca*[2]

[1]"Carol Davila" University of Medicine and Pharmacy, Dept of Legal Medicine and Bioethics, Bucharest, Romania
[2]„Mina Minovici" National Institute of Legal Medicine, Bucharest, Romania

Background: An incomplete abortion is a subtype of spontaneous abortion, and can be a cause of maternal mortality. It may lead to severe consequences such as sepsis from the retained product, hemorrhagic shock, or uterine rupture. Nowadays these complications are rare and the prognosis is generally good with a prompt medical intervention and close obstetric follow-up. The purpose of this presentation is to present the autopsy findings in a rare complication of incomplete abortion, namely generalized thrombosis, in the absence of a prompt request for medical assistance.

Case description: We present the case of a 29-years-old woman with a medical history of 2 births and 2 spontaneous abortions, which requested medical assistance at the emergency room for lumbar-abdominal pain and fainting that began 24 hours before the presentation. She also reported an episode of serious vaginal bleeding 4 days ago. Based on a clinical and ultrasound examinations was formulated the diagnosis of " 2nd month incomplete abortion" and was performed aspiration curettage. Before surgery, the patient had a severe episode of bradycardia. and died at about 1 hour postoperatively. The autopsy and the histopathological exam revealed uterine changes in postabortion context, generalized thrombosis (dural, pulmonary, hepatic, uterine, ovarian) and subacute myocarditis.

Discussion: The cause of incomplete abortion is not always detectable by usual methods, but the consequences are predictable, although some, such as generalized thrombosis, are rare. An incomplete abortion can be a cause of death in the absence of prompt medical care.

POSTMORTEM TECHNIQUES – THERMAL ANGIOGRAPHY OF THE HUMAN HEART

Yanko Kolev [1,2]

[1]Department of Forensic Medicine, Medical University – Pleven, Bulgaria
[2]Department of Forensic Medicine, District Hospital MBAL, Gabrovo, Bulgaria

Background and aims: One of the purposes of the science is to invent and introduce new techniques for the practice, which improve the quality of the diagnostics and lead to better results. Better is for the methods to not complicate the practical routine and to not need expensive equipment. Postmortem diagnostics of the coronary arteries is still a challenge as it requires fine technique and depends on the grade of atherosclerotic calcification.

Methods: The postmortem thermal angiography of the heart was first proposed by Fais et al. (2018) and tested on porcine hearts for the development of the protocols, selection of contrast medium etc. As the first tests seem promising and future studies on human hearts were recommended, we decided to test it in real forensic cases in autopsy environment. Thermal images were acquired through a Flir One Thermal Imager infrared camera, paired with iPhone 6S iOS smartphone. The proposed refrigeration of the heart to about 4^0C and the usage of heated to 40^0C water as a contrast medium for the injection was found the best and easy to perform. Different methods of injection catheters fixation and insertion were found to be useful as a result of difficulties during the procedure – related to the narrowing and calcification of the left coronary artery ostium.

Results and conclusion: First results of thermal imaging of coronary arteries on ex situ human heart, compared to the dissection results show coincidence of findings. There was better vision about the sub-occlusion and distal branches of the arteries, especially in calcified regions. More systematic studies are necessary to get detailed results and to improve this easy-to-perform, cheap and non-destructive method.

WOMAN FOUND IN SUITCASE

*Halide Nihal Açıkgöz[1], Abdullah Zübeyir Ceylan[2], Merve Küçükyetim[3], Deniz Tankurt[4], **Ömür Gözde Demirtaş**[5], Ceyda Alaca[6]*

[1]Ankara University Forensic Sciences Institute-Department of Forensic Biology
[2]Autopsy Assistantship Program, Vocational School, Beykent University
[3]Biology Department, Ankara University
[4]Physics Department, Middle East Technical University
[5]Molecular Biology and Genetics Department, Gebze Technical University
[6]Biology Department, Gazi University

Background and aims: The number of femicides is increasing in the world and in Turkey. In most cases of homicide, concealment is an important problem for killers and the most obvious method is cleaning the crime scene and hiding the body. The difficulty of transporting the body without being noticed may be the reason why there are many cases of bodies being found in suitcases. Suitcases are an easy choice in terms of being easily accessible and inconspicuous.
While there are papers on body concealment and research on how suitcase concealment affects forensic entomological findings, a general review of cases of bodies in suitcases has not been done and that is the aim of this paper.

Methods: Three publications were found in Pubmed with the keywords "found suitcase", "suitcase murders", "death body found in suitcase", "forensic suitcase", "woman in suitcase". Searches made with the keywords "found suitcase", "woman in suitcase" and "found suitcase" AND country name" in the world and Turkish media, found 122 cases where bodies were found in suitcases that occurred between the years 2009-2021.

Results: A statistical analysis of 122 cases from 35 countries that occurred between the years 2009-2021 was conducted using the IBM SPSS Statistics 26 system. It was observed that 62.3% of the victims in the cases were women and 32% were men. It was determined that 32% of the bodies were dismembered and 50.8% were put in a suitcase without being dismembered. The media did not mention entomological data in 98.4% of these cases.

Conclusions: Evaluating these statistics, it is extremely serious that a significantly higher percentage of the victims are women, 62% in the world and 73% in Turkey. We believe that countries should review their justice systems and increase the penalties in order to prevent femicides.

DETERMINATION OF Δ9-THC IN ARTIFICIAL CEREBROSPINAL FLUID BY LIQUID CHROMATOGRAPHY-TANDEM MASS SPECTROMETRY (LC-MS/MS) METHOD

Neslihan Zengin[1], Murat Yayla[1], Tugba Tekin[1], Merve Kuloglu[1], ***Zeynep Turkmen[1]***

[1]Institute of Forensic Sciences and Legal Medicine, Istanbul University-Cerrahpaşa

Introduction: Cannabis is one of the oldest and most abused drugs in the world, and its use is associated with pathological and behavioral toxicity. Therefore, it is important to understand cannabinoid toxicokinetics and the distribution of cannabinoids through biological fluids and tissues.
Quantitative analysis of biotherapeutic agents in cerebrospinal fluid (CSF) by LC-MS/MS is common situation in clinical trials. On the other hand, CSF plays a complementary role in determining the cause of death as an alternative matrix. Thus, it provides service to justice by analysing with highly sensitive GC-MS and LC-MS methods.

Aim: A standard artificial cerebrospinal fluid (aCSF), is necessary as a surrogate matrix in developing sensitive LC-MS methods for the determination of certain compounds in relevant matrices as a blank sample without sacrificing a few animals and/or using real CSF.

Material and Methods: This study was composed of a validation, conducted on the main active ingredient of cannabis Δ9-THC, which is one of the most common illegal substances, by an efficient extraction from a modified aCSF matrix using the SPE method and LC-MS/MS analysis.

Results and Discussion: According to the 7-point calibration results, the linear range of Δ9-THC was determined in the range of 0.5-50 ng/mL. The correlation coefficient in this range was found R2 = 0.9996. The obtained LOD and LOQ values of the method were found 0.41 ng/mL and 0.48 ng/mL, respectively. According to spiked data analysis established on aCSF samples at three different concentration levels, the percentage of recovery was 80.73±1.87% at 0.5 ng/mL; 81.50±1.81% at 5 ng/mL and 81.96±0.56% at 50 ng/mL.

Conclusion: Within the scope of the validation study, the parameters such as linearity, calibration curve, LOD, LOQ, recovery and stability were performed.

Balkan Academy of Forensic Sciences

BALKAN ACADEMY OF FORENSIC SCIENCES

12TH ANNUAL SCIENTIFIC MEETING

24 - 26 SEPTEMBER 2021.

FORENSIC TOXICOLOGY SESSION

FORENSIC TOXICOLOGY SESSION

MINIMIZING ERRORS IN FORENSIC TOXICOLOGY LABORATORIES TO IMPROVE CRIMINAL JUSTICE

***Ashraf Mozayani*[1]**, *PhD, PharmD, F-ABFT,*

[1]Texas Southern University, Houston, Texas. USA

In a 1760' s commentary, William Blackstone stated that "It is better that ten guilty persons escape than that one innocent suffer". The same principle appears in Jewish writings, where Maimonides stated "it is better and more satisfactory to acquit a thousand guilty persons than to put a single innocent one to death" and in Islam, where Jami' at-Tirmidhi quotes prophet Muhammad as saying, "Avoid legal punishments as far as possible, and if there are any doubts in the case then use them, for it is better for a judge to err towards leniency than towards punishment". Variations of this thought have been written by many legal scholars and are a mainstay of the British and American legal systems.

Whether an individual agrees with the principle stated above, the underlying goal of the forensic science community is to minimize the possibility that an innocent person is wrongly convicted, while utilizing as much technology, scientific reasoning and practical laboratory skill to determine the correct answer to the forensic puzzle before them and ultimately improve the investigation and the outcome. The wrongful investigation has various causes, including but not limited to

- Inaccurate eye witness testimony,
- Inappropriate testimony,
- Lack of foundational science to support the selected analysis,
- Human factors (in the police department, crime laboratory, courts), and/or
- Inadequate investigation

At least four of these five causes may involve forensic toxicologists. The bright light of public examination of the forensic sciences has not been kind to the profession. As a result of such adverse publicity, many forensic science associations and organizations have established a code of ethics for their memberships. In 2016 a National Code of Professional Responsibility, containing 16 responsibilities for forensic analysts and managers, was created by the National Commission on Forensic Science (NCFS). The AAFS Standards Board has published Standards and Best Practice Recommendations in a number of forensic disciplines, and is working to develop standards in many others.

This presentation will focus on the issues and inconsistencies that have surfaced in the forensic toxicology, update the attendees on recently published standards and recommendations, and provide resources to allow the forensic science community to comply with current acceptable practice.

THE HIDDEN POISONING: PHOSPHINE

*Silviya Stoykova[1,2], Ivo Ivanov[1,2], Rositsa Kostandieva [1], Elka Ivanova[3], **Vasil Atanasov [1,2]***

[1] Forensic Toxicology Laboratory, Military Medical Academy, Bulgaria
[2] Faculty of Chemistry and Pharmacy, Sofia University "St. Kliment Ohridski", Bulgaria
[3] Department of Forensic Medicine, Military Medical Academy, Bulgaria

Background and aims: Phosphine poisoning is extremely rare in Bulgaria. Phosphine gas is used as a pest control agent and its precursor – aluminium phosphide is available without restriction in the country. As the clinical signs of intoxication are general and unspecific, the initial diagnosis is usually different and the adequate treatment is delayed.

Methods: A case report of fatal phosphine poisoning of 9-year-old boy is presented. His grandfather put some tablets of aluminium phosphide in a rodent-hole under the child' s bed which was closed with mud. A few hours later the boy and his 11-year-old sister displays unspecific symptoms (nausea and vomiting). The boy is medicated twice from the ambulance service with metoclopramide (at home, on the same bed). 24 h later the boy died and his sister was admitted to the ICU.

Results: The autopsy findings did not indicate any signs of acute illness as well as no specific morphological changes were described. The microbiology and virology results of his sister were also negative. Then toxicological analysis of the postmortem samples (including phosphine assay) was performed. The results indicate acute phosphine poisoning (1.9 μg/mL in blood; 53 μg/mL in urine; GC-NPD). The calculation of phosphine amount released in the child' s room based on the found residues of aluminium phosphide is estimated on 80 mg/m^3 which is extremely toxic for a long stay.

Conclusion: The phosphine poisoning is a diagnostic challenge antemortem as well as postmortem. However, it is possible to be detected using specific toxicological assay when there are unspecific signs in patients, especially from agricultural areas.

4-FLUOROISOBUTYRYLFENTANYL INTOXICATIONS – WHY OPIOID CRISIS STILL CAUSES A LOT OF CONCERNS

Kaja Tusiewicz [1,2], *Marcin Zawadzki* [1], *Olga Wachełko* [1], *Agnieszka Chłopaś-Konowałek* [1], *Paweł Szpot* [1]

[1] Institute of Toxicology Research, 45 Kasztanowa Street, Lower Silesia Province, Borowa 55-093, Poland
[2] Faculty of Chemistry, University of Wrocław, 14 F. Joliot-Curie Street, 50-383, Wrocław, Poland

Background and aims: Opioid crisis that emerged in the United States at the end of 20th century is now becoming noticeable in Europe. Over-prescription of opioid analgesics is now accompanied by increasing cases of illicit drugs such as fentanyl, fentanyl analogues and other new psychoactive substances from opioid group intoxications. The aim of the presentation is to bring awareness to fentanyl analogues problem and to present cases of fatal and nonfatal intoxication resulting from
4-fluoroisobutyrylfentanyl (4-FiBF) administration.

Methods: In both cases: fatal and nonfatal 4-FiBF intoxication biological material was analyzed using ultra-high-performance liquid chromatography triple quadrupole tandem mass spectrometry (UHPLC-QqQ-MS/MS). Quantification of this xenobiotic was performed in blood, urine, vitreous humor, bile and gastric content. Fentanyl-d_5 served as an internal standard.

Results: Among all analyzed biological materials the highest 4-FiBF concentration was found in bile and gastric content (among fluids) and liver (among tissues). The concentrations ranged from 76.1 ng/mL to 5410 ng/mL. Distribution of beforementioned substance in post mortem samples have been detailed, as well as validation of a method used to determine 4-FiBF in biological material.

Conclusions: 4-FiBF is a synthetic opioid and an analogue of fentanyl that binds to μ opioid receptors causing analgesics symptoms. Interestingly, to achieve half of the maximum opioid receptors response as fentanyl, more 4-FiBF is needed, which probably results from its weaker binding to opioid receptors [2]. This fact might explain high concentrations of 4-FiBF that are determined in biological samples (76.1-5410 ng/ml [2], 0.1-331 ng/ml). The most serious acute health risk from overdosing 4-FiBF is a chance of respiratory depression that can lead to respiratory arrest and death, so applicable methods of 4-FiBF determination are highly required.

Balkan Academy of Forensic Sciences

A PATHOLOGY THAT IS OFTEN NEGLECTED IN OUR COUNTRY, TURKEY; ALCOHOL WITHDRAWAL SYNDROME (AWS) IN INTENSIVE CARE UNIT

*Ali Şefik Köprülü[1], Ali Haspolat[2], **Yaşar Gökhan Gül**[3], Halil Can Canatan[4]*

[1] Department of Anesthesiology, Medicine Faculty, İstanbul Yeni Yüzyıl University Turkey
[2] Department of Anesthesiology, İstanbul Şişli Vocational School, Turkey
[3] Medicine Faculty, Department of Anesthesiology, İstanbul Medipol University, Turkey
[4] Department of Anesthesiology, İstanbul Private Güngören Hospital, Turkey

Background and aims: Alcohol is the most abused substance worldwide following nicotine. In the Western world, delirium triggered by alcohol withdrawal is a complication seen in approximately 10% of ICU patients. Although this rate is lower in our country, it is steadily increasing. In this study, we drew attention to the subject based on two different case examples.

Methods/Results: Case-1: A 43-year-old male patient was admitted to our ICU with the diagnosis of methyl/ethyl alcohol intoxication. He responded positively to the applied mechanical ventilation treatment and hemodialysis. Following his awakening he was extubated and sedative medication was administered. Despite the sedative medication administered, he suddenly became extremely agitated, tried to take the nurse in charge hostage by breaking off the entire medical cable, serum set and seizing the medical scissors that were routinely in the care tray at the 38th hour of the treatment. He was neutralized by the intervention of the other medical team and appropriate treatment was administered. On the 4th day, he was transferred to psychiatry unit, and he was discharged with cure. **Case-2:** A 28-year-old male patient with alcohol+synthetic cannobioid use, responded favorably to treatment including mechanical ventilation. He was extubated at the 36th hour. He acted harmoniously for a while, however he was suddenly agitated, breaking all connections and running from the bed to the window shortly after his extubation. He tried to break the glass with his own body but failed and he repeated the action with a stool this time. He was successful in his second attempt, and he was prevented from jumping from the 6th floor with the help of the medical staff. He refused psychiatric help and wanted to be discharged voluntarily. He was handed over to law enforcement for the completion of the forensic investigation.

Conclusion: AWS is a clinical condition where comprehensive history/physical examination is important in diagnosis. Its symptoms range from mild tremors to life-threatening delirium tremens. D.Tremens is seen with hallucinations, disorientation, tachycardia, hypertension, hyperthermia, agitation, sweating starting 48-96 hours after the last drink. If the clinic includes mental status change/fever, other causes such as infection, trauma, metabolic disorders, drug overdose, liver failure should be excluded. AWS is characterized by signs of overactivity of the sympathetic nervous system. Its severity parallels that of adrenergic stimulation. The physiology of the overactive sympathetic system is based on upregulation of NMDA receptors. Alcohol is an agonist of GABA receptors and an antagonist of NDMA receptors. During repeated/long-term alcohol use, GABA receptors are downregulated and NDMA receptors are upregulated. In the absence of alcohol, the number of GABA receptors decreases, and an increased number of NDMA receptors creates a synergistic adrenergic effect. Treatment in AWS is based on reducing the hyperadrenergic response. Benzodiazepines are the drugs of first choice to dexmetedomidine. In any case it is important to note that ICU staff should always consider the possibility of AWS in their routine work protocols.

„CHEMSEX" – A HAZARDOUS COMBINATION OF „CHEMS" AND SEX

Patryk Kuropka [1,2], *Marcin Zawadzki* [1,3], *Paweł Szpot* [1,3]

[1] Institute of Toxicology Research, 45 Kasztanowa Street, Lower Silesia Province, Borowa 55-093, Poland
[2] Faculty of Chemistry, University of Wrocław, 14 F. Joliot-Curie Street, 50-383, Wrocław, Poland
[3] Department of Forensic Medicine, Wroclaw Medical University, Mikulicza-Radeckiego Street 4, 50-345 Wroclaw, Poland

Background and aims: „Chemsex" is a term that refers to the voluntary intake of psychoactive drugs in sexual context which are supposed to improve performance and enhance sexual experience. These practices are particularly popular among partygoers and are often associated with risky sexual behaviour. In addition to the risk of infection with sexually transmitted diseases, acute intoxication must also be considered. The common practice of using these drugs in combination with others can lead to dangerous interactions, resulting in nonfatal and even fatal intoxications. The purpose of this presentation is to discuss some of the chemsex-related substances and their mechanisms of action. Authentic cases from toxicological analyses performed at the Institute of Toxicology Research will be presented.

Methods: Biological samples including blood, urine, and gastric contents, were analyzed using an ultra-high-performance liquid chromatography triple quadrupole tandem mass spectrometry (UHPLC-QqQ-MS/MS).

Results: In fatal intoxication case GHB – a classic chemsex related drug has been found simultanously with substances not usually associated with chemsex such as venlafaxine. Concentrations of GHB were 691.8 µg/ml in blood and 2652.0 µg/ml in urine. In second presented intoxication case synthetic cannabinoid 5F-CUMYL-P7AICA was found in blood and urine, respectively 2.8ng/ml and 3.1ng/ml.

Conclusions: The most commonly used drugs of abuse in chemsex practices are GHB, synthetic cathinones and cannabinoids, amphetamines, erectile dysfunction agents, alcohol and poppers. [1] Simultaneous use of many different substances often leads to dangerous interactions and fatal poisoning. Forensic toxicologists should be aware of the dynamic development of novel psychoactive substances that may contribute to the emergence of new patterns of chemsex-related intoxications. In the second intoxication case, the cause of the death was probably not a 5F-CUMYL-P7AICA overdose, but due to hallucinations and autoerotic stimulation induced by consumption of cannabinoid, which resulted in self-aggression and eventually death.

FORENSIC APPLICATIONS OF LASER-INDUCED BREAKDOWN SPECTROSCOPY (LIBS)

***Eda Kiriş*[1], *Dilek Salkım İşlek*[1], *Emel Hülya Yükseloğlu*[1]**

[1] İstanbul University- Cerrahpaşa Institute of Forensic Sciences and Legal Medicine.Department of Science

Background and aims: Forensic Science can be broadly defined as the application of science to law in solving cases. Forensic scientists use multidisciplinary (physics, chemistry, biology, mathematics, medicine, psychology, sociology, etc.) scientific techniques to analyze physical evidence in order to establish or exclude a relationship between a suspect and the crime scene. A wide variety of analytical methods have now been used to identify a sample and determine whether two or more objects have a common origin. One of these techniques is Laser-Induced Breakdown Spectroscopy (LIBS). The aim of this presentation is to introduce LIBS as forensic instrument that is currently use in some laboratories.

Methods: LIBS is a versatile, relatively low-cost adaptation of atomic emission spectroscopy that has been successfully applied to forensic analysis. LIBS is used in forensic science to detect counterfeit money, drugs, explosives, fingerprints, firearm residue, ink, paper, hair, paint, glass, etc. used in the analysis of such items. On the other hand, it is more useful than other methods due to simple sample preparation, analysis of major, minor or trace elements and rapid results.

Results: As a result, in this presentation, the principle, structure, studies and results of the LIBS device will be discussed. On the other hand, in this presentation, the advantages and disadvantages of the device will be mentioned and information will be given about why it should be in laboratories.

Conclusion: In conclusion, LIBS has lots of advantages other than traditional techniques for forensic analysis. That' s why LIBS is a forensic instrument that should be in all forensic laboratories. This presentation helps you to understand why LIBS should be in all laboratories.

CHROMATOGRAPHIC DETERMINATION OF VARENICLIN IN PLASMA AND URINE OF PATIENTS UNDER SMOKING CESSATION TREATMENT

Siti Rahmawati[1], *Tugba Tekin[1], Merve Kuloglu[1], Sermin Borekci[2], Bilun Gemicioglu[2], Zeynep Turkmen[1]*

1 Institute of Forensic Sciences and Legal Medicine, Istanbul University-Cerrahpaşa
2 Department of Pulmonary Medicine, Istanbul University— Cerrahpasa, Istanbul, Turkey

Introduction: Smoking cessation is known as one of the best ways to protect our health. A program to support smoking cessation has recorded 2.283.871 applications between 2009 January 1st – 2018 September 30th and administered free Nicotine replacement therapies; Varenicline (Champix®, Pfizer) and Bupropion (Zyban®, GlaxoSmithKline) to 893.041 participants.
In recent studies, Varenicline is found to be associated with neuropsychiatric disorders such as behavior changes, depression, hostility and suicidal thoughts just like recalled Zyban.

Aim: The analytical studies of Varenicline by using LC-MS/MS are mostly aimed at determining the impurity of the dosage form. The present study proposes the development and validation of Varenicline in plasma and urine sample using LC-MS/MS with a fast, specific, easy, low detection limit, high repeatability and high recovery method.

Material and Methods: The developed method was then applied to the plasma and urine samples of 16 patients currently receiving smoking cessation treatment at Smoking Cessation Polyclinic, Department of Chest Disease, Cerrahpasa Medical Faculty.

Results and Discussion: The LOD and LOQ was found respectively 0.36 ng/mL and 0.46 ng/mL for plasma; 0.29 ng/mL and 0.50 ng/mL for urine. The correlation coefficient between the ranges was found to be R^2=0.9971 for plasma; R^2= 0.9944 for urine. The percentage recoveries from spike plasma samples were found 129.68±5.73% at 10 ng/mL concentration and from spike urine samples were found %107.31±3.73 at 10 ng/mL. The repeatability of plasma was defined at 3 different concentrations with 6 samples; at 2 ng/mL the average was 2.31±0.063 ng/mL with RSD 6.3, at 10 ng/mL the average was 10.73±0.035 ng/mL with RSD 3.5, at 50 ng/mL the average was 56.80±0.02 ng/mL with RSD 2.0.
According to the developed method, Varenicline concentration was found at the range of 15.5-60.1 ng/mL in the plasma; and 0.7-3.22 ng/mL in the urine samples of 12 patients.

Conclusion: The developed LC-MS/MS method is a more efficient method for the determination of Varenicline in urine and serum samples.

MODELING POSTMORTEM ETHANOL PRODUCTION BY *C. ALBICANS*: EXPERIMENTAL STUDY AND MULTIVARIATE EVALUATION

***Glykeria Velivasi*[1]**, *Iraklis Sakkas*[2], *Nikolaos Kourkoumelis*[3], *Vassiliki A. Boumba*[4]

[1]Department of Forensic Medicine & Toxicology,
[2]Department of Microbiology,
[3]Department of Medical Physics,
Faculty of Medicine, School of Health Sciences, University of Ioannina, 45110 Ioannina, Greece

Background and aim: In previous research, we proposed the mathematical modeling of the ethanol production by certain bacteria under controlled laboratory conditions in an attempt to quantify the production of microbial postmortem ethanol in cases where other alcohols were co-detected. This work aimed to study ethanol, higher alcohols (1-propanol, isobutanol, 2-methyl-1-butanol and 3-methyl-1-butanol), and 1-butanol production by *Candida albicans*, a gram-positive, facultative anaerobic fungus, under controlled experimental conditions and develop simple mathematical models to predict the microbially produced ethanol in correlation with the other alcohols.

Methods: *C. albicans* was cultured: (i) in different culture media (Brain Heart Infusion, BHI and, Sabouraud Dextrose Broth, SDB), (ii) under mixed aerobic/anaerobic or strict anaerobic conditions, and (iii) at different temperatures (37°C, 25°C and, 4°C) for 23 days at most. Ethanol and the other alcohols concentrations were determined by head space-gas chromatography-flame ionization detector (HS-GC-FID). Regression analysis was employed in 25°C cultures to model the correlation between the produced ethanol (as the response variable) and the other alcohols (as the explanatory variables). The applicability of the constructed models was tested in the *C. albicans* cultures in BHI and SDB media at 37°C, in denatured human blood, acidic and neutral with different concentrations of additional glucose, in acidic denatured blood diluted with dextrose solution and in blood from autopsy cases.

Results: The *C. albicans* models showed a potential for application in cases where yeasts have been activated in blood with elevated glucose levels. Overall, the in vitro ethanol production by *C. albicans* in blood depended on temperature, time, glucose (or carbohydrate) content, pH of the medium and endogenous changes in the medium composition through time.

Conclusions: Our results suggested that methyl-butanol was the most significant indicator of fungal ethanol production, followed by the equally important isobutanol and 1-propanol in qualitative and quantitative terms.

Balkan Academy of Forensic Sciences

BALKAN ACADEMY OF FORENSIC SCIENCES

12TH ANNUAL SCIENTIFIC MEETING

24 - 26 SEPTEMBER 2021.

GENERAL SESSION

GENERAL SESSION

NEUROSCIENCE & TRAINING PRACTICES

Jean-François GADECEAU[1]

[1]Head of the INTERPOL Global Academy, INTERPOL

Is it true that adults are less able than children to learn because their brain is less plastic? Yes, it is.

A lot of research on the brain is undertaken mainly for health purposes and for the aging population, sometimes for the education of children, and too rarely on how adult best learns. However, lessons can be drawn from findings on the brain. Why should we care? Because countries spend millions of euros every year in capacity building activities. So we shall ensure that the training community (project managers, instructors) uses resources the most efficiently.

Let's start by something research did not confirm.

There are beliefs in the training community which are not supported by research on how the brain functions: the speech will start by giving an example of such a belief: the "learning styles" on which a recent review by researchers on this assertion proved there is no evidence that validates it.

How can neuroscience findings on brain confirm or adjust our training practices?

Speech structure:

1 - Basics on brain
Notions on how the adult brain works.

2 - Consequences of age on the brain.
What are the brain functions which decrease and which ones do increase?

3 - Factors stimulating the adult brain.
How to enhance brain plasticity and maximize learning?

4 - Good practices in training.
Recommendations to course managers and trainers

5- Future research endeavors
There are projects on brain related to adult training.

LETHAL CONSEQUENCES OF DOMESTIC VIOLENCE: A CASE SERIES

Oana-Maria Isaila[1,2], *Sorin Hostiuc*[1,2], *George Cristian Curcă*[1,2]

[1]"Carol Davila" University of Medicine and Pharmacy, Dept of Legal Medicine and Bioethics, Bucharest, Romania
[2]„Mina Minovici" National Institute of Legal Medicine, Bucharest, Romania

Background and aims: Domestic violence causes a significant burden on the healthcare systems by increasing the mortality, morbidity, and decreasing the overall quality of life of the victims. The main forms of domestic violence are: physical, psychological, verbal, sexual, economic, social, spiritual and cyber violence. The purpose of this paper is to present a series of deaths in the context of some of the forms of domestic violence.

Methods: We selected three cases from the National Institute of Legal Medicine" Mina Minovici" Bucharest, in which the death has been associated with previous or concurrent acts of domestic violence. In every case investigation we obtained crime scene investigations, and were performed a medical-legal autopsy and complementary laboratory examinations (toxicological and histopathological).

Results: Case one: 73-years-old woman hit by her son with a microwave oven on her head. The autopsy findings were: complex cranio-facial fracture, hyoid fracture, and mechanical asphyxia with blood aspiration. Case two: 36-years-old woman hit by her lover in the head; she was hospitalized about 2 weeks and operated for" acute subdural hematoma". The autopsy findings were old bruises, cerebral contusions and lacerations. Case three: 15-years-old girl, with a history of abuse from her father. At the time of death, she was neglected, living alone in an apartment, without family. The autopsy findings were multiple tattoos, stigmas of drug administration and the toxicological exam revealed the presence of drugs in the samples taken.

Conclusions: Domestic violence is complex a phenomenon that can have multiple forms and can lead to lethal consequences at any moment during the lifetime of the victim.

CORPORATE NEGLIGENCE AND ABUSE IN ELDERLY CARE

Ceren Dulman[1]

[1]Psychology Department, İstanbul University, İstanbul, Turkey

Elderly neglect and abuse is an important but preventable and intervenable public health problem with serious consequences. However, the neglect and abuse of the elderly began to attract attention in the 1970s. Since elderly care was not considered as a problem area in Turkey until recently, the care of the elderly in the family and with the family was supported, however, the care of the elderly in the family was replaced by alternative models and professional care with the effect of social changes and developments. Today, home care services are given priority to help individuals live their lives in the home environment, and institutional care services such as day care services and nursing homes, nursing homes/elderly care institutions, elderly residences and holiday villages continue to develop.

In the study, the related news in the last 5 years in the press were scanned, and the problems mentioned in the news about the neglect and abuse of the elderly in institutions were classified and evaluated together. Even if we don't know the number and proportions, all problems can be easily gathered under the same headings.
In terms of institutions, deficiencies related to the physical environment, the qualification/specialization of the working personnel, and the medical and psychosocial support categories have been identified that may be effective in the neglect and abuse of the elderly.

In order to prevent psychological disorders such as depression and addiction, studies are carried out for older adults around the world, and services are provided to provide education to the individual, his/her family and caregivers, to connect with health professionals and to provide behavioral mobilization in the individual, together with the identification of symptoms. However, when all care services are evaluated, it is seen that institutional services in Turkey are in need of social and psychological development.

Balkan Academy of Forensic Sciences

EVALUATION OF THE FIGHT AGAINST DOMESTIC VIOLENCE IN TURKEY IN TERMS OF PROFESSION EXPERTS

Duygu Buğa[1], *Zeynep Belma Gölge*[2]

[1]Psychology Department, İstanbul Commerce University, İstanbul, Turkey
[2]Institute of Forensic Medicine and Forensic Sciences, İstanbul University-Cerrahpaşa, İstanbul, Turkey

Background and aims: Although violence against women is preventable, 1 out of every 3 women worldwide are exposed to violence by men with whom they have a close relationship and domestic violence against women and children are two areas of struggle that can be intertwined. In this study, it is aimed to identify areas of public need and to develop solution proposals for more effective service models in the context of strengthening the fight against domestic violence in Turkey.

Methods: The universe of the research is defined as profession experts who work actively in the field of combating domestic violence. 60 experts participated in the study; 28.3% of whom working with children and 25% with women in state-affiliated institutions, 21.7% with children and 25% with women in non-governmental organizations. In the study, in which qualitative and quantitative methods were used together, the Burnout Scale and the Quality-of-Life Scale for Employees were used to collect the quantitative data, and the Expert Interview Form created by the researcher was used to collect the qualitative data.

Results: It was seen that the burnout levels of public employees were higher than those of non-governmental employees and the professional satisfaction of those working in civil society was higher than those working in the public sector. It was observed that burnout in terms of quality of life of those working with children was higher than those working with women. In addition, it was seen that studying at undergraduate level willingly, loving one's profession and/or job and legal knowledge had positive effects on burnout and quality of life. The data obtained from quantitative part of the research will be discussed in detail in the discussion section in the context of recruitment processes, organizational socialization and governance, presented with quotations from the participants.

Conclusions: In the combat against domestic violence against women, the effectiveness of the employees working in the field comes to the fore. In this context, it is thought that it is very important to consider criteria such as being interested in the field, doing their job with love, competence, especially in the recruitment and appointment processes of employees serving in the public sector. On the other hand, it is thought that in the context of organizational socialization it is important for the employees to go through a well-structured orientation process, to receive the quality and continuous in-service training they need, to support their professional development and graduate education, and to provide supervision opportunities, in the effective execution of the combat against domestic violence against women.

MISINTERPRETATION OF DNA RESULTS MAY BECOME A TRUE DISASTER FOR THE FAMILIES OF THE VICTIMS: A CASE REPORT

***Sotiri Kalfoglou*[1 3], *Ersi Abacı Kalfoğlu*[1 2]**

[1]Forensic Sciences Laboratory Istanbul Yeni Yuzyıl University, Istanbul, Turkey
[2]Medical Faculty, Istanbul Yeni Yuzyıl University, Istanbul, Turkey
[3]Institute of Forensic Medicine and Forensic Sciences, İstanbul University-Cerrahpaşa, İstanbul, Turkey

Background and Aim: Human identification by the use of DNA is the most exciting development in forensic sciences. This technology is a success story with which we can be more and more accurate in typing less and less amounts of evidence quicker than ever before. This ability though may be the cause of wrongly accusing innocent people. Technology alone does not work and the correct interpretation of the forensic evidence is essential. An example is the following case:

The case: Büşra and Tuğçe**,** two ten-year-old girls, were abused and murdered by strangulation on March 2006. Their bodies were found on May the 3rd, 2006, superimposed in a culvert in Savaştepe area of southern Marmara region in Turkey. Buşra' s body had partially decomposed whereas Tuğçe who was in the upper position was seriously decomposed. Two suspects were tested for ySTRS, compared to Buşra' s nail scrapings resulting a complete match. However, the nuclear DNA of the nail scrapings revealed that there was some DNA that does not match those suspects and the girl. As a result, they were both excluded. After 11 years the defense part brought the case to our laboratory. There was no biological evidence left for analysis but a careful examination of the already present results showed that the DNA expert completely ignored the presence of the second body and the leak of biological material that could have been passed to the body below. Indeed, the STRS that excluded the suspects were present in the genetic makeup of the second girl. Another fact that the prosecution used was that the suspects were already accused and convicted for rape a few years ago. The suspects were sentenced to imprisonment.

Results: There are various factors that can influence human decision making in forensic science and can affect our interpretation of the evidence. Misinterpretation of DNA evidence is a real challenge. It is our duty to reduce the possibility of misinterpretation that can lead to miscarriages of justice primarily by serious audits and in-service trainings.

THE THIRD MOLAR DEVELOPMENT AS AN INDICATOR OF LEGAL ADULTHOOD ON THE POPULATION OF BOSNIA AND HERZEGOVINA

Jasmina Mlaćo Durek[1], *Selma Zukić[2], Amra Ahmić[2], Lejla Kazazić[3], Alma Mušanović[4], Jasmin Habibović[5]*

[1]The Public Institution Health Centre of Bugojno, Bugojno, Bosnia and Herzegovina
[2]Department of Dental Morphology, Dental Anthropology and Forensics, Faculty of Dentistry with Clinics, University of Sarajevo, Sarajevo, Bosnia and Herzegovina
[3]Department for Stomatology Prosthetics with Dental Implantology, Faculty of Dentistry with Clinics, University of Sarajevo, Sarajevo, Bosnia and Herzegovina
[4]Clinic for Orthodontics, Faculty of Dentistry with Clinics, University of Sarajevo, Sarajevo, Bosnia and Herzegovina
[5]The Public Institution Health Centre of Živinice, Živinice, Bosnia and Herzegovina

Background and aim: Cameriere et al. have published a method for the determination of adulthood, using the technique of measuring the open apices of the third molars (the third molars' maturation index) and determined the specific cut-off value. The aim of this research was to verify the reliability and accuracy of the Cameriere's formula for the determining of dental age based on the third molars' maturation index in relation to chronological age of the Bosnian-Herzegovinian population.

Material and methods: The sample for this study consisted of 300 digital orthopantomograms of the subjects aged 13-24 years. For the analysis of the third molars' maturation index, the widths of the projections of the open apices of the third mandibular molars (a,b) and the height of the molar were recorded.

Results: The sensitivity of the test was 100% for males and 98.8% for females, and specificity was 95.2% for males and 88% for females, with a cut-off of 0.08. In the total sample, 99.4% of the subjects older than 18 years and 91% younger than 18 years were correctly classified.

Conclusion: The cut-off value of index of 0.08, proposed by Cameriere, can be used for the determination of the age limit of 18 years on the population of Bosnia and Herzegovina.

SELF-USE/ABUSE OF ANALGESIC IN PRIMARY CARE PATIENTS IN THE SOUTHEASTERN ANATOLIA REGION-TURKEY

Meral Gülbaran[1]

[1]Family Medicine Specialist, Doctoral Lecturer, İstanbul Şişli Vocational School, Department of Emergency Medicine

Background and aims: Analgesics are the most frequently used, but the most abused drugs as well. Unnecessary analgesic use is a major public health problem all over the world. In our study, we examined the local view on the use of analgesics by conducting a survey among family physicians in the Southeastern Anatolia region of our country.

Methods: A questionnaire composed of 19 questions was sent to the selected regional physicians in electronic format and their voluntary participation was asked. The outcomes of 215 physicians who replied were compiled.

Results: Physicians reported that 80.2% of the patients who applied to them with pain had chronic complaints, 95.7% were women, 54.8% were over the age of 60, and 39.1% were between the ages of 40-59. They stated that the pain was originated from the musculoskeletal system, head-neck-teeth, and abdomen, respectively. 77.8% of these patients were using analgesics (49.3%-NSAID, 35.1%-Paracetamol, 6.7%- Salicylate, 8.9%-Other) recommended from different sources at the time of admission. At the time of admission, 49.1% showed GIS, -22.4%-allergic symptoms, 7.9%-liver dysfunction and 6.1%-renal dysfunction as drug side effects. Physicians stated that 44.6% changed the analgesics themselves and 10.9%, changed the route of administration. 16.3% added different analgesics and 16.3% adjusted the dose themselves. It was determined that only 28.3% of the patients were not recommended to change.

Conclusions: Although the "prescription drug" warning is written, many drugs can be sold without a prescription in our country. There is also a large amount of medicines left from older treatments in homes. As a result, people can easily reach the drugs without the recommendation of a physician. Analgesics are marketed with average doses and they are made up of many different active ingredient groups. The physician determines the drug, its dose, and the mode of administration according to the patient's physiological variables, the presence of other diseases/drugs, daily life characteristics, and the severity of the pathology. In short, the practice has been reduced from general to very specific, individualized drug administration. In such an approach, the patient should be examined and evaluated by the physician and then the treatment should be planned. The drawbacks of uncontrolled, self-analgesic use may be severe. The symptoms that may be a warning of serious pathologies such as pain may be diminished. Chronic pain syndromes that require long-term drug use and whose treatment may be medically difficult may be affected. Family physicians have an important role in raising public health awareness in order to prevent this situation. Raising awareness about the issue with rational drug use information programs for adolescents on radio, television and social media, providing easily accessible quality health services, and determining up-to-date strategies in drug marketing/distribution/sales with a scientific point of view are important steps to be taken to solve this problem.

Balkan Academy of Forensic Sciences

HEALTH CARE PROFESSIONALS LEVEL OF KNOWLEDGE AND EXPERIENCES ABOUT ADDICTION

*Yasemin Sanal-Ozcan[1], **Nurcan Hamzaoglu**[2]*

[1] Faculty of Science and Letters, Department of Psychology, Manisa Celal Bayar University Manisa, Turkey,
[2]Institute of Health Sciences, Istanbul Yeni Yuzyıl University, Istanbul, Turkey

Background and aims: Studies indicate that the negative attitudes of healthcare professionals towards alcohol and substance abuse can create an important obstacle for patients (Mutlu, Bilici & Çetin, 2014). In addition, the literature predicts that as knowledge and awareness about substance addiction increase, discriminatory behaviors towards addicts will decrease (Yılmaz and Şaşman Kaylı,2020). In this context, it is important to determine knowledge of healthcare professionals on addictions. The current study examined the general knowledge levels of healthcare professionals about the effects of various substances and whether they know the treatment approaches in substance addiction.

Methods: Data was collected through online survey application. 248 valid forms were analyzed. All participants were healthcare professionals (74.6% female, 25.4% male) and the mean age was $\bar{X}$= 30.20 ± 10.25. The rate of encountering an addicted individual professionally at least once was 61.1% (N:149).

Results: Within the scope of the study, participants were asked whether they knew the psychological and physical effects of the aforementioned substances. While the rates came up in between 77% and 84.8% for marijuana, synthetic cannabinoids, volatile substances, heroin and cocaine; but decreases to 53.7% for amphetamines and 46.7% for hallucinogens. Knowing the treatment approaches to be applied varied between 28.3% and 48.4%. In addition to general information, the participants were grouped as doctors, paramedics, nurses, midwives and others. Various comparisons were made between the groups regarding the processes of knowing the substances, their effects, treatment approaches and possibility of quitting the substances, and statistically significant differences were reached.

Conclusions: As a result, it has come to the fore that healthcare professionals who are likely to encounter addiction should undergo in-service training or information workshops on related issues.

SUICIDE TOGETHER BY JUMPING FROM JULY 15 MARTYRS' BRIDGE: DYADIC DEATH

Cüneyt Destan Cenger[1]

[1]Istanbul University Istanbul Medicine Faculty Department of Forensic Medicine Istanbul

Background and aims: Suicide by two people together or committing suicide after committing murder is defined as "dyadic death". Suicide by two people together is very rare compared to dyadic death in the form of murder-suicide. A dyadic death case in the form of suicide by jumping from the July 15 Martyrs' Bridge is presented because of its rarity.
In the forensic evaluation of the cases; It was determined that people came to the July 15 Martyrs' Bridge by a car in December at around 2.40 pm, got out of the vehicle on the bridge and crossed over the railings, committed suicide by jumping into the sea. The bodies of both victims were reached on the same day.

Results: Case 1 - The male was 47 years old, widowed, had 325 mg/dl of ethanol in his blood, no sperm cells were detected in the analysis of the anal swab sample and the death occurred as a result of the joint effect of multiple rib, pelvis, vertebral bone fractures, internal bleeding from internal organ tears and drowning.
Case 2 - The woman's corpse was 33 years old, single, had 165 mg/dl ethanol in her blood, no sperm cells were detected in the examination of anal, vaginal swab samples, the death of the woman occurred as a result of drowning with multiple rib, thoracic vertebral fractures, spinal cord injuries.

Conclusions: In the autopsies of people who committed suicide by jumping into the water from the 15 July Martyrs' Bridge and Fatih Sultan Mehmet Bridge between 2000 and 2013, it was reported that the male-to-female ratio was 9:1 and the mean age was 34.06 ± 9.6 years. Suicide rates are higher in December. In cases of dyadic death with varying causes and results, a careful examination is essential to clarify the event.

Balkan Academy of Forensic Sciences

BALKAN ACADEMY OF FORENSIC SCIENCES

12TH ANNUAL SCIENTIFIC MEETING

24 - 26 SEPTEMBER 2021.

CRIMINILASTICS SESSION

CRIMINILASTICS SESSION

FORENSIC NURSING SCIENCE: AN EVOLUTION OF THE GLOBAL FORENSIC SCIENCES

Virginia A. Lynch, *MSN, RN, FCNS, DF-IAFN, DF-AAFS, FAAN*
Certified Professional Instructor in Forensic Science;
Certified Sexual Assault Nurse Examiner;
Diplomate American Board Forensic Examiners

As the science of nursing merged with the forensic sciences and criminal justice systems a distinctive discipline has evolved: Forensic Nursing Science. This emergent science has evolved in response to the consequences of global human violence. Forensic nursing is a dynamic discipline that recognizes human violence and its associated trauma through a contemporary domain of scientific knowledge, health care, human rights, social justice, public health, and evidence-based practice. Due to the global need for expanded health care services worldwide the evolution of forensic nursing has created a previously unrecognized resource for victims of domestic and international terrorism. Historically, the forensic foundations of nursing have long existed. Accordingly, in the 17th century prior to the French Revolution nursing had not yet become a science until Florence Nightingale brought the forensic aspects of nursing to the Crimean War while caring for the wounded and the dead.

Forensic nursing is a science broadly defined as nursing applied to the law, following the long tradition of the forensic medical sciences. Forensic Nurse Examiners (FNE) are health care providers qualified in the examination and evaluation of patients presenting with forensic biomarkers of crime-related trauma, court testimony, and the clinical investigation of questioned deaths. Recent strategies to improve global standards of care for victims of crime, the falsely accused, and those wrongly convicted require specialized knowledge in nursing education: e.g., wound classification, recovery of best specimens for laboratory analysis, forensic imaging of physical findings, and pertinent knowledge of law. These strategies require specialized knowledge in the forensic sciences with application to nursing roles in the health and justice disciplines.

The American Academy of Forensic Science (AAFS) was the first to formally recognized forensic nursing as a scientific discipline in 1991 at the 43rd annual meeting. The AAFS General Section declared the discipline of forensic nursing science eligible for AAFS membership. Their pronouncement stated (in part) "it is proposed that the body of knowledge recognized as the science of forensic nursing consists of a synthesis, reorganization, and or extension of concepts drawn from the basic or other applied sciences that in their reformulation, tend to become new concepts (AAFS). This pronouncement has brought the science of forensic nursing into prominence as a previously unrecognized resource to the forensic medical sciences. The purpose of this expanding discipline is to increase availability of forensic health services globally. In 2020, The AAFS elevated this emergent discipline to the status of a section of its own: The Forensic Nursing Science Section.

EXAMINATION OF THE TIME DEPENDENT VARIATIONS IN SIGNATURES

Özge Genç Sütlü,[1] *Ayşegül Şen Yılmaz[1], Faruk Aşıcıoğlu[1],*

[1]Institute of Forensic Sciences and Legal Medicine, Istanbul University-Cerrahpaşa, Laboratory of Questioned Document Examination

Background and Aims: This study was carried out to determine the changes in signatures over time. Signature is a biometric element consisting of descriptive texts and figures that shows an individual's characteristics. The signature, like handwriting, undergoes some changes over time. These changes may occur due to personal and environmental factors.

Methods: In order to define such changes, a sample group including ten participants was determined and their signatures on timesheets for 1st, 7th, 15th, 30th, 90th, 180th and 360th days were examined. It is expected that some changes may occur in second signatures which are signed at the end of the working day. These signatures were evaluated in terms of "complexity", "speed", "pressure", "deviation angle from the baseline", "aspect ratio" and "special marks" variables.

Results: When the change in signature characteristics in different time period were examined; it was observed that "speed" has decreased while "pressure" has increased (%40) or both have remained constant (%50) for most of the participants. While the "complexity" (%70) and "deviation angle from the baseline" (%90) of the signatures remained constant, "aspect ratio" of signatures in half of the participants tended to remain constant (%50). When the change of the second signature on the same day is also examined, it was observed that the second signatures of four participants had more pressure whereas two participants had less pressure; three participants had a tendency to exaggerate the initial stroke of their signatures; four participants had a tendency to decrease the number of mid characters, six participants had changes in their last figure of their signatures and four participants had similar characters in comparison with first signatures. At the end of the working day, as an expected result of acting in a hurry to catch the shuttle service, an increase in speed and a decrease in pressure were observed in the signature of only one participant.

Conclusions: This study is a preliminary study for more comprehensive studies that are carried out by expanding the sample group and evaluating many factors such as age, gender and professions together.

FORENSIC ENTOMOTOXICOLOGY CASE OF A MUMMIFIED BODY

Yanko Kolev [1,2], *Vasil Atanasov* [3,4]

[1]Department of Forensic Medicine, Medical University of Pleven, Bulgaria
[2]Department of Forensic Medicine, District Hospital MBAL, Gabrovo, Bulgaria
[3] Forensic Toxicology Laboratory, Military Medical Academy, Bulgaria
[4] Faculty of Chemistry and Pharmacy, Sofia University "St. Kliment Ohridski", Bulgaria

Background and aims: Forensic entomotoxicology is a relatively new discipline, which uses the insects as evidence of the presence of xenobiotics in decomposing tissue during an investigation. There is still no practice of such criminal cases involving insects in Bulgaria and we present the first one.

Methods: A body of a woman was found dead and mummified in apartment in the town of Gabrovo. She died 14 months before the discovery of the body. During the crime scene investigation, information about possible time and manner of dead was collected, including some insect evidence - dead and living fly maggots and puparia. A plastic cup of dry greenish substance at the bottom was found on the floor. Autopsy was performed and the evidence was analyzed, together with entomological samples, in forensic toxicology laboratory.

Results: During the medicolegal examination of the body, no evidence of trauma and illness was found, but green coloration around the mouth orifice and dead and living fly maggots in the mouth, oropharynx and near the mouth, together with fly puparia around. The toxicological analysis reported low concentration of zinc and copper in the internal organs and high levels of the same metal ions in fly maggots and puparia from the corpse. Evidence of Cuprozin (combined fungicide containing copper oxychloride and zinc ethylene-bis-dithiocarbamate) was found from the green substance in the plastic cup.

Conclusion: The cause of death in this case was ruled out with the help of entomological evidence. A large amount of Cuprozin was ingested causing acute intoxication and possibly allergic shock, with low levels of the substance in the internal organs. High concentration of the same substance (as metal content) in the insects, feeding from the mouth soft tissues confirmed the mechanism of death. The use of insects for detecting toxins poisons/ xenobiotics/toxic substances in decomposing tissues during death investigation has been demonstrated.

COMPARISON OF DIGITAL EVIDENCE OBTAINED BY DIFFERENT METHODS FROM IOS PHONES SEIZED FROM CRIMESCENE

***İsmail Barbaros*[1],** *Fatma Çavuş Yonar[1],Ömer Karataş[1], Emel Hülya Yükseloğlu[1]*

[1] IstanbulUniversity-Cerrahpasa, Institute of ForensicSciencesand Legal Medicine, Istanbul, Turkiye

Background and Aims: Nowadays people do a lot of daily tasks with their mobile devices so they carry these devices all the time. Daily activities can be recovered from these devices like a digital diary. They can also provide valuable information to investigators in the clarification of forensic events or crimes. The IOS operating system is used in mobile devices developed by Apple and is widely used in Iphone phones. The evidence availability is limited due to the security restrictions of these phones. In our study, we investigated different digital evidence gathering methods of digital forensics and we attempted to determine which method can obtain more evidence and how this methods contribute to the investigations of digital forensic experts.

Methods: Two separate Iphone phone used in our research and one of them was jail broken and the other one is not. And then we installed Discord instant messaging app to interact between two phones. We texted, shared documents, Picture and other different types of files. When we interact between two phones we set up a controlled environment to listen the packets flow through the network and connected the phones to a computer in order to dump the live memory. After the interaction acquisition of the two phones extracted by a forensic software and compared with the other two methods.

Results: Only the memory dump of the jail broken phone could be extracted. It has been observed that there are some prerequisites for the application of all three methods. There were some precautions that forensic experts had to take if an investigation was to be made on the network or if it was necessary to take a memory dump. Investigation on network or extraction of memory dump is quite harder than data extraction from physical image of the Iphones.

Conclusions: Digital forensic experts must have the necessary equipment and competence to intervene in digital evidence when they arrive at the crime scene. If some prerequisites are present, it will be possible to detect very valuable information by listening on the network or extracting the memory dump of the phones.

STABILITY OF MICROBIAL STRUCTURE IN SALIVA AND MIXTURE (SKIN AND SALIVA) SAMPLES OVER TIME

Sukriye Karadayı[1], *Beytullah Karadayı[2]*

[1]Department of Medical Laboratory Techniques, Altınbaş University, Istanbul, Turkey
[2]Department of Forensic Sciences, Cerrahpasa Medical Faculty, Istanbul University-Cerrahpaşa, Istanbul, Turkey

Background and aims: The knowledge that the microbiomes contained in the forensic samples can be used as evidence has been widely accepted in recent years and it is thought that this field will have an important place in the future of forensic sciences. In the investigation of forensic cases, saliva is often a preferred biological sample when compared to other body fluids due to its detectability at the crime scene and ease of collection methods. In cases where traditional DNA methods have limitations, especially in sexual assaults, it is thought that the salivary microbiome may contribute to the solution of the event. However, in order for a biomarker to be used in the solution of forensic identification cases, it must meet some conditions such as maintaining stability of the biomarker over time.

Methods: In this study, it was aimed to investigate the stability of saliva in the mouth and on the skin within 48 hours using new metagenomic analysis techniques. We have collected 40 samples from four healthy couples, including male saliva samples (n = 20) and mixed samples (saliva transmitted on breast skin) (n = 20). It was evaluated microbiota taxonomic profiles of male saliva and female mixed samples. Also, it was investigated whether saliva's taxonomic profiles of microbiota in samples collected from mixed samples of participants. It was examined temporal diversity of the microbiota taxonomic profile of saliva and mixture samples with the use of 16S rRNA gene phylotype. Differentiation between samples was calculated by beta-diversity analysis methods.

Results: Analysis of time-dependent variation in the microbial composition of saliva and mixed samples revealed that within the same individual, the microbiome remained stable or showed very minor changes.

Conclusions: The results of this study show that there is still potential for comparison between the microbial structure of the mixture samples obtained on the victims and the salivary microbiomes of the suspects who may be the perpetrators of the incident, with the use of metagenomic analysis methods, within 48 hours after a sexual assault incident.

Balkan Academy of Forensic Sciences

TATTOOS AND ANTISOCIAL PERSONALITY DISORDER

William Cardasis[1]

[1]St. Mary Mercy Hospital - Livonia, Michigan, USA
Program Director, Psychiatry Residency and Chairman, Department of Behavioral Medicine

Background and aim: The relationship of tattoos to the diagnosis of antisocial personality disorder (ASPD) was explored in a forensic psychiatric inpatient hospital setting. It was hypothesized that a greater proportion of forensic inpatients that possessed tattoos had ASPD than patients who did not possess tattoos.

Method: Forensic male psychiatric inpatients (*N*=36) were administered a semi-structured interview to determine the presence of a tattoo. Antisocial personality disorder (ASPD) was determined by criteria on a DSM-IV ASPD checklist. Demographic and background characteristics of the patients were collected and details about each tattoo were obtained including a calculation of the surface area of each tattoo.

Results: Significantly more forensic psychiatric inpatients with tattoos had a diagnosis of ASPD compared to patients without tattoos. Patients with ASPD also had a significantly greater number of tattoos, a trend toward having a greater percentage of their total body surface area tattooed, and were more likely to have a history of substance abuse than patients without ASPD. Tattooed subjects, with or without ASPD, were significantly more likely to have histories of substance abuse, sexual abuse, and suicide attempts than non-tattooed patients.

Conclusions: Forensic psychiatric inpatients with tattoos should be assessed carefully for the presence of ASPD as well as for substance abuse, sexual abuse, and suicide attempts, factors having potentially significant influence on the assessment and treatment of such patients.

MUTATION SCREENING OF mtDNA IN TURKISH POPULATION

***Ömer Karataş*[1,*], *Havva Altunçul*[1], *Fatma Çavuş Yonar*[1], *Emel Hülya Yükseloğlu*[1]

[1] Istanbul University-Cerrahpasa, Institute of Forensic Sciences and Legal Medicine, Istanbul, Turkiye

Background and aims: mtDNA is often used to identify samples that contain low amounts of DNA or that have been degraded. Although there is only one nuclear DNA in each cell, it is advantageous to work with mtDNA in degraded samples since there are many copies of mtDNA due to high mitochondrial copy. As a result of the literature review, it was determined that the 8389-8865 base pair interval of mtDNA is both free from diseases and suitable for study. The aim of this study is to analyze the sequence of the region between 8389-8865 base pairs in the coding part of mtDNA and examine it in terms of SNP and polymorphism, to determine the mutations in the Turkish population and to determine whether it is suitable for use in forensic sciences.

Methods: The section between 8389-8865 base pairs of the coded region was studied with samples taken from 150 unrelated individuals belonging to the Turkish population. While determining the borders of the examined region, attention was paid to exclude regions related to diseases such as 8344 myoclonic epilepsy, ragged-red fiber, 8363 ataxia and 8993 neurogenic muscle weakness, and 8356 retinitis pigmentosa. DNA isolation was performed using the silica-based Invitrogen Purelink Genomic DNA Mini Kit®. Replication of the study region was performed according to the method of Tzen et al. Sequence analysis of PCR products was performed with the ABI PRISM BigDye Terminator v3.1 Cycle Sequencing Kit.

Results: The studied sequences were compared with the Cambridge Reference Sequence. The discriminatory power of the studied region was 0.923641, random match probability was 0.076359, and the genetic diversity was 0.9303827.

Conclusions: This study shows that the mtDNA regions studied in the Turkish population are highly polymorphic and can be used for identification purposes in forensic sciences. It has been determined that these data can distinguish between individuals with the region we examined, and that these regions can increase the discrimination power by working together with the HVI, HVII, HVIII regions.

CREATININE ANALYSIS FROM ARTIFICIAL VITREOUS HUMOR: A NEW APPROACH FOR LEGAL MEDICINE

***Simge Zengin*[1]**, *Tugba Tekin Bulbul*[1], *Murat Yayla*[1], *Duygu Tarhan*[2], *Alev Meltem Ercan*[2], *Aslı Gok*[3], *Selda Mercan*[1]

[1] Istanbul University-Cerrahpasa, Institute of Forensic Sciences and Legal Medicine, Department of Science, Buyukcekmece, Turkey
[2] Istanbul University-Cerrahpasa, Faculty of Medicine, Department of Biophysics, Fatih, Turkey
[3] Istanbul University-Cerrahpasa, Faculty of Engineering, Department of Chemical Engineering, Avcılar, Turkey

Background and aims: Vitreous Humor (VH), provides information about the pathological condition of the person before death, drug/psychotropic drug uses, chronic/acute alcohol consumption, cause of death, and postmortem interval (PMI) by analyzing the related indicators it contains. Previous studies have shown that the creatinine biomolecule in VH helps both estimation PMI and determination of ante-mortem kidney function.
The aim of the study was to determine the physicochemical properties of artificial-VH (A-VH)' s and to develop analysis methods for creatinine in A-VH by both spectrophotometer and Liquid Chromatography-Tandem Mass Spectrometer (LC-MS/MS). This study also aimed to demonstrate the change in the physicochemical properties and the creatinine concentration in case of contamination of VH with blood during autopsy.

Methods: In this study, four types of A-VH; which represents different age groups; were prepared. Osmolality, surface tension, density, pH, viscosity, and refractive index were measured for each A-VH types and compared with real VH values. In addition, the samples were contaminated with 10% blood and the same physicochemical measurements were conducted. Afterward, quantitative analysis methods were developed to detect creatinine by spiking all VH types by using UV-spectrophotometer and LC-MS/MS systems. In both methods linearity, accuracy, precision, and repeatability parameters were investigated, additionally in LC-MS/MS method; extraction efficiency, recovery, limit of detection (LOD) and limit of quantification (LOQ) parameters were considered as well.

Results: Osmolality, pH and viscosity values of contaminated A-VH were significantly different than non-contaminated ones while density, surface tension, and refractive index values were insignificant. When the developed analysis methods were compared, it was seen that LC-MS/MS method was more advantageous in terms of sensitivity, sample treatment time, injection and sample volume. This is the first study in which an LC-MS/MS method was developed for the analysis of creatinine in A-VH, as well as being the first study in which A-VH was used in forensic sciences.

Conclusions: In this study, 4 different age groups were addressed and a more comprehensive study was conducted than previous studies. In this way, the relation between biological age and physicochemical properties of the VH was revealed for the first time in this study. It is thought that the study will be a pioneer for further researches using artificial VH in forensic sciences and other scientific fields.

THE IMPORTANCE of PHOSPHATIDYLETHANOL (PEth) ALCOHOL BIOMARKER IN FORENSIC SCIENCES- A REVIEW

Fatma Beyza Kula[1], *Dilek Salkım İşlek[1] and Emel Hülya Yükseloğlu[1]*

[1]Istanbul University-Cerrahpasa Institute of Legal Medicine and Forensic Sciences, Istanbul, Turkey

Backgrounds and Aim: Alcohol is one of the important causes of mortality, especially in traffic accidents. Considering alcohol is a significant reason of fatalities in traffic, the amount of alcohol consumed and the exact time of the consumption could enlighten forensic cases and guide the justice system correctly. Alcohol consumption interpretation is a difficult problem due to individuals' alcohol metabolism and parameters such as gender, age. Alternative metabolic products of alcohol has been used to determine the amount of alcohol intake. One of the most interesting alcohol biomarker that is called phosphatidylethanol (PEth) has caught attention due to its long half-life and not being affected from sex, liver diseases or age; in addition to being only synthesized under the presence of ethanol. PEth is a highly sensitive and specific biomarker compared to its counterparts. PEth has been a reliable biomarker for chronic alcohol consumption as well as for determining social and moderate drinkers' alcohol intake. The aim of this review is to present a general overview on PEth alcohol biomarker in forensic sciences, its potential use and its limitations.

Methods: Studies conducted from 2010 to 2021 are searched through Google Scholar and Pubmed to summarize the clinical use of PEth biomarker for social, moderate and chronic drinkers.

Results: The most prominent homologues of PEth are PEth 16:0/18:1 and PEth 16:0/18:2 which can be detected in heavy and social drinkers. The half-life of PEth can be up from 4 days up to 12 days. Alternative sampling methods of PEth with Dried Blood Spots (DBS) could also offer advantages over whole blood sampling and proved to be reliable.

Conclusions: PEth is an alcohol biomarker that can be used for heavy and social drinking. Further kinetic studies should be conducted such as PLD enzyme activity, PEth precursors and PEth elimination rates for the interpretation of PEth homologues correctly.

Balkan Academy of Forensic Sciences

BALKAN ACADEMY OF FORENSIC SCIENCES

12TH ANNUAL SCIENTIFIC MEETING

24 - 26 SEPTEMBER 2021.

POSTER PRESENTATIONS

Balkan Academy of Forensic Sciences

BALKAN ACADEMY OF FORENSIC SCIENCES

12TH ANNUAL SCIENTIFIC MEETING

24 - 26 SEPTEMBER 2021.

POSTER SESSION I

POSTER SESSION I

DETECTION OF DIFFUSE AXONAL INJURY IN FORENSIC PATHOLOGY. THE USEFULNESS OF IMMUNOHISTOCHEMISTRY

***Chrysavgi Kousi*[1],** *Antigony Mitselou[1], Evangeli Lampri[2], Stavroula Papadodima[3], Fotios Chatzinikolaou[4], Vassiliki Galani[5].*

1 Department of Forensic Medicine and Toxicology Health Sciences, School of Medicine, University of Ioannina. Greece
2 Department of Pathology Health Sciences, School of Medicine, University of Ioannina. Greece
3 Department of Forensic medicine and Toxicology Health Sciences, School of Medicine, University of Athens. Greece
4 Department of Forensic Medicine and Toxicology, Health Sciences, Medical School, Aristoteleio University of Thessaloniki, Greece
5 Department of Anatomy, Histology, Embryology, Health Sciences, School of Medicine, University of Ioannina Greece.

Background: Traumatic brain injury (TBI) is one of the leading causes of mortality and morbidity. The pathology of TBI is complex and multifactorial. The key component of TBI pathophysiology is traumatic axonal injury (TAI), commonly referred to as diffuse axonal injury (DAI). DAI is a considerable cause of death in medico-legal autopsies and is imperative to detect axonal damage with a reliable and low-cost technique.

Aim: DAI is difficult to detect using conventional techniques such as H&E staining, which can identify the axon injury after 24 h, but an immunohistochemical technique that uses b-APP allows identification of damaged axons a 2-3 h after TBI. On the other hand, astrocytes are considered key cells in initiating the process of repair after injury. We also investigated the expression of GFAP and S-100B protein to understanding the mechanisms of reactive gliosis either protective or reparative that could help to determine the extent of damage after TBI.

Materials and methods: Total fifty human brains (49 with fatal closed head injuries and one control) were included in the study. We used immunohistochemical techniques to investigate the expression of beta-amyloid precursor protein (β-APP), glial fibrillary acidic protein (GFAP) and S-100B protein in white matter of parasagittal region, corpus callosum and brainstem, to identify the axonal injury and astrogliosis.

Results: Diffuse axonal injury (DAI) was found in 26 (53.06%) cases, assessed with β-APP immunohistochemical staining in parasagittal white matter, corpus callosum and brainstem. GFAP was detected in 48.9% of the cases and S-100B was observed in 46.9% of the cases studied. A statistically significant correlation was found between β-APP immunostaining in the regions studied in relation to survival time ($p<0.002$, $p<0.003$ and $p<0.005$ respectively). A statistically positive correlation was noted between GFAP and S-100B immunoreactivity in the study regions to reactive gliosis ($p<0.003$).

Conclusions: The present study demonstrated that β-APP is a reliable marker in evaluating the patterns of axonal injury in the daily practice of forensic medicine and GFAP and S100B are indicators of astrocytosis, and can predict mortality, recovery, outcome and intracranial lesion.

HEMATOPOIETIC NEOPLASMS. AN AUTOPSY STUDY IN THE REGION OF EPIRUS – NORTHWESTERN GREECE

*Antigony Mitselou[1], **Chrysavgi Kousi[1]***

[1]Department of Forensic Medicine and Toxicology, Medical School, University of Ioannina – Greece.

Aim: Postmortem examination may reveal clinically unsuspected disorders such as hematopoietic neoplasms. Lymphoma is a major cause of morbidity and it is the 7th leading cause of death in cancer patients. In this study we aim to review autopsy cases performed at our institution in the past 21 years, with an ante-mortem or post-mortem diagnosis of hematopoietic neoplasms (HN).

Materials and methods: This study was performed in the department of Forensic Medicine and Toxicology at the University of Ioannina Medical School of Medicine and autopsy records from the last 21years (1998–2019) were searched for a diagnosis of hematopoietic neoplasms personal archives of one of the authors). All cases and available medical records were reviewed, and the following parameters were recorded: age, gender, clinical presentation, available laboratory findings and imaging (including CT scan). Hematopoietic disorders included leukemia, lymphoma type and grade: (low grade B-cell lymphoma, high grade B-cell lymphoma, classical Hodgkin, and T-cell lymphoma), extent of involvement by lymphoma, the presence of hepatosplenomegaly, enlarged lymph node and bone marrow involvement, and the cause of death.

Results: A total of 51 patients with a diagnosis of HN were identified (0.93% out of 5442 autopsies). Out of these cases, 7 were diagnosed with lymphoma and leukemia ante-mortem. The cases included 12 females (33.5%) and 39 males (76.5%), with varying ages from 29 to 90 years (mean age: 59,7 years). The post-mortem new diagnosed cases were as follows: Nine cases were B-cell lymphoma, 5 cases were T-cell lymphoma, 10 Hodgkin' s lymphomas, 5 myeloma multiple, 4 plasmacytoma, 5 MALT lymphoma, 2 myelodysplastic syndrome, 1 myelohyperplastic syndrome, 2 intravascular lymphoma and 1 lymphoma of the skin. Most B-cell lymphoma patients had lymph node involvement, while T-cell lymphoma patients had widespread multi-organ involvement with no overtly enlarged lymph nodes. The most common cause of death in B-cell lymphoma was opportunistic infection (pneumonia), while most T-cell lymphoma deaths were due to multi-organ failure from widespread lymphoma.

Conclusions: This series of cases further confirms that traditional autopsy remains a reliable tool in elucidating accurate diagnoses but also identifying previously unknown diagnoses. Hematologic malignancies may present with nonspecific clinical manifestations and death is mainly attributed to disease, disease progression, toxicity from therapy, infections or co-morbid conditions.

EXPRESSION OF OREXIN-A (HYPOCRETIN-A) IN THE HYPOTHALAMUS AFTER TRAUMATIC BRAIN INJURY. A POSTMORTEM EVALUATION

Chrysavgi Kousi[1], *Antigony Mitselou[1], Evangeli Lampri[2], Fotios Chatzinikolaou[3], Stavroula Papadodima[4], Vassiliki Galani[5]*

1 Department of Forensic Medicine and Toxicology Health Sciences, School of Medicine, University of Ioannina. Greece
2 Department of Pathology Health Sciences, School of Medicine, University of Ioannina. Greece
3 Department of Forensic Medicine and Toxicology, School of Medicine, Aristoteleion University of Thessaloniki. Greece
4 Department of Forensic Medicine and Toxicology, Medical School University of Athens, Greece
5 Department of Embryology, Histology and Anatomy, University of Ioannina, Greece

Background: Traumatic brain injury (TBI) is one of the leading causes of mortality and morbidity in developed countries. The key component of TBI pathophysiology is traumatic axonal injury (TAI), commonly referred to as diffuse axonal injury (DAI). Coma is a serious complication which can occur following traumatic brain injury (TBI). Recently, studies have shown that the central orexinergic/ hypocretinergic system exhibit prominent arousal promoting actions.

Aim: The purpose of this study is to investigate by immunohistochemistry the expression of beta-amyloid precursor protein (β-APP) in white matter of parasagittal region, corpus callosum and brainstem and the expression of orexin-A (ORXA) in the hypothalamus after traumatic brain injury.

Results: DAI was found in 26 (53.06%) cases, assessed with β-APP immunohistochemical staining in parasagittal white matter, corpus callosum and brainstem. Orexin-A immunoreactivity in hypothalamus was completely absent in 5 (10.2%) of the cases; moderate reduction of ORXA was observed in 9 (18.4%) of the cases; and severe reduction was observed in 7 (14.3%) of the cases. A statistically significant correlation was found between β-APP immunostaining in white matter, corpus callosum and brainstem in relation to survival time ($p<0.002$, $p<0.003$ and $p<0.005$ respectively). A statistically positive correlation was noted between ORX-A immunoreactivity in hypothalamus to survival time ($p<0.003$). An inverse correlation was noted between the expression of β-APP in the regions of brain studied to the expression of ORX-A in the hypothalamus of the cases studied ($p<0.005$).

Conclusions: The present study demonstrated by immunohistochemistry that reduction of orexin-A neurons in the hypothalamus, involved in coma status and arousal, enhanced the immunoexpression of β-APP in parasagital white matter, corpus callosum and brainstem. Further studies are needed to investigate the relation between Orexin-A and coma in patients after TBI.

SUDDEN DEATH DUE TO A CYSTIC LESION IN THE CEREBELLUM. A CASE REPORT

***Chrysavgi Kousi*[1], *Antigony Mitselou*[1]

[1]Department of Forensic Medicine and Toxicology, Medical School University of Ioannina - Greece

Introduction: Sudden death from an undiagnosed primary intracranial neoplasm is an exceptionally rare event, with reported frequencies in the range of 0.02% to 2.1% in medico-legal autopsies. Pilocytic astrocytomas comprise approximately 5-6% of all gliomas, without a gender predilection. Preferred sites of localization include the optic nerve, the thalamus and basal gaglia, cerebral hemispheres, cerebellum and brain stem. Pilocytic astrocytomas are soft, grey, and intra- or paratumoral cyst formation is common.

Case presentation: A 24-year-old man had been found unconscious in bed at home. He was rushed to the emergency department of the General Hospital of Corfu, but he died at his admittance. Approximately 1 month before his dead, the patient had consulted a doctor complaining of headache, neck pain, dizziness, nausea and ataxia.

A forensic autopsy was conducted the day after the patient' s death. Externally, no significant injury was found. Internally, the heart was of normal size and configuration with no evidence of anomaly, while the lungs showed mild to moderate congestion and pulmonary edema. With exception of the brain, the remaining organs were apparently healthy, with no evidence of macroscopic pathology. The brain weighed 1570 g and showed diffusely cerebral edema and swelling. The coronal sections of the cerebrum showed moderate enlarged lateral ventricules. The axial sections of the cerebellum and brain stem showed a 6.2x6.ox3.4 cm cystic cavity in the right cerebellar hemisphere and a midline shift from right to left. The medulla oblongata was distorted because of transforaminal herniation. The cyst was filled with clear yellow fluid. The inner wall of the cyst was smooth, an a round tumor-like lesion was found (1.2x1x1 cm) in the anterolateral wall of the cyst. Microscopically, the tumor lesion consisted of elongated and/or atractoid neoplastic cells in bundle arrangement (piloid cells) with mixoid and mucoid background, with a highly monomorphic appearance, and scanty Rosenthal fibers. The tumor cells infiltrate the white matter of the cerebellum. The cells are strongly glial fibrillary acid protein (GFAP) immunopositive. Focal hemorrhages and necrosis were found in cerebellar and brain stem parenchyma.

Conclusion: The autopsy revealed a large cyst in the right cerebellum hemisphere, moderate hydrocephalus and transforaminal herniation. We conclude that the cause of death was attributable to the brain stem compression which was caused by obstructive hydrocephalus secondary to the mass effect of the cyst due to pilocytic astrocytoma.

AN UNUSUAL CASE OF RAPID DECOMPOSITION IN A HOUSE SETTING

Martina Tkalčić[1], *Petar Škavić[1], Anita Galić Mihić[1], Vedrana Petrovečki[1]*

[1]Institute of Forensic Medicine and Criminalistics, School of Medicine, University of Zagreb, Zagreb, Croatia

Background: Determining postmortal interval is one of the most challenging tasks of forensic pathologist due to the variety of factors that influence the changes of the body after death and the speed at which they occur. Factors that can affect the speed of decomposition include, among others, heat, humidity, presence of insects and scavenger animals.

Case report: A 70-year-old man was found dead on 15th August in his home lying on the bathroom floor. At the scene of death partial skeletisation of the upper body was already present with an abundance of larvae, while the lower body expressed only mild putrefaction changes. Further examination of the scene, particularly the bathroom, showed bloodstains in form of splashing on the mirror above the sink and pooling in the sink. Right next to the sink there was a roll of paper towels, also blooded. The rest of the house showed no signs of struggle. Inspection of medical records showed that the deceased had laryngeal cancer with a permanent tracheostomy. Further examination of the body at autopsy showed the skeletal frame of the upper body with mostly missing inner organs or their parts in a late putrefaction stage. Organs of the abdominal cavity showed mild putrefaction changes. No injuries were detected.

Discussion: The last undeniable contact the deceased had was established by the police to have been 4 days prior to finding his body. The windows in the living room and bathroom were opened and supposedly neighbors had seen cats coming and going.

Conclusion: Although the cause of death could not be determined the rapid partial skeletisation was explained by the high temperatures in August, possible blood present in the neck and upper thoracic region (probably due to bleeding from the tracheostomy orifice), and probable activity of the cats.

A CASE OF AUTOEROTIC DEATH BY HANGING IN COMBINATION WITH PICTOPHILIA

*Metodi Goshev[1], Alexandar Alexandrov[1], Biliana Mileva[1], Ivan Tsranchev[2], **Pavel Timonov[2],** Antoaneta Fasova[3]*

[1]Department of forensic medicine and deontology, Medical University-Sofia, Bulgaria
[2]Department of forensic medicine and deontology, Medical University-Plovdiv, Bulgaria
[3]Department of anatomy, histology and embryology, Medical University-Plovdiv, Bulgaria

Background: Autoerotic asphyxia is lethal outcome of a person while performing a solitary sexual activity by using different methods intending to reduce the oxygen supply to the body and to induce cerebral hypoxia with the result – increasing of the sexual gratification. Such cases are extremely rare.

Case presentation: In the spring of 2021, the dead body of a 26-years-old man was found in his apartment. The mother stated that she saw a scarf sticking out from the outer side of the entry door and when she opened the door, she saw her son fell on the floor with ligature encircling the neck made by a cotton scarf and towel and tied to the door.

Results: The forensic examination of the body at the crime scene showed livor mortis on the anterior surface of body with intensive bluish color. Protrusion of the tongue and body fluids around penis, resembling semen was found. The external examination revealed a well-defined ligature mark over the neck, with an oblique direction, situated above the thyroid cartilage. No other external traumatic injuries were found. The internal examination of the lungs and brain showed severe congestion and edema with few petechial hemorrhages of the white matter. Over the lungs and epicardium pinpoint hemorrhages were found, and the blood was dark red and liquid. Histology of internal organs showed edema of brain and lungs, corresponding to the cause of death - asphyxia. The chemical analysis of blood showed no alcohol or any drug concentrations.

Conclusions: In cases of sexual asphyxia, hanging by ligature, the crime scene investigation plays a crucial role in determining the type of asphyxia and the manner of death. Lack of adequate and appropriate information about the specific findings at the crime scene can lead to serious expert mistakes. Such cases could be mistaken for ligature strangulation with homicidal manner or hanging with suicidal manner of death. These expert diagnostic mistakes could lead to investigative and law-related negative consequences.

LABORATORY ANALYSIS OF USED ORAL FLUID DRUG TESTING ON-SITE DRÄGER DEVICES

Silviya Stoykova[1,2], ***Vasil Atanasov***[1,2]

[1] Forensic Toxicology Laboratory, Military Medical Academy, 3, St. G. Sofiiski str., 1606 Sofia, Bulgaria
[2] Laboratory of Biocoordination and Bioanalytical Chemistry, Department of Analytical Chemistry, Faculty of Chemistry and Pharmacy, Sofia University "St. Kliment Ohridski", 1, J. Bourchier blvd., 1164 Sofia, Bulgaria

Background and aims: According to the Bulgarian law, the roadside testing for drugs of abuse (DoA) should be performed in oral fluid (OF) using an immunoassay screening kit - Dräger DrugTest 5000 or Dräger DrugCheck 3000. If the screening is positive, confirmation has to be done in blood. In case of driver' s denial to give such sample, result based on preliminary testing should be accepted. However, in some cases the judiciary demand to evidence these results.

Methods: In the present work, 109 on-site testing cartridges were submitted for confirmatory analysis. OF collector was transferred into test tube and was treated with mix of deionized water, methanol and 1M hydrocloric acid in equal amounts (total volume 6 mL). After sonication (20 min), 2 mL 1M sodium hydroxide was added and an extraction with 7 mL ethylacetate was carried out. The detection of DoA was performed by GC-MS and the laboratory results obtained are compared with those of preliminary roadside testing.

Results: The prevalence of confirmed positive samples for tetrahydrocannabinol, amphetamine/ methamphetamine, cocaine and opiates were 37, 46, 33 and 40%, respectively. These results might vary widely due to unclear storage condition (time and temperature; usually more than a month at room temperature) and type of collection device. Except cross-reaction or combined drug use, the mismatching results could be due to degradation of the substance concerned and/or to adsorption on the plastic tip of the collector device. GC-MS analysis of used testing devices, preliminary positive to DoA, confirms the results in more than 50% of cases when the corresponding roadside test was administrated in laboratory up to 2 months after initiatory testing.

Conclusions: In conclusion, a fast and simple procedure for analysis of DoA in OF specimen collected from on-site immunological screening kit was used. However, difficulties in such confirmation analysis should be better evaluated before the implemention.

DETERMINATION OF OLANZAPIN IN HAIR BY LIQUID CHROMATOGRAPHY TANDEM MASS SPECTROMETERS (LC-MS/MS) METHOD

Merve Oka[1], Murat Yayla[1], Tugba Tekin[1], Merve Kuloglu[1], ***Zeynep Turkmen[1]***

[1]Institute of Forensic Sciences and Legal Medicine, Istanbul University-Cerrahpaşa

Introduction: Olanzapin, one of the atypical antipsychotic drugs, is often prescribed not only in adults but also in young people. Especially sudden heart deaths, decreased seizure threshold levels in epilepsy make the olanzapine important in forensic toxicology. For this reason, analytical methods for the determination of olanzapin from keratinized samples such as hair and nails are needed.

Aim: The purpose of analytical method validation is to confirm that an analytical method can achieve reliable and reproducible results for the specified purpose. An unreliable analytical result has no any value. In this study, a fast and inexpensive method was validated with LC-MS / MS, to provide significant benefits in the exclusion of olanzapine toxication in forensic cases.

Material and Methods: In order to understand the hair matrix effect with before spike and after spike; 9 repeat experiments with olanzapine at a concentration of 1 ng / mL were carried out.

Results and Discussion: In the study, the linear range of olanzapin with ten-point calibration solution was determined as 0.1-100 ng/mL. The correlation coefficient in this range was R^2= 0.9994. The LOD and LOQ values was determined as 0.36 ng/mL and 0.39 ng/mL, respectively. According to after spike data in the hair sample was determined as 81.80±.2.97% at a concentration of 5 ng/mL (Middle point). According to these experiments, recovery results of before spike (58.5%) decreased approximately by half compared with recovery results of after spike (91.6%). The change in the samples analyzed by a 7-day break was 0.0054% for stability study. Since this value remains below 1%, the stability of the method developed has thus been proven.

Conclusion: Although studies have been carried out to determine the active ingredient of olanzapine from other biological samples, there is no any study for the detection of olanzapin from hair sample. Therefore, the contribution of this study to the literature is considered to be important.

SEXUALITY, SCIENCE AND FORENSICS IN CRIME REALITY SHOWS

Taner Güven[1], *Sotiri Kalfoglou*[2 3]

[1]Medical Faculty, Istanbul Science University
[2]Forensic Sciences Laboratory Istanbul Yeni Yuzyıl University, Istanbul, Turkey
[3]Institute of Forensic Medicine and Forensic Sciences, İstanbul University-Cerrahpaşa, İstanbul, Turkey

Background and aim: Today, national television channels are still an effective communication media watched by millions of people in Turkey. "Reality Shows" on these channels receive very high interest from the audience Murder, fraud and sexual assault/cheating cases are included.
Scientists from different disciplines such as forensic medicine specialists and lawyers participate in the live broadcast as expert witnesses. In this study our aim is to draw attention to the importance of scientific communication in television by opening up the issues of sexual crime and murder, in a "Reality Show" program.

Material and method: The material of the presentation will be based on two cases that were included in the shows. The analysis will be based on the effect of the programs for the delivery of justice.
Case1: The dead body of a 12-year-old girl was found severely wounded in her house in 04/01/2001. The perpetrator was not found for 20 years. Following a reality Show episode, it was found that the step mother and the father were the murderers and they were sentenced following the criminal investigation and the court decision.
Case 2: A 42-year-old mother applied to a reality Show to report the loss of her daughter. She was just 18 years old and she was missing for 6 days. The mother had 3 children, and presently she was living with her boyfriend. The investigation that was done by the Show revealed that the young girl was together with the boyfriend of her mother and that they were officially married.

Discussion: The burden of an unsolved murder to the relatives of the victim and to the society is very heavy. While the relatives of the victim have to deal with severe psychological problems, the sense of trust in the society is damaged. The resolution of the cases is realized in most of the cases via reality shows thanks to the correct scientific communication established with the public. In any case the scientific advisors of these shows and specifically the forensic scientists play a pivotal role. To conclude, the Public Science Communication which is the main activity of these shows should always be carefully obeyed. Otherwise, the harm that it creates may be greater than its benefit.

Balkan Academy of Forensic Sciences

TUMORS OF THE CENTRAL NERVOUS SYSTEM - AN AUTOPSY STUDY PREVALENCE IN THE REGION OF EPIRUS – NORTHWESTERN GREECE

*Antigony Mitselou[1], **Chrysavgi Kousi[1]***

[1]Department of Forensic Medicine and Toxicology, Medical School, University of Ioannina, Greece.

Background: Although most fatal tumors are diagnosed well before a patient' s death, occasionally forensic pathologists encounter cases in which the presence of a primary tumor of the central nervous system (CNS) had not been suspected prior to death. Sudden death from an undiagnosed primary intracranial neoplasm is an exceptionally rare event, with reported frequencies in the range of 0.02% to 2.1% in medico-legal autopsy series.

Aim: A search for cases of sudden death due to intracranial tumors from a total of 5442 autopsies from the archives of the Department of Forensic Pathology, University of Ioannina, Greece, in the period 1998-2019, was undertaken. The specimens were fixed in 10% neutral-buffered formaldehyde and embedded in paraffin. The paraffin blocks were stained with hematoxylin and eosin and the use of Envision method immunostainins. The following antibodies were examined: CKAE1/3, anti-GFAP, anti NSE, anti-chromogranine, CD56, LCA, EMA, Vimentin, anti-p53 and anti-Ki67.

Results: A total of 17 patients with a diagnosis of primary tumors of the CNS were identified (0. 3% out of 5442 autopsies). Out of these cases, 5 were diagnosed ante-mortem. The cases included 6 females (35.5%) and 11 males (64.5%), with varying ages from 24 to 82 years (mean age: 52,7 years). The post-mortem cases were as follows: Nine cases were meningiomas, 3 cases were astrocytomas, 3 cases were oligodendrogliomas, 1 case was glioblastoma multiforme and 1 case was extraventricular neurocytoma according to the World Health Organization' s classification.

Conclusion: Autopsy is still definitive in determining the exact location, topography, mass effects and histology of brain tumors. The most common explanation of the mechanism of sudden death due to intracranial neoplasms is a rapid increase in intracranial pressure produced by the mass effect of the neoplasm. Other mechanisms of death include acute intracranial and intratumoral hemorrhage, and benign neoplasms that grow in the vicinity of vital centers altering neural discharge in autonomic pathways leading to cardiac suppression or lethal arrhythmia. Forensic pathologists must keep in mind that sudden unexpected death caused by intracranial tumors although extremely rare, may be encountered in the forensic setting.

Balkan Academy of Forensic Sciences

UNEXPECTED NEOPLASMS. AN AUTOPSY STUDY IN THE REGION OF EPIRUS – NORTHWESTERN GREECE

Antigony Mitselou[1], ***Chrysavgi Kousi***[1]

[1]Department of Forensic Medicine and Toxicology, Medical School, University of Ioannina, Greece.

Aim: The forensic autopsy affords unique opportunity to study not only death of violent causes but also diagnosed and treated trauma, disease, and cancer, and the natural evolution of untreated cancer as well. Clinically occult cancer is not uncommon and may eventually present clinically or at autopsy in unusual fashion. Advanced cancer may, sometimes on initial presentation, be responsible for sudden, unexpected death. In this study we aim to review autopsy cases performed at our institution in the past 21 years, with an ante-mortem or post-mortem diagnosis of malignant neoplasms (MN).

Materials and methods: This study was performed in the department of Forensic Medicine and Toxicology at the University of Ioannina Medical School of Medicine and autopsy records from the last 21years (1998–2019) were searched for a diagnosis of malignant neoplasms (personal archives from one of the authors). All cases and available medical records were reviewed, and the following parameters were recorded: age, gender, clinical presentation, available laboratory findings and imaging (including CT scan). We excluded brain tumors and hematopoietic neoplasms from the study.

Results: A total of 375 patients with a diagnosis of MN were identified (6.9% out of 5442 autopsies). The cases included 126 females (33.6%) and 249 males (66.4%), with varying ages from 27 to 96 years (mean age: 61.5 years). The incidence of malignant diseases increased with age. The malignant tumor was the cause of death in 201 cases (3.7%) of the total autopsied subjects. The most frequent cause of death was the lung cancer (145 cases). Other locations of malignancies less frequently found were as follows: thyroid gland (134 cases), liver (12 cases), colon (7), stomach (6), pancreas (11), kidney (8), endometrium (8), ovary (10), breast (6), and 9 cases of mesothelioma. In 97 cases, widespread tumor with metastases was identified as an immediate cause of death. The most common cause of death was infection/sepsis, embolism, cardiac failure, bleeding.

Conclusions: This series of cases further confirms that traditional autopsy remains a reliable tool in elucidating accurate diagnoses but also identifying previously unknown diagnoses. This study (similar to studies performed previously) reiterates the value of the autopsy as an auditing tool for diagnostic accuracy. Autopsies remain relevant even after the first decade of the 21st century.

HISTOPATHOLOGY FINDING OF HEART DAMAGE CAUSED BY HYPERTHERMIA-ANIMAL MODEL

Emina Dervišević[1], *Mirsad Dorić[2], Sabaheta Hasić[3], Svjetlana Radović[2], Nermin Sarajlić[1], Adis Salihbegović[1]*

[1]Department of Forensic Medicine, Faculty of Medicine, University of Sarajevo, Sarajevo Bosnia and Herzegovina
[2]Department of Pathology, Faculty of Medicine, University of Sarajevo,Sarajevo, Bosnia and Herzegovina
[3]Department of Medical Biochemistry, Faculty of Medicine, University of Sarajevo

Introduction: An increasing number of deaths in the world are caused by hyperthermia and often require forensic expertise, which includes macroscopic and microscopic analysis.

Objective: To examine whether the intensity of myocardial pathohistological changes in Wistar rats exposed to hyperthermia was related to the temperature that caused the hyperthermia and to classify the degree and type of cardiomyocyte damage.

Material and methods: The study was conducted on 40 adult Wistar rats that were methodologically divided into three experimental groups, depending on water temperature exposure of 37 ° C (KG, n = 8), 41 ° C (G41, n = 16) , and 44 ° C (G44, n = 16). Depending on the length of time of exposure to water temperatures of 41 ° C and 44 ° C are further divided into G41-AM, G41-PM, G44-AM and G44-PM. A heart sample for pathohistological analysis was taken by sacrifice. Morphological-descriptive (qualitative analysis) and semiquantitative analysis of the myocardium was performed using light microscopy, with the Hematoxylin-Eosin staining method.

Results: Pathohistological analysis determined the usual structure of the myocardium of controlled group of rats with gentle and degenerative changes and changes that are nonspecific for hypertemia in cardiomyocytes of rats exposed to water temperatures of 41 ° C and 44 ° C. The type of rat myocardial changes in groups G41 and G44 was classified as minimal and multifocal degenerative changes (G41: 45.25%; G44: 51.6%) which was significantly more expressed compared to myocardial control groups ($p < 0.0005$) .
The analysis of the extent of the changes revealed damage to individual cardiomyocytes in all groups (33%) and multiple damage to cardiomyocytes (50% in G41, 44.4% in G44), $p = 0.109$).

Conclusion: The severity of pathohistological changes in the heart increased with increasing temperature and length of exposure. The dynamics of the development of morphological changes in cardiomyocytes did not show high significance, which is attributed to the time required for the development of pathohistological changes as well as the insensitivity of the myocardial staining technique that was used.

BALKAN ACADEMY OF FORENSIC SCIENCES

12TH ANNUAL
SCIENTIFIC MEETING
24 - 26 SEPTEMBER 2021.

POSTER SESSION II

POSTER SESSION II

COMPREHENSIVE METHOD VALIDATION OF CAFFEINE AS AN ANTHROPOGENIC MARKER IN SURFACE WATER BY LC-MS/MS

Yeliz Arpacik[1,2], *Tugba Tekin Bulbul[1], Merve Kuloglu Genc[1], Gulten Erbas[2], Selda Mercan[1]*

[1] Istanbul University-Cerrahpasa, Institute of Forensic Sciences and Legal Medicine, Department of Science, Buyukcekmece, Turkey
[2] Istanbul-1 Public Health Laboratory, Department of Chemistry, Zeytinburnu, Turkey

Background and aims: Caffeine is one of the most widely used pharmaceutics. Previous studies have shown that caffeine is preferred as an anthropogenic marker on surface waters to indicate only human activities due to the stability in water samples. Stabile characteristic and to indicate only human activities make caffeine a significant biomarker for wastewater-based epidemiological (WBE) analyses. WBE studies have been started by detecting cocaine in surface waters and today it continues to be applied in evaluations related to public and environmental health. Therefore, it is important to develop a fast and reliable analytical method for caffeine in surface water. The aim of the study was to validate a comprehensive method for caffeine in surface water with high precision, accuracy, recovery and low quantification limit.

Methods: A Liquid Chromatography- Tandem Mass Spectrometry method was generated; validation parameters such as selectivity, analytical sensitivity, limit of detection (LOD) and quantification (LOQ), linearity, precision, accuracy (trueness) and robustness were studied. Tap water samples were enriched with caffeine and solid phase extraction (SPE) recovery was evaluated.

Results: Calibration curve was acquired in linear form with 0.997 correlation coefficient. 0.165 ng/mL and 0.548 ng/mL measured as LOD and LOQ levels respectively. Repeatability studies were found <10% RSD. Accuracy (trueness) values were between 87-109% in different days and at different concentrations in the range of 0.5-100 ng/mL. Following validation, three tap water samples were enriched with 50 ng/mL in 50 mL caffeine and solid phase extraction recovery was found as 93.3%. All relative uncertainties were combined for combined relative uncertainty and expanded relative uncertainty. The expanded relative uncertainty of the method was calculated as 0.21 at the 95% confidence interval.

Conclusion: This is the first comprehensively developed and validated method to detect caffeine in surface waters with high precision, accuracy and recovery. Further studies including metabolites of caffeine should be conducted to extend the method; which can be easily applied to wastewater to monitor human dynamics of the region with evaluating previous WBE studies.

GEOGRAPHICAL INFORMATION SYSTEM BASED SPATIAL ANALYSIS OF TRAFFIC ACCIDENTS IN ISTANBUL

Zeynep Turkmen[1], *Emre Kayabasi[1], A. Ozgur Dogru[2], Hızır Aslıyuksek[1], Faruk Asicioglu[1]*

[1]Istanbul University-Cerrahpasa, Institute of Forensic Sciences and Legal Medicine, 34500, Hadımkoy Campus, B. Cekmece, Istanbul, Turkey
[2] Istanbul Technical University, Geodesy and Photogrammetry Department, 34469 Maslak, Istanbul, Turkey

Introduction: Hundreds of thousands of people die because of traffic accidents in the world. It is of great importance to identify these areas where accidents occur more frequently based on fast and firm data. It has become necessary to identify the hot spots and take essential preventions.
With the developments in spatial information technologies, Geographic Information Systems (GIS) is becoming more and more widespread in spatial evaluations of forensic events. GIS is a collection of software, hardware and applications used to capture, archive and process spatial data, to reveal new information about the data through analysis of these data and to present the information studied with maps and graphs.

Aim: The aim of this study is to determine the hot spots of traffic accidents in Istanbul and to create a data analysis reports from the traffic reports generated by the Istanbul Traffic Specialization Department in Council of Forensic Medicine (January 1, 2017 - December 31, 2017).

Material and Methods: The data sets were created using Microsoft Office Excel program, taking into account the temporal data, spatial data, daylight conditions, weather conditions, accident type and the characteristics of the data related to the accident result, which were stated in the reports.

Result and Discussion: The distribution of the data sets, results, analyzes on the map created with the mentioned materials and methods are given in detail in this presentation. Accident investigation reports with 11162 files across the Turkey have been prepared and 1568 (14.04%) accidents occurred within the provincial borders of Istanbul (Fig 1).

Conclusion: This system is considered to be advantageous in terms of being fast to obtain the correct information, providing data storage and revealing the whole picture in a striking way.

Balkan Academy of Forensic Sciences

CASES OF FORENSIC MEDICAL AUTOPSY MALPRACTICE

Maria Grozeva[1], ***Rossen Hadjiev***[1], *Georgi Gergov*[1]

[1]Multifunctional Hospital for Active Treatment 'Losenetz', Department of Forensic Medicine

Background and aims: Misinterpretation of post-mortem artefacts could lead to serious suspicion about the cause and manner of death. Histological examination should be considered for accurate forensic diagnosis.

Methods: A 79-year-old woman (1.) and a 76-year-old man (2.) were found dead with no traumatic injuries established. Autopsies requested by the relatives were performed.

Results: (1.) No visible traumatic injuries of the neck area were established. Cyanosis was found as well as spotty haemorrhagic infarcts on the posterolateral aspect of the neck. The internal examination revealed fracture of the right horn of the hyoid bone and the thyroid cartilage, haemorrhages in the surrounding soft tissue, dark liquid blood, spotty haemorrhagic infarcts under the pleurae, haemorrhages on the right side of the neck next to the mandibular angle. No material was collected for histological processing. It was concluded that the cause of death was mechanical asphyxia due to strangulation. A re-autopsy confirmed the fracture of the horn of hyoid bone and haemorrhage surrounding the fracture and ahead of the horn of thyroid cartilage. Opening of the coronary arteries in the neck revealed severe sclerosis with occasional ulcerations. Despite the advanced post-mortem changes, the histologic examination confirmed ischemic stroke and a large pervious myocardial infarction on the anterior wall of the left ventricle.
(2.) No visible traumatic injuries of the neck area were established. The internal examination revealed no fracture of the hyoid bone or its horns, and no hemorrhages in the surrounding tissues. A fracture of the right horn of thyroid cartilage with no displacement was found, with a limited dark-reddish suffusion on the tissues around the fracture. Point-like hemorrhages on the pleura were found. Opening of the coronary arteries and the aorta revealed multiple atherosclerotic plaques with ulcerations.
A mechanical asphyxia due to strangulation was pronounced the cause of death.
Additional histological examination was ordered which revealed that the cause of death was lobular confluent pneumonia and a myocardial infarction due to atherosclerotic lesions as a complication of a plaque disruption. The fractured horn of thyroid cartilage was an artefact as not performing the section of the neck organs in-situ but removing them outside the corpse and thus breaking the horn unintentionally.

Conclusions: Incorrect autopsy technique was used, incomplete autopsy was performed on the neck organs, hemorrhage was mistaken for suffusion. Homicide as the cause of death was indisputably ruled out and the forensic conclusion was inaccurate.

EVALUATION OF VIOLENCE-RELATED GENES IN TERMS OF FORENSIC SCIENCES IN KICKBOXING ATHLETES

Buse Sabiha Bozaslan[1], *Emel Hülya Yükseloğlu[2], Ümit Şakir Zeybek[3], Fatma Çavuş Yonar[2], Ömer Karataş[2]*

[1] Uskudar University, Vocational School of Health Services, Istanbul, Turkey
[2] Istanbul- Cerrahpaşa Unversty, Instıtute of Forensic Sciences and Legal Medicine, Istanbul, Turkey
[3] Istanbul University, Aziz Sancar Institute of Experimental Medicine, Department of Molecular Medicine, Istanbul, Turkey

Background and aims: Research on aggressive behavior has shown that; their genetics and the environment they live in are held responsible for the variability of aggressive attitude among individuals. Dopamine and serotonin, which are chemicals produced in the human body, are metabolized by monoamine oxidase (MAO-A), and it is known that this pathway has an important effect on the determination of personality traits. Studies have shown that there is an inverse relationship between blood levels of 5-hydroxyindolacetic acid (5-HIAA), the main metabolite of serotonin, and aggressive behavior and tendency to violence. It was planned to obtain a meaningful result by examining the variations of MAO-A, COMT, 5-HTT, 5HT1A, TPH1 and TH genes, which are known to be related to the behavioral characteristics of individuals.

Methods: From this point; MAO-A (Monoamine Oxidase A), COMT (Catechol-O-methyltransferase), 5-HTT (Serotonin Transporter), 5HT1A (Serotonin 1A Receptor), TPH1 (Tryptophan Hydroxylase 1), and TH (Tyrosine Hydroxylase) genes which exist in the literature and are known to be related to behavioral characteristics of individuals were examined in samples taken from individuals and it was planned to obtain a meaningful result. Within the scope of the study, it was planned to collect samples from licensed athletes who were engaged in 20 Kick Boxing sports and actively working in this branch. Mouth swab samples obtained after obtaining consent from each of the athletes were included in the study.

Results: The results of the study will be published later. In addition, the basis of the study will be determined by showing the concrete reflections of the effects of genes on behaviors with the statistical data obtained.

Conclusions: In this context, an analysis based on the genetic basis of the phenomenon of violence in terms of forensic sciences has been made to determine how the said genes in athletes affect people in terms of behavior and the results will be shared later.

DNA-ANALYSIS OF MIXED TRACE EVIDENCE AND KINSHIP DETERMINATION USING THE Y Filer Plus™ PCR AMPLIFICATION KIT FOR Y-CHROMOSOME IDENTIFICATION

*Iliev Plamen[2], Mirchev Bogdan [2], Peev Kamen[2], Georgieva Mihaela [2], Angelova Ekaterina[2], Djeliova Vera [3], Hristov Atanas[1,2], **Apostolov Aleksandar[1,2]***

[1] Department of Forensic medicine and Deontology, Medical University, Faculty of Medicine, Bulgaria.
[2] Clinic of Forensic medicine and Deontology- University Hospital "Alexandrovska", Sofia, Bulgaria.
[3]Vera Djeliova, Institute of Molecular Biology "RoumenTsanev", Department of the Molecular Biology of the Cell Cycle, Bulgarian Academy of Sciences, Bulgaria.

Background and aims: In expert practice, Y chromosome analysis is an excellent method for detecting male DNA presence in mixed traces, for identifying unknown men or for establishing kinship. The goals of the research were to identify the minimal male component in mixed biological samples, as well as to identify unknown deceased men or to determine genealogical relationships.

Methods: DNA isolation - AutoMate Express Forensic DNA Extraction System. DNA assessment via Real-Time PCR system 7500 with Quantifiler ™ Trio DNA Quantification Kit. SimpliAmp PCR ™ Thermal Cycler. DNA profiles for Y chromosome STR´s markers with Yfiler ™ Plus PCR Amplification Kit and for autosomal STRs with NGM Detect ™ PCR Amplification Kit. KE of 3500 Series Genetic Analyzers for Human Identification (Life Technologies), computer analysis of Gene MapperTM v1.2 Full Software, for HID analysis.

Results: Usually in the analysis of mixed traces containing female and male genetic material, the female component prevailed quantitatively in the analysis of autosomal genetic markers. Additional alleles suggestive of a complex male genetic profile were also reported. We took a direct amplification approach using the 25 Y chromosome markers contained in the Yfiler ™ Plus PCR Amplification Kit, thus directly eliminating the female component by deriving Y chromosome profiles in the mixed sample.
To identify deceased individuals, referring to the genealogical determination for the transmission of Y chromosomal information in a direct male line, we used comparative samples from presumed uncles and cousins.

Conclusions: Y chromosome analysis is a successful method for detecting the presence of male DNA in mixed traces or excluding a subject as a male cell donor. After numerous studies, we confirmed the benefit of sequential use of primary autosomal STRs analysis and secondary Y-STRs test, and in some cases direct Y chromosome determination is justified.

CASE OF FATAL MESENTERIC THROMBOSIS DUE TO MISSED DIAGNOSIS FORENSIC DATA REVIEW

Rossen Hadjiev[1], *Margarita Tankova*[1], *Georgi Gergov*[1]

[1]Multifunctional Hospital for Active Treatment 'Losenetz', Department of Forensic Medicine

Background and aims: Mesenteric thrombosis occurs when blood flow to the intestines is compromised from a clot leading to tissue necrosis (intestinal infarction). This is life-threatening condition that requires emergency medical attention. Diagnosis is challenging to identify in early stages because the symptoms may be associated with a variety of abdominal pathologies.

Methods. Case report: An 80-year-old man was diagnosed with a pertrochanteric fracture due to falling inside a bus. A successful operation was performed, and the patient was moved to a rehabilitation center for palliative cares. Two weeks after the accident symptoms occurred: poorly localized abdominal pain, diarrhea, bloated abdomen, difficult palpation, nausea. The patient was hospitalized for active treatment, a diagnostic testing was performed but died in two days. The laboratory results indicated an ongoing generalized infection and increased coagulation markers. Abdominal ultrasound examination and computed tomography were performed with non-specific imaging data for acute abdomen. The autopsy revealed that the cause of death was multiple organ failure as a result of mesenteric thrombosis, intestinal infarction and diffuse peritonitis.

Results: In this clinical case, in addition to the development of mesenteric thrombosis, an object of interest is the possible connection of the received blunt force trauma to the disease development, the delayed diagnosis of the process and respectively its properly treatment. The neglected data from the examination and presence of clinical symptoms as well as not-performed laparoscopic exploration are an omission of the physician.

Conclusions: With an autopsy performed the forensic medical specialists made the conclusion that there is no causation between the accident and the cause of death. The patient' s medical history included myocardial infarction, atherosclerosis, hypertension, dyslipidemia, and chronical kidney disease, which were additionally aggravating factors to the lethal outcome.
Each clinical case should be managed particularly and in considering to the patient's specific heath conditions. This ensures reliability for the absence of medical malpractice and an unfavorable outcome for the patients. It is a mandatory condition for implementing a good clinical practice.

AN UNUSUAL CASE OF SUICIDE BY SAFETY RAZOR BLADE

***Anton Mažuranić*[1]**, *Marija Baković*[1], *Pero Bubalo, Davor Mayer*[1]

[1]Institute of Forensic Medicine and Criminalistics, School of Medicine, University of Zagreb, Zagreb, Croatia

Background: Suicide by cutting has become a rare method of suicide in modern times. Majority of suicidal incision wounds are found on the wrists, elbows or the neck. Here we present an unusual case of suicidal cutting.

Case report: The deceased was a 78-year-old female with a history of depressive disorder, dementia and Parkinson' s disease. She was found dead, sitting on a chair in a shed, with both of her feet in a paint bucket filled with blood. Upon emptying the bucket, forensic team found a razor blade on the bottom of the bucket. Main autopsy finding were transverse incision wounds on both lower legs with cut superficial veins and cut great saphenous vein of the left leg. The cause of death was exsanguination.

Discussion: The victim used a rare method of suicide. Cuts were made by a rare instrument and were made in an unusual location. Altogether, the manner of the suicide was unusual.

Conclusion: Findings on the scene and autopsy findings point towards suicide. The suicide was carried out methodically, with premeditation and in an orderly way.

UNWANTED PREGNANCIES AMONG MENTALLY DISABLED WOMEN: THE ALBANIAN CASUISTIC

*Elmas Shaqiri[1], Bledar Xhemali[1], Tefta Shaqiri[2], **Gentian Vyshka[3]***

[1]Institute of Legal Medicine, Ministry of Justice in Tirana, Albania
[2]Laboratory Department, German Hospital, Tirana, Albania
[3]Faculty of Medicine, University of Medicine in Tirana, Albania

Introduction: Mentally disabled women (MDW) might easily become preys of sexual predators due to a variety of reasons. Being more vulnerable, they are as well largely unable to denounce the fact and to request appropriate legal support. All this is related to cognitive, linguistic and communicative handicaps.

Case description: The criminal acts were perpetrated within an Albanian care center for mentally disabled persons. The issue was brought to public attention from mass media and received a wide coverage. The repetitive offences were initially uncovered from an investigative journalist team. By that time the situation was almost out of control, with three allegedly criminal abortions that were practiced in total secrecy from the staff of the center, without being declared nor consented from otherwise three pregnant women suffering from profound mental disabilities. In three separate events, three victims – all MDW, inmates of the center – were forced to perform secretly involuntary abortions. The first case, H.A., aging 37 years at the time of abortion, was allegedly forced to abort in August 2012. In September 2013 another woman was forced to perform involuntary abortion; G. A. at that time aged also 37 years old. In an otherwise unspecified period of time, probably between August-October 2014, a third woman was secretly forced to involuntarily terminate her pregnancy; G.S. at that time aged 36 years old. The first two cases allegedly had a pregnancy which was terminated at the fifth month; the third woman had the pregnancy interrupted unlawfully at the sixth month.

Discussion: Once alleged, or when little doubt remains so to charge or indict any responsible for the crime, the investigating team needs of course the expertise of forensic experts. Data gathering will produce the necessary evidence in courts of law. As shown from the three cases of MDWs in the center where the crimes and the investigation took place, the misdeeds might be concealed for a long period of time, before any suspicion, intervention and corrective measures will be taken. A diversity of factors contributes to such a structural failure, among which societal abandonment and prejudice toward mentally disabled people; but the legal and judicial system needs its own reflections aiming at a better knowledge of this setting, leading to a prompter and therefore a more successful response once the facts are proven.

CHROMATOGRAPHIC DETERMINATION OF VARENICLIN IN PLASMA AND URINE OF PATIENTS UNDER SMOKING CESSATION TREATMENT

***Siti Rahmawati*[1],** *Tugba Tekin[1], Merve Kuloglu[1], Sermin Borekci[2], Bilun Gemicioglu[2], Zeynep Turkmen[1]*

1 Institute of Forensic Sciences and Legal Medicine, Istanbul University-Cerrahpaşa, Büyükçekmece Campus, Alkent 2000, 34500, B. Çekmece / Istanbul
2 Department of Pulmonary Medicine, Istanbul University— Cerrahpasa, Istanbul, Turkey

Introduction: Smoking cessation is known as one of the best ways to protect our health. A program to support smoking cessation has recorded 2.283.871 applications between 2009 January 1st – 2018 September 30th and administered free Nicotine replacement therapies; Varenicline (Champix®, Pfizer) and Bupropion (Zyban®, GlaxoSmithKline) to 893.041 participants.
In recent studies, Varenicline is found to be associated with neuropsychiatric disorders such as behavior changes, depression, hostility and suicidal thoughts just like recalled Zyban.

Aim: The analytical studies of Varenicline by using LC-MS/MS are mostly aimed at determining the impurity of the dosage form. The present study proposes the development and validation of Varenicline in plasma and urine sample using LC-MS/MS with a fast, specific, easy, low detection limit, high repeatability and high recovery method.

Material and Methods: The developed method was then applied to the plasma and urine samples of 16 patients currently receiving smoking cessation treatment at Smoking Cessation Polyclinic, Department of Chest Disease, Cerrahpasa Medical Faculty.

Results and Discussion: The LOD and LOQ was found respectively 0.36 ng/mL and 0.46 ng/mL for plasma; 0.29 ng/mL and 0.50 ng/mL for urine. The correlation coefficient between the ranges was found to be R^2=0.9971 for plasma; R^2= 0.9944 for urine. The percentage recoveries from spike plasma samples were found 129.68±5.73% at 10 ng/mL concentration and from spike urine samples were found %107.31±3.73 at 10 ng/mL. The repeatability of plasma was defined at 3 different concentrations with 6 samples; at 2 ng/mL the average was 2.31±0.063 ng/mL with RSD 6.3, at 10 ng/mL the average was 10.73±0.035 ng/mL with RSD 3.5, at 50 ng/mL the average was 56.80±0.02 ng/mL with RSD 2.0.
According to the developed method, Varenicline concentration was found at the range of 15.5-60.1 ng/mL in the plasma; and 0.7-3.22 ng/mL in the urine samples of 12 patients.

Conclusion: The developed LC-MS/MS method is a more efficient method for the determination of Varenicline in urine and serum samples.

NANOSCIENCE AND FORENSIC GENETICS

*Fatma Çavuş Yonar[1], **Ömer Karataş[1,*]**, Itır Erkan[2], Emel Hülya Yükseloğlu[1]*

[1] Istanbul University-Cerrahpasa, Institute of Forensic Sciences and Legal Medicine, Istanbul, Turkiye
[2]Istanbul Yeni Yuzyil University, Faculty of Health Sciences, Istanbul, Turkiye

Background and aims: In the processing of material crime evidence, which is an important element in determining the relationship between the victim or the victim and the perpetrator, in obtaining consistent and reliable scientific evidence, lots of countries are making necessary studies to benefit from nanotechnology in almost every field of forensic science. Therefore, in our study, it is aimed to raise awareness about the applicability of nanotechnology in research and techniques to be used both at the crime scene and in the laboratory in the field of forensic genetics.

Methods: In this study, the current situation in the applicability of nanoscience in the field of forensic genetics was examined by reviewing the literature; It has been tried to reveal how nanotechnology will serve interdisciplinary fields such as forensic genetics and forensic sciences in the future.

Results: With the help of nanotechnology, more sensitive and selective methods are developed in the formation of forensic expert reports and in the analysis of evidence, thus producing highly efficient nano-kits used in the experimental process. In bioseparation and purification applications, microparticles are replaced by nanoparticles because they have a high surface/volume ratio. Magnetic nanoparticles are becoming an increasingly popular technique for isolating biomolecules such as proteins, DNA and RNA separately from their environment. Today, nanotechnology-based tools have been developed that can be used to directly read the DNA sequence in a molecule.

Conclusions: With the continuous development of nanotechnology, forensic scientists will encounter various kinds of evidence at the nanoscale in the future. As researchers examine this nanostructured evidence, they may raise the following questions: How can I properly examine this type of evidence? Is this nano-evidence toxic to me? If it is toxic, how can I protect myself and my colleagues? In order to answer these and similar questions, forensic scientists should have more knowledge in nanotechnology-related fields.

GENETIC EVALUATION OF ANTISOCIAL PERSONALITY DISORDER IN CRIMINAL TENDENCY

*Fatma Çavuş Yonar[1], **Ömer Karataş[1]**, Dilek Salkım İşlek[1], Emel Hülya Yükseloğlu[1]*

[1] Istanbul University-Cerrahpasa, Institute of Forensic Sciences and Legal Medicine, Istanbul, Turkiye

Background and aims: Antisocial personality disorder (ASPD) is defined in the literature as "a widespread and persistent disregard for and violation of the rights of others". ASPD may include disregard for social norms and laws, fraud, inability to control impulses, irritability/aggression, disregard for the safety of others, irresponsibility in both family and social life, frequent delinquency, psychoactive substance use, and lack of remorse. There are studies in the literature that ASPD may have genetic origins. In our study, it was aimed to emphasize the genetic factors underlying ASPD.

Methods: In this study, a literature review was conducted on the subject and information about the genetic origin of ASPD was tried to be revealed.

Results: The two most likely serotonergic genes expected to be associated with ASPD are the neurotransmitter serotonin (SLC6A4, 5-HTT), which governs serotonin presynaptic reuptake, and monoaminoxidase (MAOA), which degrades serotonin into presynaptic and post-synaptic. Variations in these genes have been investigated in previous studies in terms of their relationship with autism, depression, alcoholism, obsessive-compulsive disorder (OCD), ASPD and other mental disorders. As a result of these studies, strong evidence has been found that these variations have an effect on some mental disorders. SLC6A4, the serotonin transporter gene associated with many mental disorders, is the least studied of these genes.

Conclusions: It is a known fact that individuals with ASPD are prone to crime. Research on this is carried out on individuals diagnosed with ASPD who have been convicted of various crimes, detained or tried without detention. In these studies, it is aimed to reveal the relationship between the variations in the related genes and the tendency to crime in individuals with ASPD. It is predicted that the determination of the genes and polymorphisms that play a role in this disorder separately for each population will be of great importance in the early diagnosis of this disorder.

GENDER DETERMINATION BASED ON FORAMEN MAGNUM USING GEOMETRIC MORPHOMETRIC METHOD

***Zurifa Ajanović*[1]**, *Aida Sarač-Hadžihalilović[1], Lejla Dervišević[1], Emina Dervišević[1], Adis Salihbegović[1], Nermin Sarajlić[1]*

[1]Medical faculty, University of Sarajevo, Čekaluša 90, 71 000 Sarajevo, Bosnia and Herzegovina

The foramen magnum is an important topographic opening which connects cranial cavity and spinal canal. The analysis of the bone material established that there are differences in the shape of the foramen magnum between individuals. The aim of this study was to determine gender based on shape and size of foramen magnum using geometric morphometric method.

Material and methods: Study was performed on three-dimensional models (3D models) of 214 human skulls of known sex and known age (141 male skulls and 73 female skulls). The skulls are located at the museum of Medical Faculty, University of Sarajevo. Skulls belong to Bosnian population from the mid-twentieth century. All examined skulls were scanned with a laser scanner to obtain their 3D models. On 3D models of the examined skulls, four landmarks were marked on foramen magnum. Analysis of gender determination was performed using the MorphoJ program.

Results: Results of this study showed that there are gender differences in the shape and size of the foramen magnum. Gender determination based on the shape and size of the foramen magnum was showed 65.25% accuracy for male and 63.01% accuracy for female using geometric morphometric method. Examination of the effect of size of foramen magnum on sexual dimorphism of shape of foramen magnum showed a statistically significant effect. Gender determination based just on shape of foramen magnum using geometric morphometric method was possible with 62.41% accuracy for male and 58.90% accuracy for female on examined sample.

Conclusion: Gender differences on shape and size of foramen magnum were found using geometric morphometric method on three-dimensional models of the examined skulls. The percentage of accuracy was higher for male based on the shape and size of the foramen magnum than for female.