



BALKAN ACADEMY OF FORENSIC SCIENCES

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ABSTRACT BOOK

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16th Annual Scientific Meeting
Abstract Book

Editors:

Bledar Xhemali
Mirnela Koçibelli

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Balkan Academy of Forensic Sciences 16th Annual Scientific Meeting Abstract Book 2025

Edited by Bledar Xhemali, Mirnela Koçibelli

2025

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With heartfelt gratitude to Professor Ersi Kalfoglou for her visionary leadership, unwavering dedication, and tireless efforts in laying the strong foundations of Balkan Academy of Forensic Sciences and guiding it to new heights of excellence and international recognition.

Bledar Xhemali

Detailed Scientific Program

Wednesday, October 08, 2025

Venue: Mak Albania Hotel

09:00 - 17:00	Registration
10:30 - 11:00	OPENING CEREMONY – Hall A Bledar Xhemali, Conference President, Albania Besfort Lamallari, Minister of Justice, Albania Ersi Kalfoglou, President of BAFS, Türkiye Nermin Sarajlic, Co-President of BAFS, Bosnia and Herzegovina Yanko Kolev, Board of Directors, Bulgaria Peter Vanezis, Honorary President of BAFS, United Kingdom
11:00 - 11:30	PLENARY SESSION – Hall A Duarte Nuno Vieira Professor of Forensic Medicine Forensic Sciences Ethics and Medical Law University of Coimbra, Portugal Quality Assurance and Quality Control in Forensic Pathology Services and the ECLFM Accreditation Program
11:30 – 11:50	Hall - A Invited Speaker: Mohammed Ranavaya Professor Occupational, Environmental and Disability Medicine Associate Dean, CME Joan C. Edwards School of Medicine Marshall University, West Virginia, USA Mastering the Courtroom: Core Cognitive and Medicolegal Skills for Forensic Experts

11:50 – 13:05	FORENSIC PATHOLOGY SESSION – Hall A Chairs: Ljubisa Jovan Dragovic & Ralph Bouhaidar
11:50 - 12:05	Is There a Role for Forensic Pathologist in Personalized Medicine and Preventing Sudden Cardiac Death? <u>Stefano D’Errico</u>, Davide Radaelli, Monica Concato, Riccardo Addobbati, Djordje Alempijevic, Tijana Petrovic, Zlatko Jakovski, Viktorija Belakapovska, Anita Galic Mihic, Dragan Primorac, Emina Dervisevic, Chaido Spiliopoulou, Tomaz Zupanc, Karin Writzl Nina Vodnjov, Ersi Abaci Kalfoglou Italy
12:05 - 12:20	The Silent Cry of Young Hearts: An Autopsy Case Report on the Sudden Death of Three Young Men <u>Ferat Buran</u> Türkiye
12:20 - 12:35	The Truth Beneath the Surface <u>Martina Tkalčić</u>, Slavica Martinović, Anton Mažuranić, Marija Baković Croatia
12:35 - 12:50	Evaluating the Use of C5b-9 Immunohistochemistry in Detecting Acute Myocardial Infarction in Postmortem Examinations <u>Puhan Liu</u>, Sajeel A. Shah, Nikolas P. Lemos United Kingdom
12:50 - 13:10	Hall - A Invited Speaker: Kristina Lee Cellmark Forensic Services, United Kingdom Cellmark’s Specialist Forensic Services: Forensic Archaeology and Anthropology in the UK and beyond (Sponsored by Eurofins TMFI)
13:10 - 14:00	Lunch Break

14:00 – 14:20	Hall - A Invited Speaker: Elif Günçe Eskiköy Regional Forensic Manager- Europe and Central Asia International Committee of the Red Cross Humanitarian Aspects of Forensic Identification: Families' Right to Know
14:20-15:20	HUMANITARIAN FORENSICS SESSION- Hall A Chairs: Elena Kranioti & Duarte Nuno Viera
14:20-14:35	Challenges in The Identification Process of Missing Persons in Kosovo: Legacy of Early Post-War Practices and the Continuing Burden 26 Years Later <u>Ditor Haliti</u> , Musa Gashi, Naim Uka, Valon Hyseni, Agron Thaqi, Flamur Blakaj Kosovo
14:35- 14:50	The Evidence of the Holocaust on Romanian Territories by Mass Graves <u>Carmen Simona Ionescu</u> , Irinel Rotariu, Ligia Barbarii Romania
14:50 - 15:05	Migrant Deaths on the Passage <u>Gregor Haring</u> , Laura Božič Slovenia
15:05 - 15:20	Enhancing Forensic Dental Identification with the Anatomage Table: A Novel Approach <u>Emilio Nuzzolese</u> , Corrado Calì, Giancarlo Di Vella Italy
15:40- 17:45	FORENSIC BIOLOGY AND GENETICS SESSION - Hall A Chairs: Emilio Nuzzolese & Zlatko Jakovski
15:40-15:55	Revised Crime Scene to Court Process, Enabled by Fast DNA Process <u>Bjarne Maas</u> Netherlands

15:55-16:10	Postmortem Evaluation of APO E, BDNF, and GFAP Levels in the Cerebrospinal Fluid of Suicide Cases <u>Esra Erbak Eser</u> , Mehmet Tokdemir Türkiye
16:10-16:25	Forensic Applications of Tissue-Specific Methylation in Lung Cancer <u>Meryem Ebedi</u> , Ömer Karataş, Nazlı Hölümen, Elif Canpolat, Erdal Mehmet Aksoy, Emel Hülya Yükseloğlu Türkiye
16:25-16:40	Missed Prenatal Diagnosis of Beckwith-Wiedemann Syndrome <u>Anton Samarxhiu</u> Albania
16:40-16:55	A Meta-Analysis on the Principles and Applications of CRISPR-CAS Technology in Judicial Processes <u>Nigar Altınoğlu</u> , Buse Sabiha Bozaslan Türkiye
16:55-17:10	Aligning ISO 21043 and ISO 17025 for End-to-End Quality in Forensic Genetics Ömer Karataş, <u>Elif Canpolat</u> , Meryem Ebedi, Nazlı Hölümen, Emel Hülya Yükseloğlu Türkiye
17:10-17:30	The Unexpected Witness <u>Irina Streba</u> , Alin Capilnean, Diana Bulgaru Iliescu, Madalina Diac Romania
20:00	WELCOME RECEPTION

Thursday, October 09, 2025

Venue: Mak Albania Hotel

09:00 – 09:20	Hall - A Invited Speaker: Nikolas P. Lemos Professor of Forensic Medical Sciences & Director of Cameron Forensic Medical Sciences Barts and The London School Medicine and Dentistry, Queen Mary University of London, United Kingdom Pediatric Forensic Postmortem Toxicology: Children Are Not Small Adults	
09:20 – 10:50	FORENSIC TOXICOLOGY SESSION Hall A Chairs: Ashraf Mozayani & Vasil Atanasov	CRIMINALISTICS SESSION Hall B Chairs: Emel Hülya Yükseloğlu & Sheila Willis
09:20 - 09:35	Challenging the Reliability of Back Calculation in Blood Alcohol Testing: A Comparative Study of Immunochemistry and GC-MS in Forensic Practice Yakup Gidon, Gavril Petridis, A. Şefik Köprülü, <u>Ersi Kalfoglou</u> Türkiye	Modular System Within Death Investigation <u>Jeroen Kroll</u> Netherlands
09:35- 09:50	Comparative Ethanol Concentrations in Blood and Vitreous Fluid <u>Sasha S. Karkada</u> , Sajeel A. Shah, Nikolas P. Lemos United Kingdom	Stages of Criminal Investigation <u>Neculai Zamfirescu</u> Romaina
09:50 - 10:05	Specimen Collection in Postmortem Toxicology: A Comparative Review of UK and USA Best Practice Standards <u>Sajeel A. Shah</u> , Nikolas P. Lemos United Kingdom	Microstamping in Firearm Identification: Performance, Challenges, and Implementation Perspectives Aylin Yalçın Sarıbey, <u>Asude Nur Algül</u> Türkiye

10:05 - 10:20	A Rapid, Multi-Analyte LC–MS/MS Method for Urine Analysis <u>Amvrosios Orfanidis</u> , Dimitra Florou, Vassiliki A. Boumba Greece	Post-Fire Detection of Gasoline Residues After 37 Days: Application of a SPME-GC/MS Method in a Controlled Arson Scenario <u>Mihriban Dilan Kılıç</u> , Merve Kuloğlu Genç, Murat Yayla, Selda Mercan Türkiye
10:20 - 10:35	Self-Immolation with Flammable Substance: A Forensic Case Analysis <u>Bledar Xhemali</u> , Blerim Peli, Zana Bruci, Mirnela Koçibelli, Gentian Vyshka Albania	Determination of Time-dependent Deformation in Fabrics Soaked in Water Samples Taken from the Sea of Marmara and the Mediterranean Sea Using Spectrophotometric and Hyperspectral Method <u>Şevval Pınar Erboğan</u> , Alihan Kocabaş Türkiye
10:35 - 10:50	High Anion Gap Metabolic Acidosis (HAGMA) in the ICU: A Decade of Toxicological Overview Ali Haspolat, Nurşen Tanrıku, <u>Ali Şefik Köprülü</u> , Ersi Kalfoglou Türkiye	
11:00-12:50	PANEL "The Judiciary System and Forensic Sciences in Dialogue" Speakers: Bledar Xhemali Chara Spiliopoulou Gentian Vyshka Ilir Rusi Mirnella Kocibelli Mohammed Ranavaya Ulsi Manja	
13:00-14:00	Lunch Break	

14:00 – 14:20	Hall – A Invited Speaker: Ashraf Mozayani Department of Administration of Justice, Texas Southern University, USA Bridging ISO 21043 Standards and Forensic Toxicology: Advancing Accuracy in Death Investigation	
14:20 – 15:50	FORENSIC TOXICOLOGY SESSION Hall A Chairs: Heessun Chung & Nikolas Lemos	FORENSIC PSYCHIATRY SESSION Hall B Chairs: Calin Scripcaru & Marta Garazdiuc
14:20 - 14:35	The Emerging Role of Forensic Science and Forensic Toxicology in Addressing PFAS Contamination and Exposure Gavril Petridis, Emrah Eroğlu, <u>Ersi Kalfoglou</u> Türkiye	Review of Preteen Suicides – Child Death Review Committee of Oakland County, Michigan <u>William Cardasis</u> , Ljubisa Dragovic USA
14:35- 14:50	A Retrospective Study of Drug Related Deaths During 2020 – 2024 in Albania <u>Zana Bruci</u> , Mirnela Kocibelli, Zija Ismaili, Elton Serani, Bledar Xhemali Albania	The Impact of Cognitive Load on Deceit Detection and Memory Recall in Children's Interviews: A Meta-Analysis <u>Sevilay Çankaya</u> , Ahmet Demirden Türkiye
14:50 - 15:05	Retrospective Analysis of Cocaine Presence in Postmortem Samples in the City of Zagreb, Croatia (2018–2024) <u>Tajana Mraović</u> , Marina Nestić Croatia	Examination of the Relationship Between Antisocial Behavior Psychopathic Tendencies and Childhood Mental Trauma Experiences in the Adult Male Offenders Convicted of Physical and Sexual Violence <u>Mehlika Beyza Önal</u> , İtir Tarı Cömert Türkiye

15:05 - 15:20	Blurred Lines: Distinguishing Between Xylazine and Fentanyl Overdose in a Clinical Setting <u>Katerina M.H. Constantinou-Hickman</u> , Sajeel A. Shah, Nikolas P. Lemos United Kingdom	Evaluation of Psychopathy Tendencies in Individuals Aged 12-18 in Terms of Criminal Thinking Tendency <u>Cagla Cavusoglu</u> , Buse Sabiha Bozaslan Türkiye
15:20 - 15:35	Current Status of the Quality Management System in Forensic Laboratories Performing Drug Analysis in Türkiye <u>Rukiye Aslan</u> , Duygu Yeşim Ovat, Serap Annette Akgür Türkiye	Borderline Personality Disorder and Crime: Corelation and Stigmatization <u>Foteini Manousaki</u> Greece
15:35 - 15:50	Contributing Factors of Citalopram-Associated Fatalities <u>Puhan Liu</u> , Sajeel A. Shah, Nikolas P. Lemos United Kingdom	Cognitive Flexibility and Extremism the Mediating Roles of Conspiracy Beliefs and Fake News Detection Ability <u>Özlem Kalafat</u> , <u>Sevilay Çankaya</u> , Hatice Demirbaş Türkiye
15:50-16:00	Investigation of Four Methanol Intoxication Cases Who Were Admitted to a Training and Research Hospital in Istanbul: Case Series <u>Serbülent Kılıç</u> , Eren Sert, Burak Kaya, Buğra Balkan, Utku Murat Kalafat Türkiye	
16:00 – 16:20	Hall - A Invited Speaker: Heesun Chung Professor of Forensic Science SungKyunKwan University, South Korea AI's role in enhancing forensic toxicology or drug testing	

16:20 – 17:35	CLINICAL FORENSIC MEDICINE SESSION Hall A Chairs: Garyfalia Ampanozi & John Clark	QUESTIONED DOCUMENTS SESSION Hall B Chairs: Hakan Kar & Magdi Kharoshah
16:20 - 16:35	Integrated Software for Monitoring, Diagnosis and Prevention of Sudden Cardiac Death in the Balkan Region <u>Zlatko Jakjovski</u> , Viktorija Belakaposka Srpanova, Natasha Bitoljanu, Goran Pavlovski, Ljupcho Cakar, Ana Ivcheva, Sasho Risteski, Aleksandar Stankov, Stefano D'errico, Radaelli Davide, Monica Concanto, Darko Cvetkovski, Emilija Iakinska, Kristijan Stojanovski, Aleksandar Mazni, Nada Lazovska, Djordje Alempijevic, Tijana Aćimović, Aleksa Lekovic, Anita Galić, Emina Dervišević, Tomaž Zupanc, Chara Spiliopoulou, Ersi Kalfoglou, Milica Keckarevic-Markovic, Dusan Keckarevic, Mary Sheppard, Nina Vodnjov, Karin Writzl, Robert Janevski, Aneta Aleksova, Lidija Popovska, Michaud Katarzyna, Yanko Kolev, Hakan Kar North Macedonia	Handwriting Examination for Nationality Attribution: Analysis of English Writing Style of Vietnamese Individuals <u>Siddharth Dangi</u> , Mohinder Pal Sachdeva India
16:35- 16:50	Sudden Cardiac Deaths in Forensic Practice During 2022 <u>Erindo Alla</u> , Idlir Frasheri, Elton Serani, Linda Matua, Blerim Peli, Bledar Xhemali Albania	Examination of Various Paper Samples with Different Inks Burned in Different Ways by Destructive and Non-Destructive Methods <u>Burcu Büyüközer</u> , Alihan Kocabaş, Zekai Genç Türkiye

16:50 - 17:05	Particular Aspects of Medical Communication in Clinical Forensic Medicine: From Challenges to Good Practice <u>Bianca Hanganu</u> , Oana Maria Isailă, Gabriela Crăciun, Beatrice Gabriela Ioan Romania	Can We Agree on Terminology beyond Handwriting? <u>Erich J. Speckin</u> , Anthony A. Milone USA
17:05 - 17:20	Medico-Legal Evaluation of Two Botox Intoxication Cases Presented to the Judiciary <u>Melike Erbaş</u> , Okan Matkap, Mehmet Özbay, Yasemin Balcı Türkiye	The Role of Standardized Sampling in Forensic Document Examination: A Case-Based Evaluation from Türkiye <u>Alpaslan Kuzucuoglu</u> Türkiye
17:20 - 17:35		The Ultimate Forensic Approach for Determining the Source of Color Laser Printouts <u>Ahmad Saed Abdel Monsef Salim</u> Egypt

Friday, October 10, 2025

Venue: Venue: Mak Albania Hotel

09:00 – 09:20	Hall - A Invited Speaker: Kurt Trübner Institute of Legal Medicine, University Hospital Essen, Germany The Importance of Neuropathological Examination in Forensic Medicine	
09:20 – 10:50	FORENSIC PATHOLOGY SESSION Hall A Chairs: Eva Montanari & Mohammed Ranavaya	CRIMINOLOGY SESSION Hall B Chairs: Anita Galić Mihić & William Cardasis
09:20 - 09:35	A Case of Domestic Dispute I - Accident or Homicide? Michigan vs Mark Unger <u>Ljubisa Dragovic</u> USA	Assessment of Public Awareness of Forensic Science Through the Influence of TV Programs <u>Aybüke Ayer</u> , Buse Sabiha Bozaslan Türkiye
09:35- 09:50	Subdural Hemorrhage in Hanging Deaths, a Retrospective Case Control Study <u>Omar Baadheem</u> , Magdy Khroshah, Dalia al-Saif Saudi Arabia	Colour Changing Cars and Their Impact on Eye Witness / Digital Camera Testimonies <u>Kazim Hilmi Or</u> Germany
09:50 - 10:05	Analysis of Fatal Cases of Falls/Jumps from Height <u>Jozef Šidlo</u> , Ján Šikuta, Dana Mikulášová, Ľuboš Nižnanský, Roman Kuruc Slovak Republic	Iris Biometrics as an Irreversible Identifier: Ethical and Governance Implications <u>Astha Sachdeva</u> , Anamika Gulati, Pooja Kataria India
10:05 - 10:20	Diffuse Axonal Injury - a Distinct Clinicopathological Entity in Closed Head Injuries <u>Natasha Davceva</u> , Balazic Joze North Macedonia	Combating Peer Bullying in Türkiye: Insights From Scandinavian Models <u>Melda Yazıcıoğlu</u> , Aylin Yalçın Sarıbey Türkiye

10:20 - 10:35	Virtual Thorax Dissection: Revolutionizing Forensic Education and Training <u>Efsevia Daskalaki</u> , Despoina E Flouri, Eirini Chasapi, Elena F Kranioti, Asterios Leonidis, George Papagiannakis, Stratos Geronikolakis, Antonios Papadomanolakis Greece	Transnational Investigations on Encrypted Platforms: The Italian Experience <u>Wanda Nocerino</u> , Giuseppe Giliberti, Angela Procaccino, Donatella Curtotti Italy
10:35-10:50		From Berlin Process to Berlin Defense Dialogue: Tracing the Security Dimension of Regional Cooperation <u>Amella Bashoviq</u> North Macedonia
11:00-11:20	Hall - A Invited Speaker: Ljubisa Dragovic Chief Forensic Pathologist and Chief Medical Examiner Oakland County Medical Examiner's Office, USA Case of Domestic Dispute IV - Natural, Accident or Homicide (Michigan vs Billie Jean Rogers & Vonlee Nicole Titlow)	
11:20 – 12:50	CLINICAL FORENSIC MEDICINE SESSION Hall A Chairs: Hansjurgan Bratzke & Chara Spiliopoulou	Workshop Hall B (11:20-13:10)
11:20 - 11:35	Two Kinds of Child Abuse in Comparison <u>Montanari Eva</u> , <u>Sabrina Siliquini</u> , Elgisa Esposito, Montana Angelo, Busardò Francesco Paolo Italy	Forensic Odontology: Tracing the Past, Shaping the Future ○ Dr Emilio Nuzzolese ○ Dr Hemlata Pandey

11:35- 11:50	Strengthening Femicide Classification and Documentation in Morocco: A 10-Year Retrospective Analysis of Autopsy and Death Investigation Data from the Femicide Data Quality Improvement Project in Casablanca <u>Hind Abouzahir</u> Morocco	
11:50 - 12:05	Traffic Accidents and Deaths – A Retrospective Study <u>Madalina Maria Diac</u> , Andrei Scripcaru, Andreea Alexandra Hlescu, Anton Knieling, Simona Irina Damian, Diana Bulgaru Iliescu Romania	
12:20-12:50	Hall - A Invited Speakers: Garyfalia Ampanozi Professor of Forensic Medicine University of Thessaloniki, Greece Postmortem CT: A Global Perspective Elena Kranioti Professor of Forensic Medicine Department of Forensic Medicine Faculty of Medicine University of Crete, Greece Postmortem CT: A Case of Greece	
13:00 – 14:00	Lunch Break	

14:00 – 14:20	Hall - A Invited Speaker: Magdy Kharoshah Bahrain Defense Force, Kingdom of Bahrain Reasons for Rejection of Manuscripts and Understanding AI’s Role in Shaping Acceptance Standard	
14:20 – 15:35	GENERAL SESSION Hall A Chairs: Stefano D’Errico & Yanko Kolev	Workshop Hall B (14:20-16:10)
14:20 - 14:35	Postmortem Infrared Coronary (PIC) Angiography Validation with Conventional Coronary Angiography—Five Preliminary Cases <u>Eva Montanari</u> , Yanko Kolev, Filippo Cortesi, Giorgia Di Mascio, Chiara Floridi, Busardò Francesco Paolo Italy	From Analysis to Testimony: Cognitive Tools for Forensic Experts in the Courtroom ○ Dr Mohammed Ranavaya
14:35- 14:50	Quantifying TNT and PETN Explosives in Contaminated Soil Using FTIR-ATR and Advanced Statistical Techniques <u>Canan Kula</u> , Nuray Satiroglu Türkiye	
14:50 - 15:05	Forensic Identification of Contact Lenses by ATR-FTIR Spectroscopy and Assessment of Chemical Stability in Various Seawater Conditions <u>Ümmügülsüm Ateş</u> , Alihan Kocabaş, Tuğba Ünsal Sapan, H. H. Sevil Atasoy Türkiye	
15:35-15:55	Hall - A Invited Speaker: Hansjuergen Bratzke Professor of Legal Medicine Goethe University, Frankfurt, Germany Violence and Sudden Death	

15:55 – 16:40	GENERAL SESSION Hall A Chairs: Mehmet Tokdemir & Naim Uka	Workshop Hall B (15:55-17:45)
15:55 – 16:10	Age-at-Death Estimation of Cremated and Non-cremated Individuals: A Histomorphometric Application and Adaptation <u>Panagiota Bantavanou</u> , Frank Siegmund, Konstantinos Moraitis, Maria Eleni Manthou, Christina Papageorgopoulou Greece	Disaster Victim Identification (DVI): Principles, Protocols, and Practice European Training Center of Active Forensic Sciences Disaster Victim Identification (ETAF) ○ Dr Eddy De Valck ○ Dr Marta Garazdiuk ○ Miles Manning ○ Dr Sven Benthous
16:10- 16:25	Investigating the Potential Use of Tree Barks in Forensic Botany <u>Hatice Mehmetcik</u> , Ayşegül Akpınar Türkiye	
16:25 - 16:40	Situation with Domestic Violence in Kazakhstan, Importance of Local Nurses’Collaboration, Empowering and Involvement <u>Anele Bekturova</u> Kazakhstan	
16:40-17:00	Invited Speaker: Ralph Bouhaidar Professor of Forensic Pathology University of Edinburgh, Scotland Digitisation and Simulation in Forensic Pathology	
17:00 – 17:30	GENERAL ASSEMBLY	
21:00	GALA DINNER	

Saturday, October 11, 2025

Venue: Mak Albania Hotel

09:00 – 09:20	Hall - A Invited Speaker: Sheila Willis Honorary Professor, University of Dundee, Scotland Partnering for Progress- Aligning Efforts	
09:20 – 10:35	GENERAL SESSION Hall A Chairs: Nermin Sarajlic & Sven Benthaus	Workshop Hall B (09:20-11:10)
09:20 - 09:35	Communication of Forensic Medicine – Challenges, Facilitators and Barriers Beatrice Gabriela Ioan, Bianca Hanganu, Gabriela Crăciun, Cristina Popa Romania	Modern Crime Scene Investigation with a Dead Body: Best Practices, Technology and Interdisciplinary Collaboration ○ Dr Ersi Kalfoglou ○ Dr Hakan Kar ○ Dr Yanko Kolev ○ Asude Algül, MSc
09:35- 09:50	Investigating Burnout Among Forensic Medicine Professionals in Romania: A Cross-Sectional Study Silviu Morar, Elena Topîrcean, Lilioara-Alexandra Oprinca-Muja Romania	
09:50 - 10:05	Towards an Ethical Use of Evidence in the Italian Criminal Proceedings: A Path to Bridging Science, Justice and Humanity Donatella Curtotti, <u>Christian Pallante</u> , Maria Giovanna Rutigliano Italy	

10:05 - 10:20	Systems Approach to Blood Access in Forensic Donor Cases: Integrating Transplant Screening and Legal Demands <u>Selena Warden</u> , Damian Jackson USA	
10:20 - 10:35	Rewrite the Law? Everyone Is (Not) Equal Under the Law <u>Valeria Kaegi</u> , Michael Thali Switzerland	
11:00 – 12:15	FORENSIC PATHOLOGY SESSION Hall A Chairs: Ersi Kalfoglou & Kurt Trübner	Workshop Hall B (11:00-12:50)
11:00 - 11:15	An Unexplained Infant Death Revealing Shaken Baby Syndrome: Forensic Autopsy and Histopathological Clues Mehmet Tokdemir, <u>Burcu Harmancı</u> Türkiye	Humanitarian Forensics: Investigation of Mass Graves and Other Buried Remains ○ Dr John Clark ○ Dr Naim Uka ○ Dr Nermin Sarajlic
11:15- 11:30	Sudden Death in a Toddler with Rubinstein-Taybi Syndrome: A Forensic Perspective on a Rare Genetic Disorder <u>Ioannis Ketsekioulafis</u> , Athina Tousia, Konstantinos Katsos, Emmanouil I. Sakelliadis, Chara Spiliopoulou Greece	
11:30 - 11:45	Approach to Charred Corpses Result of Car Explosion: Case Series <u>Mustafa Seçkin Özyayla</u> , Şahnur Serap Aytuğ Türkiye	

11:45 - 12:00	Autopsy and Identification of the Victims of the Mass Disaster Caused by Fire in Kochani <u>Aleksandar Stankov, Verica Popovska, Zlatko Jakjovski, Renata Jankova, Goran Pavlovski, Natasha Bitoljanu, Viktorija Belakaposka Srpanova, Ljupco Chakar, Ana Ivcheva, Natasha Davcheva, Rosica Sijamkouri, Arifton Rakipi, Zoran Mitrevski, Kristijan Kotevski</u> North Macedonia	
12:45 -13:30	CLOSING CEREMONY	

POSTERS

Poster exhibitions are open for viewing at any time on our website as well as e-poster area at the conference venue

Forensic Pathology Track

P-01

Lethal Sodium Nitrite Intoxication: The Contribution of Immunohistochemical Markers

Roberta Bibbò, Stefania De Simone, Maria Antonella Bosco, Alessandro Santurro, Francesco Orsini, Giovanni Pollice

Italy

P-02

Immunohistochemical Markers for Diagnosing Diffuse Axonal Lesions

Iuliana Hunea, Manuela Ciocoiu, Mădălina Maria Diac, Andreea Velnic, Călin Scripcaru, Diana Bulgaru Iliescu

Romania

P-03

Donor-Derived Strongyloides Stercoralis Hyperinfection After Kidney Transplantation: Autopsy-Confirmed Two Cases

Mehmet Doğan, Yusuf Atan, Bahri Teker, İbrahim Üzün

Türkiye

P-04

Fatal Fat Pulmonary Embolism in Correlation with Severe Anemia - An Autopsy Case Report

Antonios Metzikofis, Ioanna Abba – Dekka, Leda-Kalliopi Kovatsi, Kyriakos Chatzopoulos

Greece

P-05

Sudden Cardiopulmonary Arrest Following Colonoscopy in 41-Year-Old Female with Ulcerative Colitis: A Postmortem Diagnosis of Descending Aortic Dissection

Gjergji Kacauni, Ilir Decolli, Elton Serani, Bledar Xhemali

Albania

P-06

Fatal Subarachnoid Hemorrhage in a 10-Year-Old Girl with Undiagnosed Bilateral Middle Artery and Anterior Cerebral Artery Aneurysms

Ilir Decolli, Gjergji Kacauni, Zana Bruci, Bledar Xhemali

Albania

P-07

Application of Surfactant Protein-A, Hypoxia-Inducible Factor 1 α and CD-68 in Diagnosis of Plastic Bag Suffocation: An Immunohistochemical Study

Raffaella Campagna, Francesco Carpano, Elena Giacani, Federica Genchi, Luigi Cipolloni, Christian Pallante

Italy

P-08

Sudden Death and Sick Cell Crisis: A Report of Different Autopsy Cases

Reham Eissa, Younis Albalooshi, Hazem Metwaly, Eslam Feteha

UAE

P-09

Fatal Butane Inhalation: The Contribution of Cardiac and Brain Immunohistochemical Markers

Maria Antonella Bosco, Alessandro Santurro, Chiara Fabrello, Roberta Bibbò, Luigi Cipolloni, Angela Procaccino

Italy

P-10

Postmortem Diagnosis of Accidental Hypothermia – Macroscopic and Microscopic Correlations in Hypothermia

Andreea-Alexandra Hleșcu, Mădălina Diac, Bianca Hanganu, Iuliana Hunea Zamisnicu, Cristian Ștefan Hleșcu, Adriana Grigoraș, Beatrice Gabriela Ioan, Diana Bulgaru-Iliescu, Cornelia Amălinei

Romania

P-11

Silent Killer at the Table – An Unexpected Cause of Sudden Death

Anita Galic Mihic, Vedrana Petroveck, Ivan Mario Stanicic

Croatia

P-12

Postmortem Diagnosis of Accidental Hypothermia - Medico-Legal Correlations and Macroscopic Aspects in Hypothermia

Andreea-Alexandra Hleșcu, Mădălina Diac, Bianca Hanganu, Iuliana Hunea Zamisnicu, Cristian Ștefan Hleșcu, Adriana Grigoraș, Beatrice Gabriela Ioan, Diana Bulgaru-Iliescu, Cornelia Amălinei
Romania

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FORENSIC PATHOLOGY SESSION I

- 01 -

IS THERE A ROLE FOR FORENSIC PATHOLOGIST IN PERSONALIZED MEDICINE AND PREVENTING SUDDEN CARDIAC DEATH?

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Background and Aims: Sudden cardiac death (SCD) is a major public health issue in Europe, responsible for 15–20% of all deaths, with an estimated incidence of 40–100 per 100,000 people annually. It frequently represents the first manifestation of inherited or acquired cardiac disorders, especially in the young. While Western Europe has implemented systematic surveillance and prevention strategies, many Balkan countries lack harmonized approaches, centralized registries, and standardized post-mortem protocols. This work aims to highlight the role of precision medicine and forensic pathology in improving SCD investigation and prevention in this underrepresented region.

Methods: Risk stratification through precision medicine—using genomic profiling, clinical phenotyping, and advanced imaging—allows early identification of individuals at risk of SCD. Forensic pathologists are central in this strategy, ensuring thorough post-mortem evaluations of unexpected cardiac deaths. Following international guidelines for autopsy and molecular testing enables accurate diagnoses and initiation of cascade genetic screening in families. Standardized autopsy data also support centralized registries critical for surveillance and prevention.

Results: To address regional gaps, we propose a multidisciplinary initiative to create a Balkan Sudden Cardiac Death Registry. Key steps include: (1) assembling an international team of forensic and medical professionals with a unified protocol; (2) administering an anonymized survey, which revealed wide heterogeneity in current practices; (3) organizing itinerant workshops for training in standardized cardiac autopsies; (4) developing centralized, AI-enhanced software for registry management and machine-learning-assisted familial risk prediction.

Discussion-Conclusions: This initiative emphasizes forensic pathology's pivotal role in precision medicine. The forensic pathologist is not only a diagnostician but also a sentinel for public health, supporting targeted prevention. Multidisciplinary collaboration and regional registry development are essential to reduce SCD burden, particularly in low-resource areas. Globally, only 15 SCD registries exist, highlighting the urgency of expanding such efforts.

Keywords: Sudden Cardiac Death, Personalized Medicine, Autopsy Guidelines, Balkan Registry, Multidisciplinary Prevention

- 02 -

THE SILENT CRY OF YOUNG HEARTS: AN AUTOPSY CASE REPORT ON THE SUDDEN DEATH OF THREE YOUNG MEN

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Background and Aims: Hypertrophic cardiomyopathy (HCM) is a leading cause of sudden cardiac death, especially in young adults, and is often associated with genetic mutations in sarcomere proteins. This presentation aims to emphasize the potential value of early clinical recognition and family-based genetic screening in mitigating the risk of sudden cardiac death associated with HCM.

Methods: This presentation provides a detailed examination of the autopsy findings from three young men aged between 15 and 25 who died of sudden cardiac death. Witness testimonies collected during the forensic investigation indicated that the deaths occurred suddenly. However, none of the cases had any previous hospital admissions or significant medical complaints in their medical histories. Two of the deaths occurred during physical exertion, while one happened during sleep.

Results: In all cases, the heart weight was above normal for age and sex, with evident left ventricular hypertrophy. Macroscopically, the left ventricular cavity was narrowed, and left ventricular hypertrophy was evident. Microscopic examination revealed findings consistent with HCM in the heart muscle in all cases, along with early ischemic changes in specific areas sampled during the macroscopic examination.

Discussion-Conclusions: This case series highlights the asymptomatic nature of HCM and its potential to cause sudden cardiac death, particularly in young individuals. The findings underscore the critical importance of accurately interpreting autopsy results and performing thorough histopathological evaluations in suspected HCM cases within forensic practice. By analyzing the autopsy findings of these three cases in light of current literature, this presentation aims to emphasize the potential value of early clinical recognition and family-based genetic screening in mitigating the risk of sudden cardiac death associated with HCM.

Keywords: Hypertrophic Cardiomyopathy, Sudden Cardiac Death, Forensic Autopsy, Young Adult Deaths

- 03 -

THE TRUTH BENEATH THE SURFACE

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Background and Aims: Deaths in the child population represent a significant public health concern. Although natural causes account for the majority of child deaths globally, violent deaths, such as those resulting from accidents, homicide, or suicide, remain a critical area of concern due to their preventable nature and uneven distribution. In lower-income countries, children are more likely to die from natural causes, while in higher-income countries, greater proportion of child deaths are attributed to violence. Within the category of violent deaths, further differences are observed across age groups, regions, and socioeconomic backgrounds. In the group of children under the age of four, drowning is among leading causes of violent death, often occurring as unintentional incidents in swimming pools, rivers, lakes, or the sea. Here we present a case of at first typical incident in an atypical setting, the case of a 4-year-old boy found dead by his mother in a bathtub floating in the water face down.

Methods and results: At the autopsy external examination of the body showed no visible injuries, the only finding were discrete petechiae on lower conjunctiva of the right eye. On the internal examination findings typically associated with drowning were found such as voluminous overinflated lungs, pleural petechiae and stomach content mixed with bath water. The rest of the macroscopic findings were unimpressive, with the exception of slightly enlarged heart. Toxicology analysis came back negative. However, the histology uncovered the underlying cause of drowning in diffuse acute myocarditis.

Discussion-Conclusions: Although the immediate cause of death was readily seen, for the broader understanding of why it happened and respecting the impact it has on the family as well as for the accuracy in documenting child mortality, all possible ancillary investigations should be performed because sometimes we have to look beneath the surface of obvious to understand the death in its full context.

Keywords: Drowning, Myocarditis, Child, Autopsy, Forensic Pathology

- 04 -

EVALUATING THE USE OF C5b-9 IMMUNOHISTOCHEMISTRY IN DETECTING ACUTE MYOCARDIAL INFARCTION IN POSTMORTEM EXAMINATIONS

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Background and Aims: In cases of myocardial infarction (MI) where the patient has survived for some time, the infarcted area can typically be identified postmortem, both macroscopically and under hematoxylin and eosin (H&E) staining. However, early MI cannot be detected by these conventional methods. Many immunohistochemical (IHC) techniques have been developed to overcome this diagnostic challenge. C5b-9 is a widely used IHC method due to its reported sensitivity early myocardial injury. Nevertheless, recent studies have produced inconsistent findings regarding its reliability. This study aims to review the current literature to evaluate the diagnostic utility of C5b-9 in forensic pathology.

Methods: A systematic literature review was conducted using the search terms: ("C5b-9 immunohistochemistry" OR ("C5b-9" AND "IHC")). Searches were performed on PubMed and Google Scholar for English-language articles published between 2000 and 2025. Studies focusing on acute myocardial infarction were included.

Results: This literature indicates that C5b-9 shows high sensitivity in early MI, even when H&E staining is negative. However, recent evidence suggests limitations exist, including false positives and/or negatives. Positive staining has been observed in non-infarcted hearts, particularly in areas with vascular degeneration and in cases where cardiopulmonary resuscitation was performed. Additionally, the extent of C5b-9 positivity may also increase with longer postmortem intervals (PMIs). Positive results of C5b-9 are observed in the right ventricle in hearts which suffered pulmonary thromboembolism. False negative results are also possible especially in infarcted myocardia in which the concentration of C5b-9 is not yet detectable in sudden death.

Discussion-Conclusions: C5b-9 shows high sensitivity in detecting early MI; however, its specificity remains limited. Positive findings must be interpreted with caution, taking into account alternative causes of death, the PMI, and the decedent's clinical history. Its utility lies in supporting—rather than solely determining—the diagnosis of myocardial infarction in forensic settings.

Keywords: Forensic Pathology, Forensic Medicine, Diagnosis, Myocardial Infarction, C5b-9 Immunohistochemistry

HUMANITARIAN FORENSICS SESSION

- 05 -

CHALLENGES IN THE IDENTIFICATION PROCESS OF MISSING PERSONS IN KOSOVO: LEGACY OF EARLY POST-WAR PRACTICES AND THE CONTINUING BURDEN 26 YEARS LATER

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Background and Aims: Over 26 years after the end of the war in Kosovo, around 1,590 persons remain unaccounted for. During the ICTY's initial post-war mission (1999–2000), over 2,000 identifications were made based on traditional methods—visual recognition, clothing, and personal artifacts—due to the unavailability of DNA testing in Kosovo. This paper examines the long-term consequences of such early identifications, including known cases of misidentification, and the ongoing efforts to correct and complete the identification process.

Methods: A retrospective analysis of ICTY, UNMIK, EULEX, ICRC and IFM records was conducted, focusing on the identification methodologies applied across periods. Comparative review analysis of cases stored in IFM, family reference matching, and re-assessment of archived case files form the basis of the current re-evaluation process initiated by IFM.

Results: The absence of genetic confirmation in early identifications has led to several documented misidentifications. Approximately 300 unidentified human remains (NN) are currently stored at the IFM morgue. These cases largely stem from the ICTY era, where identification was not the tribunal's primary mandate. In response, IFM has initiated a comprehensive internal review of all stored remains, including detailed examination of accompanying case files and re-testing of biological samples where possible.

Discussion-Conclusions: The early use of non-genetic identification methods left a legacy of unresolved or incorrect identifications. The IFM's systematic re-examination of morgue cases represents a crucial step forward, but further regional cooperation, increased access to reference samples, and political will remain necessary to resolve the fate of all missing persons.

Keywords: Kosovo, Missing Persons, ICTY, Forensic identification

- 06 -

THE EVIDENCE OF THE HOLOCAUST ON ROMANIAN TERRITORIES BY MASS GRAVES

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

Material and methods: Five mass graves dating from 1941 have been discovered in the Iași region: 3 in 1945 and 2 in 2009 and 2019 respectively.

Results: The forensic report from 1945 on the 3 mass graves found in Stanca, Iași county, revealed the following findings: a total of 311 corpses were found, placed in an unorganized manner, more men than women, while the ratio children to adults was approximately 30%. Additional findings included multiple gunshot wounds to the chest and abdomen and rarely to the head. The forensic anthropological report from the mass graves found in the Iași region in 2009 and 2019 shares similarities to the one from 1945: same unorganized pattern of placement of the bodies, same percentage of children, few gunshot wounds to the head, though some cranial fractures were observed. The main differences were the small number of skeletons, 36 and, respectively, 22, and the marked deterioration of the bones.

Conclusion: The three forensic reports from 1945, 2010 and 2021 share many similarities regarding the characteristics of the victims and the traumatic injuries observed. Although the number of victims is relatively small compared to historical testimonies, anthropological reports represent the key piece of evidence of the Holocaust on Romanian territories.

Keywords: Mass Grave, Genocide, Jewish Population, Forensic Anthropology, Holocaust, Second World War, Romania

- 07 -

MIGRANT DEATHS ON THE PASSAGE

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Background and Aims: Since the migration crisis of 2015, the influx of people from the Middle East and Africa to Europe has continued. One of the key migration corridors is the so-called Balkan route, which also crosses the territory of Slovenia. The journey poses significant risks—not due to overcrowded boats, as in the Mediterranean, but mainly due to natural obstacles such as rivers, mountains, and harsh weather. This article presents data on deceased migrants in Slovenia and outlines the procedures for their management.

Methods: We conducted a retrospective review of data from the Statistical Office of the Republic of Slovenia, police records, and the archives of the Institute of Legal Medicine (ILM). We compared the overall number of deaths in Slovenia, autopsies performed at the ILM, illegal border crossings, and the number of deceased migrants handled by the ILM.

Results: Despite tens of thousands of border crossings annually, relatively few migrants die on Slovenian territory. The Kolpa river, marking part of the Slovenian Croatian border, is the most dangerous location. On average, fewer than four migrants die per 32,000 crossings. For comparison, the average annual mortality in Slovenia is around 20,000. Each year, two to three deceased migrants are successfully identified and repatriated.

Discussion-Conclusions: Although the number of migrant deaths is low, every case must be handled according to international standards, law and protocols. The use of Interpol's Disaster Victim Identification (DVI) protocols is crucial, as it ensures standardized collection of antemortem and postmortem data. This significantly improves the likelihood of successful identification and repatriation of the deceased.

Keywords: Migrants, DVI, Death on The Passage

- 08 -

ENHANCING FORENSIC DENTAL IDENTIFICATION WITH THE ANATOMAGE TABLE: A NOVEL APPROACH

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Background and Aims: The Anatomage Table is a cutting-edge tool that offers a hands-on approach to studying anatomy. With its user-friendly interface and interactive tools, this technology provides a unique platform for precise manipulation and analysis of anatomical structures on an 83-inch touchscreen.

Methods: In this study, the authors propose leveraging the Anatomage Table for forensic identification cases by uploading DICOM datasets of human remains. Through *virtuopsy* examinations, valuable dental data can be extracted, leading to the creation of a comprehensive biological profile and a portrait image of the deceased. The Anatomage Table's innovative approach to radiographic imaging allows for reference point placement and the creation of accurate 2D radiographic images of dental arches, termed "orthodontograms."

Results: By defining cutting planes based on specific anatomical landmarks, forensic odontologists can obtain unconventional yet highly accurate 2D radiographic images of dental arches, similar to a panoramic X-ray image. Furthermore, the system's X-ray filter function, allows odontologists to generate 3D volumetric renderings of the skull and produce radiographic images similar to conventional periapical radiographs. These images are crucial for dental age estimation by assessing tooth and pulp volume and human identification. Additionally, portrait-like images based on CT scan data can be created for cases where decomposition has not occurred, enabling color enhancements for public circulation or recognition of the deceased.

Discussion-Conclusions: The Anatomage Table emerges as a transformative tool in forensic odontology, offering a novel approach to post-mortem dental data collection and analysis during autopsies. Its advanced capabilities in radiographic imaging and data visualization make it an effective adjunct tool for forensic dental identification cases and remote consultations. This technology has the potential to enhance the accuracy and efficiency of forensic investigations, ultimately contributing to the field of forensic science.

Keywords: Anatomage, Virtual Dental Autopsy, Virtuopsy, Human Identification, Forensic Odontology

FORENSIC BIOLOGY AND GENETICS SESSION

- 09 -

REVISED CRIME SCENE TO COURT PROCESS, ENABLED BY FAST DNA PROCESS

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This presentation outlines an example of a collaborative project to maximize the impact of forensic science supporting policing priorities.

Working in a public-private-partnership (PPP) with the Dutch Police, Prosecutors Office and National DNA-database, Eurofins TMFI has developed a FAST DNA service and revised the end-to-end model from scene attendance to reporting, enabling:

- Accelerated investigative process
- Earlier identification and arrest
- Charging decisions whilst suspect in custody
- Reduced opportunity to reoffend and improves public confidence

The process is not cutting corners with indicative results, but is a LEAN design with proven technology and accredited methods to ensure fast results that can be used both as forensic intelligence and fully court admissible evidential results.

The process includes optimized DNA-extraction for lower concentration crime stains ('touch DNA'), quantification and a standard duplicate PCR + CE to allow both database loading and spec searching, full casework comparison and statistical evaluation of potential matches reported in a Full Evidential Expert Witness Statement.

Immaculate planning and smart design with small but frequent batches of samples to allow for a smooth continuous process flow, have turned the Old Urgent into the New Normal. Despite upfront scepticism about the quality of such a fast process, faster processing of 'fresher' samples seems to have improved success rates.

The full end-to-end process from scene attendance to follow up on DNA results (arrest, charging decision) has been reduced from more than 100 days to a week.

The collaborative approach and CJS-wide process optimization greatly accelerates the investigative process, leads to earlier identification of the suspect following the initial offence and a quicker arrest, preventing the offender from committing further crime and improving public safety. This partnership re-designed the investigation process enabling conscious prioritization and smart use of operational Police capacity.

Keywords: Fast Forensic DNA Process-revision Public-Private-Partnership

- 10 -

POSTMORTEM EVALUATION OF APO E, BDNF, AND GFAP LEVELS IN THE CEREBROSPINAL FLUID OF SUICIDE CASES

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Background and Aims: Suicide remains a leading cause of death worldwide and poses a major public health challenge. Recent studies have focused on identifying neurobiological alterations associated with suicidal behavior. This preliminary study aimed to evaluate postmortem cerebrospinal fluid (CSF) levels of glial fibrillary acidic protein (GFAP), apolipoprotein E (APOE), and brain-derived neurotrophic factor (BDNF) in suicide cases, and to investigate their potential role as postmortem biomarkers.

Methods: CSF samples were collected from 15 suicide cases and 15 matched controls without a history of head trauma. GFAP, APOE, and BDNF concentrations were measured using enzyme-linked immunosorbent assay (ELISA). Statistical analyses were performed using the Mann-Whitney U test and independent samples t-test, with significance set at $p < 0.05$. This work represents a preliminary phase of an ongoing study.

Results: GFAP and APOE levels were significantly lower in the suicide group compared to the control group ($p = 0.0488$ and $p = 0.0237$, respectively). No statistically significant difference was found in BDNF levels ($p = 0.8356$). Demographic characteristics were similar across groups. These early findings suggest that reduced GFAP and APOE concentrations may be associated with suicide risk.

Discussion-Conclusions: The results indicate that GFAP and APOE may serve as potential postmortem biomarkers in forensic neurobiology. However, due to the limited sample size, these findings are preliminary and require validation through studies involving a larger number of cases. Data collection and additional analyses are ongoing as part of a broader research project.

Acknowledgment: We sincerely extend our gratitude to the Scientific Research Commission of the Ministry of Justice – Council of Forensic Medicine Presidency for granting permission for our study, and to Izmir Katip Celebi University for their financial support, which greatly contributed to the realization of this work.

Keywords: Suicide, CSF, GFAP, APOE, BDNF

FORENSIC APPLICATIONS OF TISSUE-SPECIFIC METHYLATION IN LUNG CANCER

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Lung cancer remains a leading cause of cancer-related mortality worldwide, necessitating continued research into novel diagnostic and prognostic biomarkers.

Epigenetic biomarkers, such as DNA methylation, histone modification, non-coding RNAs, play a crucial role in lung cancer development and progression. In forensic molecular pathology, the stability of epigenetic changes after death makes these biomarkers valuable tools for diagnosing lung cancer postmortem, determining the cause and manner of death, and even linking cancer to genetic predispositions.

This review aims to synthesize and critically evaluate research conducted over the past decade on the role of epigenetic biomarkers, specifically DNA methylation, in the diagnosis, prognosis, and forensic applications of lung cancer.

By analysing the methylation profiles of lung tumour samples and comparing them to those of adjacent non-tumour lung tissue or other somatic tissues, researchers have identified a subset of CpG sites exhibiting significant differential methylation. These tissue-specific methylation markers can serve as valuable tools for early lung cancer detection, tumour subtyping, and prognostic assessment.

The stability of DNA methylation patterns in biological fluids and forensic samples has opened up new avenues for forensic applications. The analysis of tissue specific methylation markers in forensic samples, can help identifying the tissue of origin, potentially providing crucial evidence in criminal investigations.

In conclusion, methylation markers hold significant promise for postmortem diagnosis of lung cancer, particularly when traditional methods are inadequate. As technologies continue to evolve, the role of methylation in forensic pathology is likely to expand, offering new avenues for accurate and reliable postmortem cancer detection.

Keywords: Lung Cancer, Forensic Molecular Pathology, Epigenetics, Methylation

- 12 -

MISSED PRENATAL DIAGNOSIS OF BECKWITH-WIEDEMANN SYNDROME: A MULTIDISCIPLINARY ANALYSIS OF MEDICAL NEGLIGENCE, ETHICAL IMPLICATIONS, AND LEGAL CONSEQUENCES

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Background and aims: BWS is a recognizable overgrowth disorder, one of the somatic overgrowth syndromes affecting multiple human organs, based on genetic imprinting disorder with distinctive prenatal ultrasonographic features including macroglossia, omphalocele, and fetal macrosomia. It exhibits altered gene expression at the 15.5 regions of chromosome no. 11, which regulate fetal growth. Early prenatal diagnosis enables appropriate counseling, delivery planning, and immediate postnatal care coordination. Methylation-specific multiplex ligation-dependent probe amplification (MS-MLPA) is recommended as the first-line molecular tool because it simultaneously detects ICR1/ICR2 methylation statuses and copy numbers that solve the majority of clinical cases in the prenatal scenario.

Methods: Report a case of missed prenatal BWS diagnosis where obvious fetal macroglossia was observed during routine ultrasonography at 25+6 weeks of gestation but was misinterpreted by the examining physician as "fetal humor" - the fetus "sticking its tongue out playfully." The sonographer failed to recognize this as a pathological finding requiring further investigation. Multiple subsequent examinations continued to report "normal fetal development" despite persistent macroglossia.

Results: The infant was born at 39 weeks with severe macroglossia, omphalocele, and hemihypertrophy, confirming BWS diagnosis. Postnatal management required multiple surgical interventions including tongue reduction surgery, ongoing speech therapy, and specialized medical care.

Discussion - Conclusions: Case highlights the critical importance of proper training in prenatal anomaly detection, adherence to diagnostic protocols, and the serious legal and ethical consequences of diagnostic failures. Healthcare systems must ensure adequate education and quality assurance measures to prevent similar cases of missed prenatal diagnoses.

Keywords: Beckwith-Wiedemann syndrome, prenatal diagnosis, medical malpractice, macroglossia, ultrasonography, medical negligence, ethical implications

A META-ANALYSIS ON THE PRINCIPLES AND APPLICATIONS OF CRISPR-CAS TECHNOLOGY IN JUDICIAL PROCESSES

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Background and Aims: Forensic science is a multidisciplinary field that applies scientific methods and techniques within legal processes to investigate crimes, uncover material truths, identify victims, and present findings supported by scientific evidence. This discipline plays a crucial role in supporting the legal system and ensuring justice through rigorous scientific analysis. Utilizing CRISPR technology, specific gene regions can be precisely edited, restructured, or replaced with alternative genetic sequences. In forensic applications, especially when analyzing fragmented biological samples contaminated or those that have traditionally yielded inaccessible genetic profiles, CRISPR technology facilitates more accurate and reliable identification. Furthermore, CRISPR-based methods herald a new era in the examination of micro-scale biological evidence collected from crime scenes, enabling unprecedented detail in forensic genetic analysis. Consequently, this study aims to perform a meta-analysis to assess the prevalence and efficacy of CRISPR technology as a novel tool in forensic science, evaluating its applicability alongside associated ethical considerations.

Methods: In our study, keywords such as "Forensic Sciences and CRISPR Technology," "CRISPR Technology and DNA Profiling," and "Forensic Genetics and the Use of CRISPR-Based Technologies" were selected. Relevant studies were identified, listed, and categorized using databases including PubMed, Scopus, Web of Science, ScienceDirect, and SpringerLink.

Results: As a result, this study categorized all research conducted with these keywords that contribute to the literature on the application of CRISPR technology in forensic sciences, highlighting its prevalence and associated ethical considerations. All findings will be presented in subsequent phases.

Discussion-Conclusions: The results indicate that, as a relatively new field, CRISPR technology—particularly in DNA profiling—has yet to be standardized and requires further optimization. Consequently, most studies emphasize the need for validation of the obtained data, as well as assessment of quality control and accreditation processes. It is anticipated that, with these evaluations, the widespread adoption of this technology in DNA profiling and various forensic genetics processes will increase.

Keywords: Forensic Biology, Forensic Genetics, CRISPR, Forensic Science

ALIGNING ISO 21043 AND ISO 17025 FOR END-TO-END QUALITY IN FORENSIC GENETICS

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Background/Objective: The field of forensic genetics faces significant challenges due to inconsistencies in crime scene procedures, laboratory methodologies, and reporting practices. These variations can compromise the reliability and legal validity of genetic evidence. This comprehensive analysis examines the synergistic relationship between ISO 21043 and ISO 17025 standards, providing practitioners with a detailed implementation framework to enhance quality control, maintain impartiality, and ensure complete traceability throughout the forensic workflow.

Approach: This study conducts an in-depth examination of the ISO 21043 series, which encompasses five critical components: standardized terminology (Part 1), evidence handling protocols from recognition through storage (Part 2), analytical procedures (Part 3), interpretative methodologies (Part 4), and reporting standards (Part 5). These components are systematically aligned with ISO 17025's technical competence requirements and quality management specifications. The integration is mapped across key operational touchpoints including crime scene investigation, laboratory processing, analysis procedures, result interpretation, and courtroom presentation, incorporating recent scholarly insights from Meuwly (2024) and Berger (2025).

Findings: ISO 17025 establishes robust laboratory practices through method validation, uncertainty measurement, proficiency evaluation, comprehensive documentation, and continuous improvement protocols. ISO 21043 broadens this quality assurance framework across the entire forensic process by implementing:

- Standardized terminology and conceptual frameworks (Part 1)
- Rigorous crime scene protocols and evidence handling procedures (Part 2)
- Laboratory analysis guidelines that align with established quality systems (Part 3)
- Systematic evaluative reasoning and probabilistic interpretation methods (Part 4)
- Standardized reporting practices optimized for courtroom presentation (Part 5)

The combined implementation of these standards delivers four key benefits:

1. Enhanced chain-of-custody and sample traceability
2. Improved analytical reliability with transparent uncertainty assessment
3. Standardized statistical evaluation procedures
4. Consistent expert testimony and communication protocols

Conclusions/Impact: The integration of ISO 21043 and ISO 17025 creates a comprehensive, internationally recognized quality framework specifically tailored for forensic genetics. Implementation of this unified approach would significantly enhance result reproducibility, strengthen judicial confidence, and facilitate cross-jurisdictional collaboration while maintaining compatibility with existing accreditation systems. This standardized framework represents a crucial advancement in forensic science practice and reliability.

Keywords: ISO 21043, ISO 17025, Forensic genetics, Quality assurance, Evidence integrity, Probabilistic reporting, Measurement uncertainty, Legal defensibility

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THE UNEXPECTED WITNESS

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Background and aims: The goal of this study is to determine the DNA profile of the person who was bite by a mosquito and establish how long that blood is proper to identify this person before it gets metabolized by the insect. The importance of this in forensic identification arises in special cases, where there is no other lead to identify a suspect when a crime occurred in a closed space or when there is no other data that can link a person to a specific place. It can also provide indicative data regarding the time of a person's presence in that space.

Methods: We used a relatively simple method. The mosquito that bites the person in the study is captured and kept alive for set intervals of time, gradually increasing, after which the blood drop from its body is genotyped to obtain a DNA profile.

Results: The results showed that we can obtain complete profiles that can lead to the certain identification of the person even after more than 20 hours from the moment of the bite and interpretable profiles after 24 hours. On one sample we obtained the genetic profile of the donor and also 4 alleles that most probably belong to the previous person bite by the mosquito.

Discussion - Conclusions: We can determine complete profiles that can lead to the definite identification of the person even after more than 20 hours from the moment of the bite. Even after 24 hours the incomplete profile obtained allows the identification of the person. Mosquitoes at the crime scene, dead or alive, could be a valuable piece of forensic evidence. Through them we can obtain data about the persons present at the crime scene, the time of a person's presence in that space, the link between the victim and aggressor.

Keywords: Forensic Medicine, Crime Scene, Identification, DNA profile, mosquito

FORENSIC TOXICOLOGY SESSION I

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CHALLENGING THE RELIABILITY OF BACK CALCULATION IN BLOOD ALCOHOL TESTING: A COMPARATIVE STUDY OF IMMUNOCHEMISTRY AND GC-MS IN FORENSIC PRACTICE

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Background and Aims: Back calculation of blood alcohol concentration (BAC) is frequently employed in forensic contexts to estimate alcohol levels at a prior point in time. However, the validity of such estimations depends heavily on the accuracy of the initial BAC measurement. This study evaluates the reliability of hospital-based immunochemical assays versus gas chromatography–mass spectrometry (GC-MS), the gold standard, and assesses the risk of error introduced by relying on back-calculated values from non-GC-MS methods.

Methods: A total of 120 blood samples from patients admitted to a general hospital were analyzed for alcohol concentration. Each sample underwent three forms of testing: Enzymatic Assays (Alcohol Dehydrogenase-based), Immunoassay Techniques (ELISA) used in hospital emergency settings, and confirmatory analysis via GC-MS in a forensic laboratory. The comparison focused on detecting discrepancies and estimating the false positive rate relevant to legal interpretation using back calculation models.

Results: The comparative analysis revealed a 5.2% false positive rate in immunochemistry-based results when assessed against GC-MS findings. These errors carry significant legal implications, particularly in retrospective estimations using back calculation, where even minor deviations in BAC readings can lead to misinterpretation in legal proceedings.

Discussion-Conclusions: The findings underscore a critical limitation in relying on hospital-based immunochemical testing for forensic purposes. Given the potential for false positives and the consequent legal risks, back calculation of BAC should be exclusively based on GC-MS-confirmed values. This study advocates for stricter standards in forensic toxicology practices and emphasizes the need for judicial awareness of analytical variability.

Keywords: Blood Alcohol Concentration, Back Calculation, False Positive, Legal Evidence, Medicine

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COMPARATIVE ETHANOL CONCENTRATIONS IN BLOOD AND VITREOUS FLUID

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Background and Aims: Ethanol quantification in postmortem forensic toxicology is complicated by postmortem redistribution (PMR), specimen collection technique and site, and possible endogenous ethanol production, all of which make interpretation in medico-legal contexts rather challenging. This study examines the comparative reliability of central (heart) blood, peripheral (femoral) blood, and vitreous humour aiming to determine which one (or more) specimens should be collected and analysed in typical postmortem toxicology cases.

Methods: A literature-based analysis was conducted, reviewing published forensic case studies, autopsy reports, and analytical techniques to evaluate ethanol's postmortem distribution patterns. Special emphasis was placed on PMR dynamics and the biochemical stability of vitreous humour in comparison to central and peripheral blood specimens.

Results: Femoral blood is generally more reliable than central blood due to its reduced susceptibility to PMR. Central blood often displays elevated ethanol concentrations post-mortem, particularly when death occurs shortly after ingestion or due to microbial activity. Vitreous humour, protected from contamination and bacterial fermentation, offers an alternative matrix with greater interpretive value in distinguishing true ethanol intoxication from postmortem artefact. As the concentration of vitreous ethanol equilibrates slowly and lags blood concentrations, it may offer interpretative information regarding alcohol's ingestion in relationship to the time of death.

Discussion-Conclusions: No single matrix considered in isolation offers infallible results. Using femoral blood in combination with vitreous humour provides a more robust interpretive framework. Accurate postmortem ethanol analysis requires consideration of sampling site, case context, time since death, and ancillary findings to differentiate antemortem ingestion from artefactual ethanol. Integrated multi-specimen strategies are essential for defensible toxicological conclusions in forensic practice in order to minimise difficulties associated with postmortem alcohol interpretation in the absence of multiple specimens or adequate case histories.

Keywords: Forensic Toxicology, Postmortem Ethanol, Femoral Blood, Central (Cardiac) Blood, Vitreous Humour

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SPECIMEN COLLECTION IN FORENSIC POSTMORTEM TOXICOLOGY: A COMPARATIVE REVIEW OF UK AND USA BEST PRACTICE STANDARDS

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Background and Aims: Postmortem forensic toxicology plays a vital role in medicolegal death investigations, particularly in determining the contribution of alcohol, drugs, poisons and other substances to the medical cause and the legal manner of death. The accuracy, admissibility and reliability of toxicologic findings is closely tied to the quality of biological specimen collection, handling, and preservation. This study compares best practice guidance on postmortem toxicology specimen collection issued by the UK Forensic Science Regulator (FSR) and by the American Standards Board (ASB) of the American Academy of Forensic Sciences (AAFS), aiming to identify areas of convergence, divergence, as well as to address the potential for global harmonisation.

Methods: The review examines key aspects of both FSR and ASB frameworks, including preferred biological matrices (e.g., femoral blood, vitreous humour, urine), collection techniques, chain-of-custody protocols, and other pre-analytical contextual factors influencing sampling decisions.

Results: The analysis revealed strong alignment between UK and USA recommendations, especially the prioritisation of femoral blood and vitreous humour. Both frameworks emphasise the use of preservatives and proper storage. However, notable differences exist in procedural detail and regulatory oversight. The UK promotes uniformity through mandated national standards, while the USA operates a decentralised model with variable adherence. USA protocols also recommend a broader range of postmortem biological specimens, such as bile, brain, and hair, based on case context.

Discussion-Conclusions: While UK and USA practices appear to be aligned in principle, differences in regulation, standardisation, and specimen scope may affect cross-jurisdictional comparability of findings. These disparities highlight the need for increased international collaboration and movement toward harmonised protocols. The study supports the development of shared guidelines to improve scientific consistency, legal defensibility, and interoperability. Future research should evaluate the practical impact of these differences and explore pathways for global standard-setting.

Keywords: Forensic Toxicology, Postmortem, Biological Specimens, Forensic Science Regulation, Standardisation

A RAPID, MULTI-ANALYTE LC-MS/MS METHOD FOR URINE ANALYSIS

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Background and Aims: Urine toxicological analysis is crucial in both clinical and forensic settings for diagnosing acute intoxications, determining causes of death, monitoring workplace substance use, and detecting drug-facilitated crimes. The dilute-and-shoot method, combined with liquid chromatography-tandem mass spectrometry (LC-MS/MS), offers an effective and versatile analytical approach. This study aims the development and validation of an LC-MS/MS method for the simultaneous detection and quantification of 115 drugs and metabolites, including drugs of abuse (DOA), new psychoactive substances (NPS), and various prescription and over-the-counter medications.

Methods: Sample pretreatment was studied by applying different solvents (acetonitrile, water or methanol), and the best results were obtained after adding 100 µL of sample, 200 µL of a mixture of methanol: acetonitrile (3:1, v/v). The mixture was vortexed, centrifuged and the supernatant directly injected into the instrument. The analysis took place on a C18 column with a gradient elution over 7.5 min. The developed method was applied for routine casework analyses of 167 urine samples collected weekly over a period of 12 weeks from 22 individuals who were under rehabilitation program.

Results: The method showed high selectivity and sensitivity, with detection limits of 0.01–1.5 ng/mL and quantification limits of 0.05–5 ng/mL. Validation included assessment of recovery, carryover, matrix effects, accuracy, precision, selectivity, stability, and dilution integrity. Applied to real urine samples, the method detected and quantified fourteen drugs across various classes, including cocaine metabolites, cannabinoids, antidepressants, antipsychotics, analgesics, and antiepileptics.

Discussion-Conclusions: The proposed method was used to detect both prescribed and illicit substances, proving to be robust, low in sample volume requirement, and highly sensitive. Notably, it enables simultaneous detection of acidic and basic drugs in a single analysis.

Keywords: Dilute-And-Shoot, Urine, DOA, NPS, LC-MS/MS

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SELF-IMMOLATION WITH FLAMMABLE SUBSTANCE: A FORENSIC CASE ANALYSIS

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Introduction: Authors present a detailed forensic-medical analysis of a rare case of suicide by self-immolation using flammable liquid (gasoline). The subject was found in a forested area in a severely carbonized state. Key findings include a confirmed history of psychiatric disorders, high levels of carboxyhemoglobin (HbCO), inhalation of smoke, and the presence of a lighter and empty gasoline containers near the body. Differential diagnosis was performed to distinguish suicide from homicide with postmortem burning. The findings support a conclusion of self-inflicted death by fire.

Case description: Suicide by self-immolation is a rare and violent act, often linked to deep psychological suffering, severe mental illness, or protest behavior. In forensic practice, such cases require a multidisciplinary approach to distinguish self-harm from potential homicide attempts disguised as accidents or fire. A male individual was discovered deceased in a remote wooded area, seated and leaning against a tree. The corpse was severely charred, with third-degree burns. Findings included a wire across the chest, two empty plastic gasoline containers, a gas lighter, and signs of fire without evidence of struggle. The body showed advanced carbonization, pugilistic posture, soot in airways, no trauma, and 39,3% HbCO in cardiac blood samples; suggesting initially death by carbon monoxide poisoning.

Discussion: The victim had a long history of psychiatric illness, including depressive episodes and inconsistent treatment, supporting the self-harm hypothesis. The presence of 39,3% HbCO in the blood, soot in airways, absence of trauma or struggle, presence of flammable agents and ignition source all pointed to suicide.

Conclusions: The case confirms death by suicidal self-immolation. All forensic indicators support that the death was self-inflicted. It highlights the need for psychiatric support and forensic vigilance. Since the victim was found in an open-air setting, with blood CO levels below what required for in-door lethal CO intoxications, we concluded that the combustion shock was the major causative mechanism of death.

Keywords: Immolation, Hbco, Gasoline, Suicide

HIGH ANION GAP METABOLIC ACIDOSIS (HAGMA) IN THE ICU: A DECADE OF TOXICOLOGICAL OVERVIEW

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Background and Aims: The osmolar gap represents the difference between measured and calculated serum osmolality. It helps detect the presence of unmeasured osmotically active substances especially in suspected toxic ingestions. High anion gap metabolic acidosis (HAGMA) is a type of acid–base disorder characterized by a decreased blood pH due to the accumulation of unmeasured anions, such as lactate, ketones, or toxins. It's a key clue in toxic ingestions and certain metabolic disturbances. HAGMA arising from toxic alcohol ingestion poses significant mortality risk in ICUs. We conducted a 10-year institutional case series (January 1, 2015–2025), assessing toxic agents, diagnostic markers (osmolar and anion gap) and outcomes.

Methods: Retrospective identification of 29 ICU patients with confirmed toxic ingestions, including methanol, ethylene glycol, isopropanol, ethanol, mannitol, and mixed exposures. We evaluated serum osmolar and anion gaps (corrected for albumin), clinical features, management (including antidotes and renal replacement therapy), and in-hospital mortality.

Results:

- Methanol: 16 cases, 9 deaths (56%)—highest fatality.
- Ethylene glycol: 3 cases, 1 death (33%).
- Isopropanol, ethanol, mannitol: 6 cases total, no deaths.
- Mixed exposures: 4 cases, 2 deaths (50%).
- Overall mortality: 12/29 (41,38%).

Methanol and ethylene glycol poisonings presented with elevated osmolar and anion gaps, consistent with literature confirming their prognostic significance (osmolal gap ~90 mOsm/kg vs ~48 mOsm/kg in survivors, pH <7.22 linked to mortality). Isopropanol typically elevated osmolar gap without acidosis, while mixed ingestions complicated osm gap interpretation.

Discussion-Conclusions: An elevated osmolar gap (>20–30 mOsm/kg) combined with high anion gap (>16–20 mEq/L) strongly suggests toxic alcohol ingestion—particularly methanol or ethylene glycol. However, variability in calculation formulas and reference ranges limits sensitivity; absence of an osm gap does not exclude ingestion. Prompt antidotal therapy (fomepizole/ethanol) and early hemodialysis improve survival and reduce permanent injury—especially ocular and renal sequelae.

In our series, methanol ingestion accounted for the majority of HAGMA cases with highest mortality; mixed ingestions also demonstrated substantial risk. Early recognition via osmolar/anionic gap screening, rapid administration of alcohol dehydrogenase inhibitors, and timely renal replacement therapy are pivotal. Further research is warranted to refine thresholds for intervention and validate predictive markers for stratifying risk in ICU settings. We have attached a decision algorithm from our clinic that is used in differential diagnosis—to underscore key diagnostic insights.

Keywords: High Anion Gap Metabolic Acidosis, Osmolar Gap, Methanol Poisoning, Ethylene Glycol Poisoning, Intensive Care Unit, Toxicology

CRIMINALISTICS SESSION

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MODULAR SYSTEM WITHIN DEATH INVESTIGATION

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In the Netherlands, with almost 18 million inhabitants, around 17.3 million people die per year, of which 14 thousand are examined by a forensic physician if there is suspicion of unnatural death. In 10 thousands of those cases, euthanasia is concerned in which no follow up investigation is needed. In the other 4 thousand cases, the forensic physician and police examine the body, its surroundings, and document the facts and circumstances surrounding the death.

If the forensic physician and police are not convinced of a natural death, or if there is a suspicion of an unnatural death, a public prosecutor will be consulted.

The public prosecutor is entitled to make the next step in the investigation, which consists: forensic radiology, forensic pathology, toxicology. All these different investigations can be used like a modular system.

Within Eurofins TMFI, we realize that a multidisciplinary approach is more comprehensive, which is the most common practice in the Netherlands.

Eurofins TMFI offers these services with the option of a multidisciplinary consultation of experts at every decision-making moment in the process. In some cases, the modular system is just a formality, if there was clearly an unnatural death, Then, the full range of investigations are carried out. For example, the forensic radiology will act as a guider with 3D imaging for the autopsy.

In certain cases, there is no clear suspicion that there was an unnatural death, but there are loose ends on a tactical level. Then, mainly radiology and toxicology is used to better substantiate the next step forward. Because of ethical reasons like invasiveness, public prosecutors are hesitant in ordering an autopsy. Like any system this modular system has advantages and disadvantages, these will be discussed.

Keywords: Forensic pathology, Radiology, Toxicology

STAGES OF CRIMINAL INVESTIGATION

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Context and purposes: The phrase “criminal investigation” outlines the research, the meticulous study, carried out systematically by: the criminal police officer; the criminal prosecutor; the forensic doctor and every representative of the sciences who are drawn into clarifying the elements of the criminal action in order to discover the unknown perpetrator.

The criminal investigation procedure shows us the “path from hypothesis to thesis” , a path that is traveled following its investigative stages, namely: identifying a criminal field; reconstructing a crime scene; verifying and valorizing the means of evidence from a semantic and psychoanalytic perspective; identifying the mode of operation; creating identification portraits, organizing and operating databases regarding criminal identification. We have listed the investigative stages that ensure the clarity, evidence and distinction of the truths discovered on this path.

Investigative methods:

- Identification of a crime scene
- Reconstruction of a crime scene
- Semantics and psychoanalysis of evidence
- Identification of the mode of operation
- Identification portraiture
- Organization and functioning of criminal identification

Results: From the formulation of the research problem, the construction of the hypothesis and the collection of specific information (determining the reflectivity of the factual situation; clarifying the action film (perpetrator / victim); deciphering the meaning of words and clarifying the moods; identifying and capitalizing on the characteristic moduli elements in which the perpetrator acted; achieving the synthesis of the identifying data of the unknown perpetrator) we arrive at the preservation and capitalization of this information, moreover, an investigative heritage is constituted.

Conclusions: There is a science of discovering unknown perpetrators and its procedure. The sublime of this science is the discovery of unknown or hidden truths, but especially the removal of the tragedy of enduring suffering for the deed of another. By respecting the procedure of the science of discovery we ensure the clarity, evidence and distinction of the truths.

The path indicated by the criminal investigation procedure is trustworthy. We support this idea by committing to applying it (demonstratively) in a case that requires the discovery of the unknown perpetrator.

Keywords: Identifying A Crime Scene, Crime Scene Reconstruction, Semantics and Psychoanalysis of Evidence Identifying The Operating Mode, Identification Portrait, The Organization and Functioning of Criminal Identification

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MICROSTAMPING IN FIREARM IDENTIFICATION: PERFORMANCE, CHALLENGES, AND IMPLEMENTATION PERSPECTIVES

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Background and Aims: Microstamping is a firearm identification technology in which unique alphanumeric codes are laser-engraved onto a firearms firing pin and, in some designs, additional internal components such as the breech face. When a firearm is discharged, these microscopic engravings are transferred onto the primer of the cartridge case. In addition to the microstamped code, characteristic toolmarks from the firearms firing mechanism—such as firing pin impressions and breech face marks—are imparted onto the cartridge case. These physical markings, inherently unique due to manufacturing tolerances and wear, complement the coded information. This combination of coded and physical marks allows law enforcement agencies to link collected cartridge cases to a specific firearm, even if the firearm itself is not found. This study aims to provide an overview of microstamping technology, summarize its potential contributions to firearm-related investigations, and examine practical considerations for implementation.

Methods: Recent data from legal regulations, forensic reports, and peer-reviewed studies were reviewed to analyze the technical capabilities and real-world limitations of microstamping. Special attention was given to the durability of engraved markings after repeated firing, legibility under various conditions, and susceptibility to tampering.

Results: Studies indicate that microstamping technology can offer evidentiary value under certain conditions and may assist investigations where firearms are not recovered. However, performance varies depending on the type of firearm, the type of ammunition, and environmental factors. Ongoing challenges include inconsistency in mark clarity, progressive wear of engraved surfaces, and the relative ease with which the system may be circumvented. These practical limitations highlight the need for further refinement and standardization.

Discussion-Conclusions: Microstamping technology shows promise as a supplementary tool for firearm identification. However, further research, technical refinement, and the establishment of clear performance standards are necessary to enhance its reliability, resistance to tampering, and practical feasibility for widespread adoption.

Keywords: Forensic Science, Forensic Ballistics, Firearms and Toolmarks Examination, Firearm Identification, Microstamping

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POST-FIRE DETECTION OF GASOLINE RESIDUES AFTER 37 DAYS: APPLICATION OF A SPME-GC/MS METHOD IN A CONTROLLED ARSON SCENARIO

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Background and Aims: In arson investigations, identifying ignitable liquids such as gasoline is crucial for confirming the use of accelerants and reconstructing fire dynamics. However, detecting these substances weeks after a fire remains analytically challenging due to degradation and matrix interference. This study assesses the applicability of a previously developed method for ignitable liquid residue (ILR) analysis using samples collected 37 days after a controlled fire conducted under arson-like conditions.

Methods: The fire was initiated using accelerants at the Istanbul Fire Department Training Center (IBITEM) of Istanbul Metropolitan Municipality during a training simulation. A room furnished with typical household items was set on fire using ~250 µL of gasoline applied at two locations. The fire was extinguished after 15 minutes using dry chemical powder. To simulate realistic post-fire conditions, the room was left undisturbed with open windows and doors for 37 days. Then, a blinded team collected 20 samples—including fire debris, soot swabs, and unburned controls—from various locations. Samples were sealed in glass containers to prevent contamination. Volatile compounds were extracted by Solid Phase Microextraction (SPME) and analyzed using Gas Chromatography–Mass Spectrometry (GC-MS), following the method developed by Kılıç et al. (2024) with a 100 µm PDMS fiber. Eighteen compounds defined by ASTM standards were used as gasoline markers.

Results: All 18 target compounds were screened in all samples. Gasoline-related markers were detected in 4 samples (20%), all collected from a completely burned carpet and an underlying, partially unburned carpet near the ignition point. No ILRs were found in soot swabs or debris from remote areas.

Conclusions: This collaborative study demonstrates the method's effectiveness in detecting gasoline residues up to 37 days post-ignition. Findings highlight the method's reliability and the importance of sampling location in post-fire forensic investigations.

Keywords: SPME, GC-MS, Fire Investigation, Arson, Room Fire Test

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DETERMINATION OF TIME-DEPENDENT DEFORMATION IN FABRICS SOAKED IN WATER SAMPLES TAKEN FROM THE SEA OF MARMARA AND THE MEDITERRANEAN SEA USING SPECTROPHOTOMETRIC AND HYPERSPSCTRAL METHODS

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Background and Aims: Forensic science is a multidisciplinary field that comes into play during the investigation and resolution of criminal cases, drawing on social sciences and natural sciences in a coordinated manner throughout the process. Water, the most essential element for the continuation of life, constitutes a large part of the structure of living organisms and is also a natural component of most chemical reactions. Fabrics, which are an important part of everyday life and can be found almost everywhere, are among the evidence increasingly encountered in forensic science, and many cases have been solved as a result of analyses conducted on fabric samples. As seen in the studies conducted, fabrics of any origin, type, or color can be examined in a way that yields important results when they are left in water and become deformed as a result of waiting.

Methods: Time-dependent deformation of fabric samples immersed in water samples with varying salinity levels and different chemical compositions was investigated. White cotton, polyester, and hybrid fabrics were immersed in water samples taken from the Mediterranean Sea and the Sea of Marmara, as well as in simulated water samples. The fabric samples were removed from the aqueous environment at the end of the 1st, 3rd, and 6th months and analyzed using IR, UV-VIS, and fluorescence spectroscopy, and imaged using Video Spectral Comparator 8000 and stereo macroscopy.

Results: When all the findings are evaluated together, the fabrics have reacted differently in chemical and physical terms depending on the environment they were in and the time they spent there. In particular, cotton fabric emerged as the most sensitive structure to time and environmental factors, while polyester fabrics were found to be more resistant, and hybrid fabrics exhibited behaviors that could be characterized as intermediate between the cotton fabrics and polyester fabrics.

Discussion-Conclusions: The amount of time and quantity of degradation of any fabric type in a specified water sample has been determined, and important data has been obtained to shed light on a forensic case. Thus, based on the results, accurate and informative conclusions have been reached regarding matters that may be subject to criminal investigation, which have been communicated to official authorities, law enforcement agencies, and criminal investigation units.

Keywords: Forensic Sciences, Chemistry, Spectroscopy, Fabric Analysis, Decomposition

FORENSIC TOXICOLOGY SESSION II

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THE EMERGING ROLE OF FORENSIC SCIENCE AND FORENSIC TOXICOLOGY IN ADDRESSING PFAS CONTAMINATION AND EXPOSURE

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Background and Aims: Per- and polyfluoroalkyl substances (PFAS) are a large group of synthetic chemicals increasingly recognized as persistent environmental pollutants with potential adverse health effects. The widespread detection of PFAS in water, soil, and biological samples has led to heightened legal, environmental, and public health concerns globally. As PFAS contamination becomes a matter of forensic relevance, forensic science and forensic toxicology are positioned to contribute essential expertise in exposure assessment, source attribution, and litigation support. This presentation aims to examine the intersection between PFAS contamination and forensic sciences, highlighting the key roles forensic toxicology can play in detecting, quantifying, and interpreting PFAS in human biological samples, and discussing how these findings contribute to environmental and occupational health investigations and legal proceedings.

Methods: A review of current analytical methodologies employed in forensic toxicology laboratories for PFAS determination will be presented, with emphasis on liquid chromatography-tandem mass spectrometry (LC-MS/MS). Case examples will illustrate the application of forensic science in legal contexts involving PFAS exposure, including exposure attribution, causality assessment, and expert testimony.

Results: Advances in analytical sensitivity now allow for accurate PFAS quantification in low-concentration biological matrices. Forensic science methodologies ensure the reliability and admissibility of these analyses in courts of law. The presentation will also discuss emerging best practices for incorporating PFAS testing into routine forensic toxicology casework.

Discussion-Conclusions: Forensic science and forensic toxicology are playing an increasingly important role in addressing the multifaceted challenges posed by PFAS contamination and exposure. Their contributions are essential for objective exposure assessment, environmental accountability, and supporting evidence-based legal decision-making in civil, criminal, and regulatory contexts.

Keywords: PFAS, Forensic Toxicology, Environmental Forensics, Exposure Assessment, Litigation

A RETROSPECTIVE STUDY OF DRUG RELATED DEATHS DURING 2020 – 2024 IN ALBANIA

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Background and Aims: The use of drugs, especially in the more intense and damaging forms, is one of the major causes of deaths in young age groups in Europe and around the world. Most of the studies on drug-related deaths in Albania are based on incomplete data. Based on official data, the number of drug-related deaths, during the period 2020-2024, is 111.

Methods: This retrospective study of drug-related deaths for the period 2008-2017 is based on the autopsy registry and toxicology registry at the Institute of Legal Medicine in Tirana. These registers are compiled based on the recommendations of the EMCDDA. In all the abovementioned drug-related death cases, the autopsy was performed and analysis of biological samples (e.g. blood, urine, vitreous humour) were performed by immunoassay techniques (EMIT, ELISA) and confirmation by GCMS and GCHS.

Results: In the period 2020 – 2024, 111 drug-related cases have been recorded. Even though, on average the number of drug-related deaths is 22.2 cases/year, this number has increased in the last years. The drugs detected in these cases were heroin, cocaine, methadone, benzodiazepines, muscle relaxants, alcohol or their combinations (e.g. cocaine-heroin, heroin-alcohol). The most frequent drug-related deaths are those from heroin overdoses. Some of the victims were previously known as drug users.

Discussion-Conclusions: These drug-related deaths are observed in persons of the 20-34 years age group and 40-60. Out of the 38 cases of drug-related deaths recorded, 98 are male victims and 13 females. Cases are Albanian victims and foreign nationality.

Victims were found in different places like abandoned buildings, streets, hotels, flats, restaurants, in the emergency room of the University Hospital Center in the Clinical Toxicology Service. In general, most of these drug-related deaths have been a result of the asphyxiation mechanism.

Keywords: DRD, Drug, Death, Victims

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RETROSPECTIVE ANALYSIS OF COCAINE PRESENCE IN POSTMORTEM SAMPLES FROM THE CITY OF ZAGREB, CROATIA (2018 – 2024)

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Background and Aims: In the past ten years, there has been an increase in cocaine use in Europe, followed by a rise in mortality related to its consumption. The aim of this study was to examine the presence of cocaine in the city of Zagreb (Croatia) over the period from 2018 to 2024.

Methods: The study analyzed the presence of cocaine in postmortem biological samples of deceased, the presence of adulterants commonly found in cocaine mixtures, medications and other substances commonly found in combination with cocaine. The causes of death, age and sex of individuals who tested positive for cocaine, were also analyzed.

Results: For 3,168 deceased individuals autopsied at our Department, a toxicological analysis was requested. Cocaine was detected in 128 cases, which represents 9% of all positive toxicology cases. The number of cases in which cocaine was detected increased by 122% over the seven-year period. Cocaine in combination with sedatives, opioids, alcohol and adulterants was detected in 85% of cases, significantly increasing the risk of a fatal outcome. The average age of the deceased was 38 years, with 87% of the cases involved male individuals.

Discussion-Conclusions: This retrospective analysis shows a significant increase in the presence of cocaine in postmortem samples in Zagreb between 2018 and 2024, with a consistent trend of polydrug use.

Keywords: Cocaine, Postmortem Toxicology, Polydrug Use

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BLURRED LINES: DISTINGUISHING BETWEEN XYLAZINE AND FENTANYL OVERDOSE IN A CLINICAL SETTING

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Background and Aims: Xylazine, a veterinary sedative not approved for human use, is increasingly adulterating fentanyl on the illicit market. Its presence may increase the potential for fatal overdose. Therefore, distinguishing between a fentanyl-only overdose and a xylazine-fentanyl overdose is imperative, though challenging due to overlapping clinical symptoms of overdose. This study aims to evaluate whether clinical symptoms can be used to distinguish between the agent causing overdose.

Methods: A systematic review was carried out, including both qualitative and quantitative data obtained through peer-reviewed databases published between 2010 and 2025. The keywords 'xylazine' AND 'overdose' OR 'symptoms', and 'fentanyl' AND 'overdose' OR 'symptoms' were searched. Abstracts were screened to select sources describing overdose symptomatology, clinical differentiation, and treatment outcomes.

Results: Both xylazine and fentanyl share key symptoms in overdose, such as sedation, hypotension, and respiratory depression. This complicates differentiation. However, some distinguishing features have been identified. Xylazine overdoses may present with an initial hypertensive, tachycardiac phase, and is associated with necrotic skin ulceration, and increased risk of dysrhythmia. Conversely, fentanyl overdose is characterised by more profound respiratory depression, chest wall rigidity, euphoria, and atypical signs such as gurgling and seizure-like activity. Response to naloxone may offer the most clarity as to which drug is causing overdose; xylazine is non-responsive to naloxone administration.

Discussion-Conclusions: Though distinguishing features exist, most are non-specific, or absent in late presentations to hospital. The high prevalence of mixed xylazine-fentanyl overdoses also leads to mixed clinical pictures, further complicating diagnosis. To reflect this, naloxone should always be administered to treat symptoms that may arise secondary to fentanyl overdose. Given the inability of naloxone to reverse xylazine toxicity, failure to respond should raise suspicion of xylazine overdose. Improved point-of-care testing and awareness of distinguishing features are critical to optimising emergency care responses.

Keywords: Forensic Toxicology, Xylazine, Fentanyl, Clinical Symptoms, Overdose

CURRENT STATUS OF THE QUALITY MANAGEMENT SYSTEM IN FORENSIC LABORATORIES PERFORMING DRUG ANALYSIS IN TÜRKİYE

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Background and Aims: Analysis of illegal and controlled drugs are carried out in forensic, criminal and medical laboratories in Türkiye. Quality Management System (QMS) is an essential component in all drug-testing laboratories, as well as in ensuring the quality of test results. This study presents an overview of the status of the drug testing process in terms of quality management systems in forensic laboratories in Türkiye.

Methods: The regulations governing forensic analysis laboratories, their relationship with the TS EN ISO/IEC 17025:2017 and TS EN ISO/IEC 15189:2022 systems, and relevant data about accreditation through Turkish Accreditation Agency (TURKAK) were examined.

Results: Drug analysis in biological matrices are provided for medical, judicial or administrative purposes in medical laboratories licensed in accordance with the Ministry of Health Medical Laboratory Regulation. It is divided into two laboratories that provides screening and confirmation stages. Screening analysis includes standard test panel (5-substance) within the specified narrow range. Compliance with ISO 15189 is not mandatory in clinical laboratories, but the implementation guidelines include the provisions of this standard. Positive forensic samples are analysed in authorised confirmatory laboratories, but there are no accredited laboratories. Biological samples from forensic cases are also analyzed in the laboratories of the Council of Forensic Medicine (ATK)-Ministry of Justice. ATK has a six-branch centre accredited by TÜRKAK. The Police, Gendarmerie and Customs Criminal Laboratory Directorates analyses seized drugs in their laboratories accredited under ISO 17025 and there is no separation as screening and confirmation laboratory.

Discussion-Conclusions: The analysis of drugs is subject to differing standards across various ministries in Türkiye. New international standards designed to ensure the quality of the forensic process like ISO 21043 specific to forensic science. With this developments, the necessity of establishing a forensic toxicological analysis guideline that is specifically aligned with the needs of our country has been emphasised.

Keywords: Forensic Sciences, Quality Management System, Drug Analysis

CONTRIBUTING FACTORS OF CITALOPRAM-ASSOCIATED FATALITIES

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Background and Aims: Citalopram is a widely prescribed selective serotonin reuptake inhibitor (SSRI) used to treat depressive disorders. While generally considered safe even in moderate overdose, fatal cases have been reported. These fatalities are multifactorial, as the cases usually involve other drugs use, suicidal actions or pre-existing conditions which bring interpretation challenges to forensic investigations. Citalopram has S-(+) and R-(-) enantiomers. Only S-(+) is pharmacologically active. Citalopram-related deaths are mainly due to serotonin syndrome (SS), exclusively caused by the S-(+) enantiomer. SS occurs due to overstimulation of serotonin receptors. Cardiac toxicity, caused by both S-(+) and R-(-) through human Ether-à-go-go-Related Gene (hERG) channel inhibition, is another mechanism of Citalopram-related deaths. The aim is to examine the pharmacological mechanisms and forensic considerations that contribute to citalopram-associated deaths.

Methods: A literature review was conducted using the search terms: "Citalopram" AND ("death" OR "fatality" OR "postmortem" OR "post-mortem" OR "autopsy" OR "forensic toxicology" OR "pharmacogenetics"). Searches were performed on PubMed and Google Scholar for English-language articles published between 2021 and 2025. Studies focusing on contributing factors of Citalopram-associated deaths were included.

Results: Factors contributing to citalopram-related deaths include overdose, delayed onset of therapeutic effect, enantiomeric composition, drug interactions, genetic variability in metabolism, and physiological conditions. Fatalities involving citalopram alone are rare due to its selective action on the serotonin transporter (SERT), which makes serotonin syndrome difficult to induce without external factors. Due to individual genetic differences, rapid metabolizers may experience reduced efficacy from Citalopram. As therapeutic onset is typically delayed, and long-term use may lead to 5-HT receptor downregulation, the combination of these factors can increase the cumulative risk of SS.

Discussion-Conclusions: Citalopram-associated fatalities are primarily linked to SS and cardiac toxicity, both influenced by pharmacological and individual-specific factors. A comprehensive understanding of these mechanisms is essential for accurate forensic interpretation.

Keywords: Forensic Toxicology, Forensic Pathology, Citalopram, Serotonin Syndrome (SS), Cardiac Toxicity

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INVESTIGATION OF FOUR METHANOL INTOXICATION CASES WHO WERE ADMITTED TO A TRAINING AND RESEARCH HOSPITAL IN ISTANBUL: CASE SERIES

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Background and Aims: Methanol is a colorless, transparent, and extremely toxic chemical that is produced by detrimentally distilling wood. Symptoms, which are usually related to the eyes, gastrointestinal tract, and central nervous system, may manifest after a latent period. Legal authorities ask an expert report from the Forensic Medicine Specialist (FMS) in methanol intoxication cases, defining the severity of injuries and whether or not they are life-threatening. This presentation aimed to increase FMSs' awareness of these cases.

Case: The medicolegal records of four adult male patients with methanol poisoning who were admitted to the Istanbul Kanuni Sultan Suleiman Training and Research Hospital's Department of Emergency Medicine (ED) between December 14, 2024, and January 14, 2025, were provided. Despite the inability to measure the blood level of methanol, the amounts of ethanol were computed. The range of blood ethanol levels is 160–180 mg/dl. The most typical symptoms include acidosis, and loss of visual acuity. Along with hemodialysis, treatment includes intravenous ethanol replacement. Interestingly, ethanol administrations were successfully carried out via nasogastric tube in our hospital even though there was no intravenous form of ethanol available. In most EDs, it is not possible to determine the blood methanol level. When preparing an expert report in such circumstances, FMSs should be aware of the characteristic findings of methanol intoxication.

Discussion - Conclusions: Our presentation describes the clinical and demographic characteristics of four methanol intoxication cases that were included, highlighting the medicolegal outcomes that occurred. Here, we describe four rare cases of methanol intoxication with a range of symptoms involving neurological and visual symptoms, as well as alternative treatment approaches like oral ethanol administration. In order to prepare a true expert report, FMSs ought to develop their medicolegal knowledge of methanol intoxication.

Acknowledgment: This presentation was supported by TÜBİTAK BİDEB under the 2224-A International Research Fellowship Program for Participation in Scientific Events Abroad.

Keywords: Forensic Medicine, Forensic Sciences, Emergency Medicine, Methanol intoxication

FORENSIC PSYCHIATRY SESSION

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REVIEW OF PRETEEN SUICIDES – CHILD DEATH REVIEW COMMITTEE OF OAKLAND COUNTY, MICHIGAN

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Background and Aims: This presentation reviews demographic, social, psychiatric, personal, and familial characteristics of preteen suicides from the perspective of a forensic psychiatrist consultant to the child death review (CDR) committee. Recent research indicates that suicides of preteen children in the United States have increased in the past several years, increased more in girls than boys, and with increased use of a firearm. There is, however, a relative lack of knowledge of psychiatric and psychological concerns regarding preteen suicides, because most young people who die by suicide have no prior psychiatric diagnosis.

Methods: At the CDR level, a group of specialists convenes in a closed, confidential manner that is restricted from public view. We assessed data from six index cases involving preteen children.

Results: The cases ranged from eleven to thirteen years, with four males and two females; one child had possible gender dysphoria. Four deaths were caused by an overdose, one by hanging, and one with a firearm. Suicide notes or similar communications were present in four cases. Two cases had a known psychiatric disorder. No substances of abuse were present in any of the cases. All were in school. Three lived with married parents, two with single parents, and one with foster parents. One child suffered physical abuse, and another had suspected abuse by a parent. None of the children took psychiatric medications; two were referred for counseling.

Discussion-Conclusions: In summary, the interdisciplinary members of the CDR, representing areas of medicine, law, social services, and law enforcement, collaborate to provide a more complete understanding of factors that contribute to child deaths. By presenting data from these specific preteen suicide cases, we intend to demonstrate how the interdisciplinary approach of the CDR process can improve measures to better understand and prevent preteen suicides.

Keywords: Child, Preteen, Suicide, Interdisciplinary

THE IMPACT OF COGNITIVE LOAD ON DECEIT DETECTION AND MEMORY RECALL IN CHILDREN'S INTERVIEWS: A META-ANALYSIS

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Background and Aims: The detection of deception in children's interviews is essential for statement veracity. The widely used method for deception detection is building cognitive load which is the logic of Cognitive Interview (CI) and its effectiveness for adults is approved. This meta-analysis delves into the effectiveness of inducing cognitive load as a means of enhancing veracity detection during interviews with children. Additionally, the effectiveness of cognitive load on children's total number of events recalled assesses as a second part of the analysis.

Methods: The current meta-analysis includes ten effect sizes from search using databases. For the effect size calculation Hedge's g was used with random effect model by using CMA version 2. Heterogeneity analysis was conducted to detect potential moderators.

Results: Overall result indicated that cognitive load had no significant effect on veracity outcomes ($g = 0.052$, 95% CI $[-.006, 1.25]$). However, high level of heterogeneity was found ($I^2 = 92\%$). Age, participants' characteristics, interview setting, and characteristics of interviewer was coded as possible moderators to explain variance. Age was significant moderator ($\beta = .021$; $p = .03$, $R^2 = 75\%$) but the analysis did not reveal statistically significant effects for other potential moderators: participants' characteristics ($Q = 0.106$, $df = 1$, $p = .744$), interview setting ($Q = 2.04$, $df = 1$, $p = .154$), and characteristics of interviewer ($Q = 2.96$, $df = 1$, $p = .086$). For the second outcome, the total number of events recalled, the overall effect was significant ($g = 4.121$, 95% CI $[2.256, 5.985]$). The cognitive load was effective in total recalled event when interviewing with children.

Discussion-Conclusions: All in all, while age plays a crucial role in determining the impact of cognitive load on veracity, the surrounding context, interviewer attributes, and inherent participant traits may not significantly alter the relationship. These findings throw light on the need for more focused, age-specific methods when using cognitive load measures. It may be possible to improve the precision and dependability of deceit detection in children interviews with the help of more study in this field.

Keywords: Deceit Detection, Cognitive Load, Memory Recall, Children Interviews, Meta-Analysis

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EXAMINATION OF THE RELATIONSHIP BETWEEN ANTISOCIAL BEHAVIOR PSYCHOPATHIC TENDENCIES AND CHILDHOOD MENTAL TRAUMA EXPERIENCES IN THE ADULT MALE OFFENDERS CONVICTED OF PHYSICAL AND SEXUAL VIOLENCE

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Background and Aims: Violence and especially sexual violence is a public health problem around the world. This study aimed to investigate the relationship between antisocial behaviors, psychopathy tendencies and early childhood abuse and neglect experiences among adult male prisoners aged 18-45 convicted of sexual and physical violence crimes in various prisons. Additionally, it was examined whether these variables differed according to certain sociodemographic characteristics and crime types, and the effect of childhood mental trauma experiences on psychopathy and antisocial behavior scores was assessed.

Methods: This study included a total of 266 adult male inmates convicted of physical and sexual violence crimes who were determined through purposive sampling from three different prisons. The data were analyzed with SPSS.

Results: The findings indicated that participants convicted of sexual violence crimes had higher scores in sexual abuse, emotional abuse and physical neglect compared to inmates convicted of physical violence crimes. Participants convicted of sexual violence reported experiencing greater sexual abuse. Moreover, childhood trauma subscale scores, antisocial behavior scores and psychopathy scores varied according to certain sociodemographic characteristics. Significant relationships were observed between childhood psychological trauma subscale scores and both antisocial behavior and psychopathy scores. Additionally the analyses revealed that physical neglect was a significant predictor of antisocial behavior scores whereas antisocial behavior scores also served as a predictor of psychopathy tendencies.

Discussion - Conclusions: It was observed that a history of sexual abuse played a role in the perpetration of sexual violence crimes. Analyses revealed that among the childhood trauma subscales physical neglect had a predictive effect on antisocial behavior and psychopathy tendencies. The findings suggest that institutions should improve trauma-focused interventions and provide family education on childhood traumas and their potential adverse effects.

Keywords: Childhood Trauma, Antisocial Behavior, Psychopathic Tendencies, Physical Violence, Sexual Violence

EVALUATION OF PSYCHOPATHY TENDENCIES IN INDIVIDUALS AGED 12-18 IN TERMS OF CRIMINAL THINKING TENDENCY

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Background and Aims: It is considered high probability to observe criminal behavior in children showing symptoms of psychopathy, even if they will not be diagnosed in the future. These symptoms show themselves in childhood and adolescence; It may occur due to reasons such as impulsiveness, inadequate parenting, hereditary predisposition, socio-economic problems, environmental factors and traumas. These symptoms can persist until adulthood and develop into issues like substance abuse, mental disorders, relationship problems, and low functionality.

The purpose of this study is to measure the extent to which adolescent individuals with psychopathy tendencies are prone to criminal thinking. In this way, it is aimed to contribute to the prevention of adaptation disorders and criminal behavior that may occur in adulthood.

Methods: The sample of the study consists of 50 participants, 62% (n= 31) girls and 38% (n= 19) boys, studying in secondary schools and high schools in various districts of Istanbul. The MACH-IV Scale and the Criminal Thinking Scale were applied respectively to the participants online, using "Google Forms".

People who score above the average on the MACH-IV scale, are expected to score above the average on the Criminal Thinking scale as well.

Results: As expected, it was observed that individuals who scored above the average on the MACH-IV Scale, also scored above the average on the Criminal Thinking Scale with a high percentage (77%). It was decided that exceptional cases were at a percentage (23%) that could be ignored within the parameters of this study.

Discussion-Conclusions: The findings of this study have indicated that even during childhood and adolescence, individuals can be prone to criminal thinking. In light of this information, it is believed that early intervention, with professional help and, if necessary, a diagnosis and appropriate treatment, is of utmost importance.

Keywords: Forensic Sciences, Forensic Psychology, Criminal Thinking, Psychopathy, Adolescence

BORDERLINE PERSONALITY DISORDER AND CRIME: CORRELATION AND STIGMATIZATION

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Background and Aims: Borderline personality disorder and its association with criminality is an unrecognized topic in the Greek literature. However, it is a multi — factorial issue both in terms of the definition of criminality and as a recognized personality disorder, as well as the stigma observed by society towards the diagnosed population. The following qualitative study aims to investigate through the experience of the participants if there is actually any correlation between borderline personality disorder and criminal behavior as well as to study the phenomenon of stigma. The rationale of this study arises from the extend of stigmatization towards borderline personality disorder and the lack of research on the subject.

Methods: A literature review of the stigma, borderline personality disorder, and criminality took part. Four (4) semi structured interviews were conducted over a period of almost one month with samples, individuals diagnosed with borderline personality disorder by mental health experts.

Results: After qualitative processing of the data, two thematic sections emerged: “The everyday life of borderline personality disorder” , and “Stigma & Criminality” . The first highlighted the feelings and experiences of the participants, as well as their experienced regarding their routine with this diagnosis, while the second thematic section highlighted the forms of stigma and prejudice towards these individuals as well as their own experience with criminal behavior.

Discussion-Conclusions: Borderline personality disorder and criminality are presented as something that is determined by a variety of factors that are interconnected and affect each participant's experience individually.

Keywords: Borderline Personality Disorder, Stigma, Theories of Crime

COGNITIVE FLEXIBILITY AND EXTREMISM: THE MEDIATING ROLES OF CONSPIRACY BELIEFS AND FAKE NEWS DETECTION ABILITY

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Background and Aims: Radicalization is a multifaceted process shaped by cognitive, social, and informational factors. This study investigated the mediating roles of conspiracy beliefs and the ability to distinguish between fake and real news in the relationship between cognitive flexibility and extremism.

Methods: A total of 157 participants completed validated scales measuring cognitive flexibility, conspiracy beliefs, fake news detection ability, and extremism. All scales demonstrated acceptable internal consistency (Cronbach's $\alpha > .70$). Mediation analyses were conducted using PROCESS Model 4 with 5,000 bootstrap samples in SPSS version 26.0 to test whether conspiracy beliefs and fake news detection ability mediated the relationship between cognitive flexibility and extremism.

Results: Cognitive flexibility showed a significant negative direct effect on extremism ($B = -0.31$, $p = .012$), along with a significant total indirect effect via the mediators ($B = 0.22$, 95% CI [0.06, 0.39]). More specifically, the ability to distinguish between fake and real news significantly mediated the relationship between cognitive flexibility and extremism ($B = 0.14$, 95% CI [0.03, 0.27]). Conspiracy beliefs, however, did not serve as a significant mediator ($B = 0.08$, 95% CI [-0.04, 0.21]).

Discussion and Conclusions: These findings suggest that cognitive flexibility reduces extremism both directly and indirectly by improving individuals' capacity to critically evaluate information, particularly online content. Conspiracy beliefs, in contrast, did not significantly mediate this relationship. Although preliminary results are reported here, data collection for this study is ongoing.

Keywords: Radicalization, Cognitive Flexibility, Conspiracy Beliefs, Extremism, Fake News Detection

CLINICAL FORENSIC MEDICINE SESSION

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INTEGRATED SOFTWARE FOR MONITORING, DIAGNOSIS AND PREVENTION OF SUDDEN CARDIAC DEATH IN THE BALKAN REGION

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Abstract: Sudden Cardiac Death (SCD) remains a critical public health issue in the Balkan region, often striking without prior symptoms and leaving families and healthcare systems unprepared. This paper proposes the development of an integrated software platform that unifies antemortem clinical data, postmortem findings—including autopsy, histopathology, biochemistry, molecular autopsy (genetic information) to improve the monitoring, diagnosis, and prevention of SCD. Central to the platform is an artificial intelligence (AI) engine capable of analyzing large, multidimensional datasets to identify individuals at elevated risk. By applying machine learning algorithms to patterns derived from ECGs, imaging, laboratory analyses, family history, autopsy results, and genetic markers, the system can provide real-time risk stratification and predictive insights for clinicians. Furthermore, the software facilitates cross-institutional collaboration among hospitals, forensic units, and genetic labs across the Balkan region, enabling comprehensive cascade screening and personalized prevention strategies. Educational training and e-manual will train healthcare providers in the use of AI-driven tools and the interpretation of complex data. This initiative aims to transform fragmented data into actionable intelligence, offering a scalable, cost-effective model for reducing SCD incidence and improving cardiovascular outcomes in the region.

Keywords: AI prediction, Sudden Cardiac Death, Diagnosis, Prevention, Monitoring, Education, Financial benefit

SUDDEN CARDIAC DEATHS IN FORENSIC PRACTICE DURING 2022

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Background and Aims: Sudden cardiac death is defined as a natural death that occurs immediately or within a short period of time. This phenomenon remains one of the main values of mortality in the whole population, an issue in young and active ages, making its identification and prevention a public priority. This study will analyze the epidemiological and medico legal aspects of sudden cardiac deaths, with the aim of deepening knowledge about the possible causes, physio pathological mechanisms and the importance of autopsy in determining the true diagnosis.

Methods: This study aims to examine the demographic aspects and clinical profiles of individuals who suffered sudden cardiac death during the period January-December 2022. Through the analysis of variables such as: age, gender, cause of death and comorbidities, this study aims to reveal trends that can help identify that part of the population that is at greatest risk for sudden cardiac death and improve prevention efforts by minimizing risk factors.

Results: The total number of sudden cardiac deaths during 2022 (January-December period) was 141, these constitute 22.8% of the total number (619) of autopsies registered in the IML registry. There is a significant male/female difference, about 78.7% of them were male and 21.3% were female. The age group with the largest number of cases was the age group 60-69 years with about 26.2% of the total number of cases. The youngest age who had suffered sudden cardiac death was 27 years old, with autopsy findings: "interventricular septal thickening". The age groups with the smallest number of cases are 90-99 years old (1 case) and 20-29 years old (2 cases). The highest number of deaths was during January and there is a significantly lower number of sudden cardiac deaths in the spring season. An interesting fact that was observed is that in the 30-39 age group, out of 11 sudden cardiac deaths in total, 5 of them had positive toxicology results for cocaine. The most common cardiac diagnosis is AMI (acute myocardial infarction) with 91 cases accounting for 64.5% of total cases.

Discussion-Conclusions: From a forensic point of view, sudden cardiac death remains a real challenge due to its immediate nature and the lack of obvious preliminary signs, making it difficult to identify the exact cause of death without an in-depth autopsy examination and supplemented with histopathological and toxicological data. Changes in nutrition, regular physical activity, avoidance of tobacco, alcohol, drugs, and stress management are important steps that can significantly reduce the incidence of sudden cardiac death and increase the quality of life in society.

Keywords: Forensic Medicine, Cardiac Sudden Death, Acute Myocardial Infarction

PARTICULAR ASPECTS OF MEDICAL COMMUNICATION IN CLINICAL FORENSIC MEDICINE: FROM CHALLENGES TO GOOD PRACTICE

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Introduction: Forensic examination of the living involves a complex set of challenges, generated by the emotional charge of the situation, the legal and procedural implications, the potential communication barriers or medical vulnerabilities of the person being examined. As such, effective communication in clinical forensic medicine has a central role and a twodimensional nature: on the one hand, it must ensure the accuracy of the forensic assessment, both from a legal and scientific perspective; on the other hand, it must protect the victim from re-traumatization and prevent any attacks on dignity, integrity and safety.

Material and methods: Based on the professional experience of the authors, an analysis of international guidelines and specialized literature was performed, through a systematic search in international databases (Pubmed, Scopus, Web of Science). Both original studies and review articles were selected, addressing the particularities of medical communication in clinical forensic practice.

Results: Medical communication in forensic practice integrates all four fundamental dimensions of human communication: verbal, non-verbal, paraverbal and extra-verbal. However, the particularities of medical communication in forensic practice vary depending on the category of vulnerable persons examined- children, the elderly, victims of sexual abuse, tortured persons, detainees, migrants, victims of human trafficking and are reflected in multiple aspects: the use of active listening techniques; expression of empathy; adaptation of language, tone and rhythm of speech; presence of the guardian/legal representative; ensuring a safe and intimate environment; guaranteeing confidentiality; respecting the dignity and integrity of the person; ensuring a qualified interpreter; demonstrating cultural competence; maintaining impartiality and rigorous documentation of findings.

Conclusions: Effective communication is a major determinant of the quality of forensic expertise performed on living persons. Continuous training of forensic medical personnel in the field of communication, with an emphasis on addressing vulnerable victims, is essential for carrying out the medical act under optimal conditions and for obtaining results in line with the highest professional and ethical standards.

Keywords: Medical Communication, Clinical Forensic Medicine, Vulnerable Victims, Forensic Examination, Empathy

MEDICO-LEGAL EVALUATION OF TWO BOTOX INTOXICATION CASES PRESENTED TO THE JUDICIARY

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Background and Aims: Botulinum toxin (BoNT) was first approved by the FDA in 1989 for the treatment of neurological disorders such as blepharospasm and hemifacial spasm. Its use in the medical field has subsequently expanded to include various indications. Its widespread use in aesthetic procedures has also led to an increase in off-label applications and botulinum toxin has become a widespread application in both medical and aesthetic fields. However, this widespread use has also led to malpractice claims, unauthorized applications and related harms. In recent years, the number of medico-legal applications in this area has increased which are usually in need of simple mild medical treatment.

Methods: In this study, the subject was discussed in its clinical and forensic aspects through two cases of iatrogenic botulism (seen clinically and medico-legally very rare), which could not be simply treated and are brought to court.

Results: Our cases were referred to us for a medico-legal evaluation after a diagnosis of iatrogenic botulism was made. In both cases the individuals who underwent the procedure consented but were not adequately informed.

Discussion-Conclusions: In such cases, proving the negligence or fault of a competent practitioner in causing the complication can be difficult making forensic medical evaluations complex. However, it is easier to prevent these situations in the first place.

Keywords: Iatrogenic Botulism, Unauthorized Application, Malpractice, Medico-Legal Evaluation

QUESTIONED DOCUMENTS SESSION

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HANDWRITING EXAMINATION FOR NATIONALITY ATTRIBUTION: ANALYSIS OF ENGLISH WRITING STYLE OF VIETNAMESE INDIVIDUALS

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Background and Aims: A mature handwriting is a product of neuromuscular coordination and several complex and influential factors like predominant writing system of an individual's country and the impact of native language on the writing style of second language. It has been established by the authorities that class characteristics in handwriting can be used for categorization of a group of individuals. This research is designed to study the national characteristics of English handwriting of Vietnamese individuals residing in Socialist Republic of Vietnam, and the effect of Vietnamese writing system on their English writing style.

Methods: This research is executed by obtaining 250 English handwriting exemplars of Vietnamese individuals. General information about the handwriting features in all the exemplars are extracted and five categorical features describing the overall appearance of handwriting and 18 dichotomous features present or absent for each exemplar are identified. The statistical data has been subjected to frequency distribution and Chi-square analysis. Correlations are analyzed amongst the categorical features while asymptotic significance values (p-values) are obtained for the dichotomous features with respect to the categorical features.

Results: Some key findings are: 86.8 % of the individuals in the focus group executed the numeral "1" with an approach or secondary stroke, the lower loop of letter "f" is executed clockwise, and 79.2 % of individuals executed composite writing comprising of block letters in place of cursive capitals. The graphemes for "F", "J", "W", and "Z" are absent in Latin-based script for Vietnamese language, this fact is observed to introduce unusual writing style for these graphemes in their English language.

Discussion-Conclusions: Our findings concurred with some of the previously reported work. We present these findings and results as a reference for forensic document examiners in the cases of writer or nationality attribution for unknown pieces of English handwriting.

Keywords: Nationality Attribution, English Handwriting, English Handwriting Style, Vietnamese Writing System, Forensic Handwriting Analysis

EXAMINATION OF VARIOUS PAPER SAMPLES WITH DIFFERENT INKS BURNED IN DIFFERENT WAYS BY DESTRUCTIVE AND NON-DESTRUCTIVE METHODS

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Background and Aims: Questioned document examination is a sub-discipline of Forensic Sciences that involves the scientific analysis of documents to determine authenticity, reveal alterations, and recover obscured information. Burned or charred documents are frequently encountered in criminal cases involving fire, whether accidental or intentional. These documents may contain crucial content, such as signatures, handwritten notes, or official records, that can influence legal decisions. However, due to the fragile nature of burned paper and ink degradation, examining such evidence presents significant challenges. This study aims to evaluate the effectiveness of various instrumental and chemical techniques in detecting and analyzing writing on burned documents.

Methods: Four types of paper as newsprint, receipt paper, A4 paper, and paper towel were written using four types of pen as pilot pen, ballpoint pen, gel pen, and pencil, then burned using four distinct methods: Household oven, lighter, laboratory oven and microwave. Following the burning process, the samples were examined using four main devices: Video Spectral Comparator 8000 (VSC8000), stereo microscope, Attenuated Total Reflectance Fourier Transform Infrared (ATR-FTIR) spectrophotometer, and fluorescence spectrophotometer. Additionally, chemical reagents sodium hydroxide (NaOH) and hydrogen peroxide (H₂O₂) were applied to samples as bleaching agents to enhance the visibility of writing.

Results: The results showed that the pen, paper, and burning method affected the degree of legibility. The VSC8000 was quite effective in detecting ink residues that were invisible under normal lighting. IR and fluorescence spectroscopy provided information about the structural properties of thermally degraded paper and ink, while stereomicroscopy enabled the observation of burn patterns at the surface level. Chemical treatments improved the legibility of some samples, but the results varied depending on the ink and the intensity of the burning.

Discussion-Conclusions: A combination of instrumental and hyperspectral techniques can significantly improve the ability to analyze burned documents. These methods are valuable in forensic investigations where recovering partially destroyed evidence is essential.

Keywords: Forensic Sciences, Burned Document, VSC8000, IR Spectroscopy, Fluorescence Spectroscopy

CAN WE AGREE ON TERMINOLOGY BEYOND HANDWRITING?

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Background and Aims: At this point in time, there seems to be a large variation in the manner document examiner express their conclusions. It has been many years since the first heated and spirited debates started on the terminology to be used in reports by document examiners. This evolved into the ASTM¹ standard and SWGDOC² standards continuing the debates and evolution of the terminology. The terminology as it relates to certainty can also be seen in expressing opinions and reporting conclusions in proficiency testing. While there are of course drawbacks at times, the use of standards to explain conclusions is generally regarded in the field as a helpful guideline. In the ASTM and SWGDOC standards number 3.5, it is said that the terminology can be applied to other areas of document examination not just handwriting examinations. The questions for today are; "Should we do that?" , Do we do that?" , and "How close are we to being on the same page in practical cases and applications?" This paper is a continuation of a previous presented paper and will be an interactive discussion-based presentation with made up case scenarios using real case images and examination results. The point of the presentation is NOT to say that someone' s opinion got more votes than another, but instead to evaluate the similarities and differences in expressing opinions in document examination cases.

Methods: ESDA examinations, infrared testing, and visual document examinations from previous case work are used as case examples. The case examples will include, the use of multiple ink formulations to create an entry, entries, or an entire document, the evaluation of impression evidence, and the evaluation of other similar examinations.

Results: Through my experience examining documents and testifying on the conclusions made from the evidence in the cases, there is a wide range of opinions given. The goal of this paper is to demonstrate these differences and create a framework to close variations like the original standards on handwriting examinations did.

Discussion: The feedback and discussion of the examples discussed in this paper can provide guidance if the standards can be used in some or all the areas of document examination and secondly, if there is a productive path forward to begin to arrive at some parameters for the implementation and use of possible future standards.

Keywords: Forensic Document Examination, Handwriting Examination

THE ROLE OF STANDARDIZED SAMPLING IN FORENSIC DOCUMENT EXAMINATION: A CASE-BASED EVALUATION FROM TÜRKİYE

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Background and Aims: Forensic document examination plays a crucial role in legal processes, particularly in societies facing increased risks of document forgery due to economic instability. In Türkiye, although the legal basis for expert reporting is established through the Expertise Law No. 6754, inconsistencies in collecting handwriting and signature samples challenge the accuracy and validity of forensic analyses. This study emphasizes the need for standardized sampling procedures and evaluates their impact on the reliability of expert reports. Case analyses demonstrate that deviations from established norms often lead to procedural errors and misinterpretations in court. Therefore, adopting a unified national protocol aligned with ISO/IEC 17025 and ENFSI guidelines is essential.

Methods: This research is based on a qualitative review of expert reports submitted between 2021 and 2024. Reports were selected from both public and private forensic institutions and evaluated by parameters such as: quantity and quality of samples, compliance with recommended standards (use of full alphabet, numerals, supervised writing), writing conditions, proximity in time between disputed and comparison documents, and adherence to ENFSI and ISO/IEC 17025 principles.

Results: Findings show that over 60% of reports relied on inadequate or non-standard samples. Many lacked complete alphabet or numeric examples. These deficiencies can be resulted in inconclusive or contested expert opinions.

Discussion - Conclusions: Lack of standardization weakens the evidentiary value of forensic reports. To improve reliability, uniform national guidelines should be enforced; judicial authorities must receive training on proper sample collection; and ENFSI and ISO/IEC 17025 requirements should be integrated into reporting templates. Collaboration among document examiners, linguists, and legal experts will further strengthen procedural integrity and public trust in the justice system.

Keywords: Forensic Document Examination, Expertise Law, Sampling Protocol, Signature Forgery, ISO/IEC 17025

THE ULTIMATE FORENSIC APPROACH FOR DETERMINING THE SOURCE OF COLOR LASER PRINTOUTS

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Background and Aims: The determination source of color laser printouts has become a significant challenge in the realm of digital forensics, especially in counterfeiting investigations. As the global distribution of color laser printers expands, forensic investigators are often tasked with determining whether a specific printer was used to produce questioned documents. The central aim of this work is to present a validated forensic framework capable of accurately attributing color laser printouts to their source printers, thus supporting law enforcement in cases involving document fraud and forgery.

Methods: The proposed methodology incorporates both passive and active forensic techniques. At its core is the use of Coded Dot Matrix Patterns (CDMP), which act as intrinsic identifiers or "fingerprints" embedded by manufacturers into printouts. These patterns are extracted and analyzed using high-resolution imaging and pattern recognition algorithms. A classification-based scheme was developed to streamline the identification process, integrating MIC (Machine Identification Code) decoding with enhanced CDMP mapping. Experimental tests were conducted on a dataset of printouts from over 20 different color laser printer models.

Results: The developed framework achieved a 100% success rate in identifying the source printer from printout samples under controlled conditions. Both MIC and CDMP analyses independently yielded high precision; however, combining the techniques significantly improved reliability and minimized false positives. The framework proved effective even in degraded or partially damaged printouts, demonstrating its robustness and field applicability.

Discussion- Conclusions: This forensic approach sets a new benchmark for printer attribution in digital forensics. By combining passive and active techniques and leveraging the unique properties of coded dot matrices, this method offers forensic professionals a highly accurate, replicable tool. Its implementation could revolutionize document authentication and significantly bolster the fight against counterfeiting.

Keywords: MIC, CDMP, Passive Techniques, Active Techniques, Color Laser Printout

FORENSIC PATHOLOGY SESSION II

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A CASE OF DOMESTIC DISPUTE I - ACCIDENT OR HOMICIDE? MICHIGAN VS MARK UNGER

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A family of four went to their favorite resort, Lower Herring Lake, in Northwestern Michigan to settle an ongoing dispute over the husband's opiate addiction for which he had been receiving monthly disability benefits in the amount of \$6,500.00. That evening after dinner they were heard arguing on a deck above a nearby boathouse. Later, the 37-year-old wife went missing and was found dead the next morning at the edge of the lake in water 5 inches deep. The couple were in the process of divorce, but the husband had said that the divorce was not going to happen.

The investigation of the scene of death and the complex pathophysiology of the trauma sustained by the victim is discussed in light of the relevant criminal charges.

Keywords: Opiate Addiction, Scene of Death, Pathophysiology of Trauma, Criminal Charges

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SUBDURAL HEMORRHAGE IN HANGING DEATHS, A RETROSPECTIVE CASE CONTROL STUDY

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Background and Aims: The main objective of this research is to determine the association between the presence of cranial subdural blood and hanging deaths. Secondary objectives include analyzing the relation between age, time passed after death, and the location of hypostasis with the presence of blood in the subdural space.

Methods: A retrospective case-control study was conducted in the Forensic medicine center in Dammam, Saudi Arabia, from October 2016 to August 2020. Death charts were reviewed and cases were classified into 2 groups according to the cause of death.

Results: After reviewing the photos of the brain, more cases were excluded for reasons including: reviewers couldn't comment on the case either because of a putrefied brain, unclear photo or there is no photo of brain before its removal from the skull (to avoid misinterpreting bleeding artefacts from manipulation).

Discussion-Conclusions: The presence of blood in the subdural space is common in both hanging deaths and other causes of death.

Keywords: Hanging, Subdural Hemorrhage, Retrospective Case-Control, Manner of Death, Interpretation of Findings

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ANALYSIS OF FATAL CASES OF FALLS/JUMPS FROM HEIGHT

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Background and Aims: The subject of the study is the analysis of fatal cases of falls/jumps from a height with a focus on the occurrence and frequency of injuries to individual parts of the body, the causes of the fall/jump and the presence of psychoactive substances in the body at the time of death.

Methods: An analysis of fatal cases of falls/jumps from height autopsied at the Department of Forensic Medicine of Health Care Surveillance Authority in Bratislava in the years 2013 – 2023 was performed, representing a catchment area of approximately 1.2 million inhabitants.

Results: The selection criteria met 391 cases, i.e. approximately 4% of all autopsied cases. To males referred 68% of cases. The age range was between 10 and 93 years. According to the immediate cause of death, the cases were divided into 3 groups: traumatic-haemorrhagic shock, brain death and other causes. In traumatic-haemorrhagic shock, the most common injuries were rib fractures in 88% of cases and lung injuries in 86%. In cases of brain death, skull fractures were found in 85% and brain injuries in 100% of cases. Ethanol was found in 25% and other psychoactive substances in 14% of toxicologically examined cases. In 24% of cases, there were accidental falls, including occupational injuries (11%), in 63% there were suicide jumps, and in 13% the cause of the fall was not determined.

Conclusion: The results of the study showed that it is necessary to pay more attention to psychiatrically treated patients, since even regular psychiatric care and treatment cannot always prevent suicide. It is also necessary to strictly monitor the prohibition of the consumption of alcoholic beverages in the workplace and compliance with safety regulations for work at heights, in order to minimize the incidence of falls with fatal consequences.

Keywords: Fall from Height, Jump from Height, Fatal Injury, Autopsy, Analysis

DIFFUSE AXONAL INJURY- A DISTINCT CLINICOPATHOLOGICAL ENTITY IN CLOSED HEAD INJURIES

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Background and Aims: Diffuse axonal injury (DAI) is a very well defined clinicopathological entity in closed head injuries. It has been defined clinically (immediate and prolonged unconsciousness leading to death) and pathologically (diffuse damage of axons in the white brain matter). In terms of its biomechanics, DAI is occurring as a result of acceleration forces of longer duration and has been fully reproduced experimentally. In this paper we discuss the criteria for diagnosing of DAI, its incidence in different kind of traumatic events and its biomechanical significance.

Methods: In this longitudinal study a total of 80 cases with fatal closed head injuries have been analyzed for the presence of DAI. In the process of the diagnosing of DAI, the performance of a complete forensic neuropathological examination has been undertaken and the immunohistochemistry method using antibodies against β -Amyloid Precursor Protein (β -APP) which has been proved to be highly sensitive and specific, selectively targeting the damaged axons.

Results: Diffuse axonal injury diagnosed by the strict criteria has been found in total of 40% of cases with closed head injury and is positively correlated with the type of the traumatic event. It has been mainly represented in vehicle traffic accidents (almost 100% incidence in drivers) and also in cases of falling from a considerable height.

Discussion-Conclusions: Results of this study show that DAI as a clinicopathological entity can cause severe impairment of the brain function, and in the forensic medicine setting, it can be found as the concrete cause of death. We are discussing its pathological feature, its mechanism of occurrence, and the events on a cellular level, but also the dilemmas about DAI that still exist in science: 1. Regarding the strict criteria for its diagnosis and 2. regarding its biomechanical significance.

Keywords: Diffuse Axonal Injury, Brain Injury, Forensic Pathology

VIRTUAL THORAX DISSECTION: REVOLUTIONIZING FORENSIC EDUCATION AND TRAINING

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Background and Aims: New tools are constantly being introduced in the training of medical students and doctors with extended reality being the latest one. In particular the application of virtual reality in medicine has been widely used by multiple medical specializations with the primary ones being in surgery. Forensics is also taking advantage of this new technology with a variety of applications. The Forensic Medicine Unit of the University of Crete and the Foundation of Research and Technology – Hellas have developed a new tool. This tool is a virtual reality application regarding the autopsy of the thorax. The aim of this application is to provide education to undergraduate and postgraduate medical students as well as practical training to forensic pathologists using a virtual environment.

Methods: The application is called VR-Thorax Autopsy and has already been tested 72 participants. Data has been collected through questionnaires to evaluate the application based on the participants experience. The majority of the participants are undergraduate medical students of the University of Crete.

Results: 82% of the participants had already attended an autopsy and the majority of them believe that the VR-Thorax Autopsy was very close to a real Autopsy. Training students in the virtual environment eliminates many risk factors of the real morgue environment and helps prepare the students for the real autopsy. In general, the application has received positive feedback and the participants have shown great enthusiasm with the majority stating that the VR-Thorax Autopsy was very helpful in understanding the procedure.

Discussion-Conclusions: Looking into the future of the application the first step is to expand the Virtual Reality autopsy to all the organs of the human body. The Virtual Reality autopsy of the brain is already being developed and will soon be available alongside the VR-Thorax Autopsy.

Keywords: Forensic Medicine, Virtual Reality, Thorax Autopsy

CRIMINOLOGY SESSION

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ASSESSMENT OF PUBLIC AWARENESS OF FORENSIC SCIENCE THROUGH THE INFLUENCE OF TV PROGRAMS

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Background and Aims: Television programs and mass media have long been recognized as influential forces shaping public opinion. While extensive research has examined media's role in guiding societal views, limited empirical data exist concerning the influence of forensic science-based television content. Notably, series such as Crime Scene Investigation (CSI) have been criticized for cultivating unrealistic public expectations regarding crime-solving capabilities through advanced technology, a phenomenon known as the CSI Effect. This study seeks to analyze how crime and forensic science-themed media content shapes individuals' perceptions and expectations of forensic science, with particular focus on how fictional representations impact public understanding of the justice system.

Methods: A structured questionnaire, titled "CSI Effect," was administered to 120 participants aged 18 and above. Informed consent was obtained prior to data collection. The gathered data were analyzed using SPSS 26 software. Descriptive statistics—sample size (n), percentage (%), mean, and standard deviation ($\bar{x} \pm ss$)—were reported, and a t-test was employed to assess differences between groups. Findings were interpreted comparatively with existing literature, yielding both national and international implications.

Results: Results indicate that individuals regularly exposed to crime-related media exhibit significantly different perceptions and expectations concerning forensic evidence compared to non-viewers. Although theoretical expectations were elevated among viewers, no definitive stance was reached on whether evidence alone suffices for conviction. Particularly, DNA and hair-fiber evidence types were evaluated in a similar manner across both groups. The prevailing conclusion is that exposure to crime-related media content exerts an influence on perceptions of forensic science.

Discussion-Conclusions: This study underscores that the CSI Effect is a cross-cultural phenomenon, influencing perceptions across different social environments. The distortion of forensic capabilities through fictional media poses potential risks to judicial fairness. Therefore, fostering accurate public understanding is essential. Collaborations between media outlets and academic institutions are recommended to promote informed and realistic societal perceptions of forensic science and justice.

Keywords: CSI Effect, Media Impact, Evidence Analysis, Forensic Science, Public Perception

COLOUR CHANGING CARS AND THEIR IMPACT ON EYE WITNESS / DIGITAL CAMERA TESTIMONIES

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Background and Aims: Recent advances in automotive surface technologies—particularly electronic ink (E Ink) panels and specialized paints such as thermochromic, chameleon, and photochromic finishes—have enabled dynamic exterior color changes in vehicles. While these developments represent a significant technological innovation, they pose a fundamental challenge to forensic disciplines reliant on visual vehicle identification. In criminal and civil investigations, eyewitness reports and digital photographic evidence often form the basis for vehicle identification. However, the reliability of such testimony is potentially compromised when a vehicle's color is variable.

Methods: This review synthesizes interdisciplinary literature from forensic science, perceptual psychology, automotive engineering, and digital imaging. Studies examining eyewitness accuracy in color recognition, digital image color fidelity, and the perceptual ambiguity of intermediate or shifting hues were systematically reviewed. Additionally, current automotive implementations of color-changing technology, particularly BMW's E Ink concepts and custom paint applications, were analyzed with respect to their visual impact under varying environmental and lighting conditions.

Results: The review identifies substantial limitations in both human and technical color recognition processes. Eyewitnesses often misidentify vehicle colors, especially when faced with hues that shift with temperature, light, or viewing angle. Inter-rater reliability in color reporting is low, particularly for vehicles with intermediate or dynamically changing coloration. Similarly, digital cameras—though frequently used in forensic documentation—struggle to capture accurate color representation due to sensor limitations and lighting variability. These effects may lead to erroneous or misleading evidence in forensic contexts.

Discussion - Conclusions: Color-changing vehicles introduce a novel source of ambiguity in forensic vehicle identification. Existing investigative protocols do not yet account for the perceptual and technological limitations posed by such innovations. To uphold evidentiary reliability, forensic practitioners must consider these technologies in witness interviewing, photographic documentation, and expert analysis.

Keywords: Forensic Vehicle Identification, E Ink Automotive Surfaces, Eyewitness Color Accuracy, Digital Image Color Distortion, Dynamic Car Exteriors

IRIS BIOMETRICS AS AN IRREVERSIBLE IDENTIFIER: ETHICAL AND GOVERNANCE IMPLICATIONS

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Background and Aims: Iris biometrics represent a widely utilized modality in biometric identification, characterized by attributes like permanence, uniqueness, and accessibility. Due to these properties, it has been integrated into various high-security identity management frameworks, including national identification programs, refugee tracking systems, post-disaster mass victim identification, financial verification, and international border security. It is permanent; once enrolled in a database, the biometric template is not designed to be modified, revoked, or deleted.

Methods: The study rigorously draws upon key peer-reviewed literature published between 2013-2024 to examine potential risks such as adversarial spoofing and template inversion attacks, even when the data is encrypted or hashed. Additionally, the study sought to evaluate the current policy landscape concerning the ethical deployment and governance of biometric technologies.

Results: The findings reveal a significant gap in the regulatory frameworks addressing the permanence and non-revocability. Although Legal regimes like the General Data Protection Regulation, the Biometric Information Privacy Act, and Aadhaar promote data minimization and consent, they do not fully resolve the dilemmas posed by irreversibility in biometric data systems. Although permanence as an operational feature offers stability and dependability, it also raises issues with user agency, data security, and the possibility of identity theft. This paper evaluates the related consequences for system design and governance and provides an analytical review of iris biometrics in light of their non-revocability.

Conclusions: This study suggests remodeling Iris biometric design to include mechanisms for pausing or limiting biometric use and fallback identity verification methods. Rather than treating biometric identity as fixed, systems should allow flexibility in response to evolving risks and technologies. The aim is to promote more practical, human-centered approaches that consider security alongside individual control, dignity, and the ability to withdraw if required. Adopting innovation through human-technology integration needs to be investigated while adhering to ethical standards to protect people's identities.

Keywords: Iris Biometrics, Ethical Concerns, Irreversibility, Identity Governance, Biometric Security

COMBATING PEER BULLYING IN TÜRKİYE: INSIGHTS FROM SCANDINAVIAN MODELS

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Background and Aims: In recent years, peer bullying in Türkiye has become a growing concern, with rising rates negatively impacting students' mental health, academic success, and overall well-being. Countries such as Finland and Norway have implemented nationally recognized anti-bullying programs like KiVa and the Olweus Bullying Prevention Program (OBPP), which have shown measurable success in reducing bullying rates. This study aims to examine the current situation of peer bullying in Türkiye and evaluate it with successful school-based prevention programs implemented in Scandinavian countries. By analyzing structured interventions of those programs, the study seeks to identify practical and evidence-based strategies that can be adapted to the Turkish educational context.

Methods: A comparative analytical approach was adopted, based on a literature review conducted using key terms such as "peer bullying," "school-based prevention," and "anti-bullying strategies." The search was carried out across databases including PubMed, Google Scholar, ScienceDirect, and EBSCOhost. The review was narrowed to include internationally implemented protocols with measurable outcomes and potential relevance to Türkiye.

Results: The OBPP program demonstrated a 35–50% reduction in bullying and victimization across Norwegian schools within two years. Similarly, Finland's KiVa program achieved consistent reductions in multiple forms of bullying, including cyberbullying. Notably, 98% of students involved in KiVa's case interventions reported improved outcomes. While general anti-bullying programs typically reduce bullying by 17–25%, KiVa and OBPP consistently surpass this benchmark.

Discussion-Conclusions: In conclusion, Scandinavian success underscores the importance of comprehensive, school-wide strategies supported by teacher training, parental involvement, and policy-level integration. Türkiye's current fragmented approach could benefit from adopting and localizing core components of these evidence-based models. Integrating elements such as empathy-based classroom activities, anonymous reporting tools, and trained intervention teams may offer a promising roadmap for long-term bullying prevention in Turkish schools.

Keywords: Peer Bullying, Bullying Prevention, Antibullying Programs, Scandinavian Models, Educational Interventions

TRANSNATIONAL INVESTIGATIONS ON ENCRYPTED PLATFORMS: THE ITALIAN EXPERIENCE

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Background and Aims: This study, conducted by researchers from the University of Foggia and the Italian State Police, explores the investigative challenges posed by encrypted digital platforms increasingly exploited by criminal organizations for illicit purposes. These platforms often rely on advanced encryption technologies and decentralized servers distributed globally, raising significant technical and legal concerns. In Italy, the Court of Cassation confirmed the legitimacy of EIO-based investigations in two landmark rulings but left unresolved the fundamental question of the legal classification of encrypted platform investigations. The research aims to analyze the critical issues related to investigations on such platforms, with particular attention to their implications in the different European jurisdictions.

Methods: The study employs a multidisciplinary approach, combining technical analysis with a legal review. It examines national and European case law, legislative frameworks, and doctrinal interpretations. Particular attention is given to the use of big data in cross-border investigations and the procedures for sharing digital evidence under the European Investigation Order. A comparative analysis was carried out based on rulings from higher Courts in France, Germany, Netherlands, Norway, as well as the jurisprudence of the Court of Justice of the European Union.

Results: Findings reveal recurring critical issues across jurisdictions, including: the impact on fundamental rights, in particular the right to defense; the need for a proper legal framework governing the decryption of data; the evaluation of procedural authorization to use the data obtained by decrypting the information stored on these platforms; the transmission of the information to other law enforcement agencies.

Conclusions: The study highlights the urgent need for a unified legal approach and clearer procedural standards across Europe. By presenting Italy's national experience, this research aims to contribute to a broader European debate and support the harmonization of investigative practices in response to the growing threat of encrypted platforms.

Keywords: Police Investigations, Digital Evidence, Cooperation, Security

FROM BERLIN PROCESS TO BERLIN DEFENSE DIALOGUE: TRACING THE SECURITY DIMENSION OF REGIONAL COOPERATION

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Background and Aims: Berlin Process received much acclaim since its 2014 launch for boosting economic-political cooperation between the Western Balkans and EU member states. However, the security side of this initiative did not receive much attention, despite calls for the establishment of a “Berlin Defense Dialogue” . This paper aims to look at how moving from economic summits to structured defense dialogues can bolster regional resilience and assist the Western Balkans in securing EU membership.

Methods: This research adopts a qualitative case study approach that analyzes official communiqués, records of joint military exercises and possible interviews of national defence attachés and EU facilitators. This method will clarify the emerging dynamics of security cooperation in the region and how the EU is enabling these processes.

Results: Analysis highlights three key dynamics. 1. Joint military exercises are helping to build trust and normalize interoperability of the armed forces of the Western Balkans. 2. Informal security working groups are gradually institutionalizing into more formalized dialogue platforms. 3. Regional confidence-building measures which are taking place to cover security gaps that cannot be covered by the EU’ s CSDP. These changes emphasize the development of the security dimension of the Berlin Process.

Discussion-Conclusions: In conclusion, formalizing a Berlin Defense Dialogue would boost military cooperation and send a stronger signal by the European Union on security commitment towards candidate countries. This might push on defense changes, increase talks on mixed threats and bring in possible future involvement in initiatives as PESCO. Research argues that it is essential for the EU to become a positive factor in the regional political systems. The EU’ s support would be an important alternative for regional actors to conflict and confrontation and will help build their resilience against disruption from outside the region.

Keywords: Berlin Process, Berlin Defense Dialogue, Security Dimension, Regional Cooperation

CLINICAL FORENSIC MEDICINE SESSION II

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TWO KINDS OF CHILD ABUSE IN COMPARISON

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Background and Aims: Accidental intoxication in children, notably involving psychoactive substances, is a frequently overlooked indicator of child abuse or neglect. While traumatic presentations such as shaken baby syndrome (SBS) are widely recognised red flags, subtler manifestations like drug-induced stupor may be misattributed to accidental exposure, delaying protective interventions. This study aims to compare two different kinds of child abuse, such as active maltreatment, which is the worst example, the shaken baby syndrome, and accidental intoxication, an expression of negligence that is an under-recognised maltreatment.

Methods: Over five years, ten paediatric cases aged 2 to 12 years were reviewed, comprising six instances of active maltreatment and four related to neglect. Two exemplar cases are presented in detail: one of SBS characterised by retinal haemorrhage and wrist fracture despite parental denial, and a second involving a four-year-old girl with stupor secondary to lorazepam and lormetazepam intoxication. Chronic benzodiazepine exposure was confirmed via advanced toxicological hair analyses. Additionally, a focused literature review was conducted using Boolean searches on PubMed and Scopus with terms relating to neglect, children, drugs, brain damage, and cerebellum.

Results: The case series and literature illustrate that SBS presents with clear traumatic signs, whereas drug-induced stupor often lacks obvious markers and is initially attributed to accidental ingestion. Subsequent toxicological and social investigations in both contexts raised suspicion of neglect or abuse.

Discussion: Unlike SBS, drug-induced stupor demands a high degree of clinical suspicion, thorough toxicological screening, and careful evaluation of the social environment. Accidental paediatric intoxication should prompt consideration of maltreatment, triggering multidisciplinary interventions. These findings underscore the need for systematic toxicological testing and social inquiry in children presenting with intoxication, positioning such events as critical red flags for potential abuse or negligence.

Keywords: Child Neglect, Shaken Baby Syndrome, Drug Exposure, Brain, Cerebellum, Magnetic Resonance

STRENGTHENING FEMICIDE CLASSIFICATION AND DOCUMENTATION IN MOROCCO: A 10-YEAR RETROSPECTIVE ANALYSIS OF AUTOPSY AND DEATH INVESTIGATION DATA FROM THE FEMICIDE DATA QUALITY IMPROVEMENT PROJECT IN CASABLANCA

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Background: Femicide — the gender-related killing of women and girls — is a global public health and human rights crisis. In Morocco, despite legal and policy advances, femicide remains underreported and unclassified in medico-legal and civil registration systems (CVRS). To address this gap, the Femicide Data Quality Improvement Project in Casablanca aimed to systematically classify female homicide cases using UN definitions and pilot a prospective protocol aligned with WHO standards and CRVS pathways.

Methods: We conducted a descriptive, observational study of female homicide cases referred for autopsy at two medico-legal centers in Casablanca between January 2015 and December 2024. Retrospective classification (n=22) applied United Nation femicide criteria based on autopsy findings, perpetrator relationship, forensic indicators, and contextual information. A Femicide Checklist was piloted to enhance documentation and standardization. Data sources included autopsy and histopathology reports, police/prosecutor investigations, and media accounts. Special circumstances, such as pregnancy, body concealment, and sexual violence, were also recorded.

Results: Of the 22 female homicide cases reviewed, 16 (73%) were classified as suspected femicides. Victims had a median age of 45 years, with the majority married (68%); elderly victims accounted for 18%. Primary causes of death included blunt trauma (45%) and sharp force trauma (36%). Intimate partners (50%) and family members (32%) were the most frequent perpetrators. Special circumstances included murder-suicide (2 cases), sexual violence indicators (2), and body concealment (5). Prospective use of the Femicide Checklist improved clarity and consistency in classification, particularly regarding gender-based motives and perpetrator dynamics.

Conclusion: Femicide accounts for the majority of female homicides in Casablanca. Systematic classification and prospective documentation, as piloted by the Femicide Data Quality Improvement Project, are feasible, enhance data quality, and align with international recommendations. This model supports Morocco's CVRS modernization and can inform national and regional strategies to monitor, prevent, and respond to gender-based violence.

Keywords: Femicide; Homicide Classification; Gender-Based Violence; Death Investigation; Civil Registration

TRAFFIC ACCIDENTS AND DEATHS – A RETROSPECTIVE STUDY

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Background and Aims: Around the world, traffic accidents are one of the major public health problems in many countries, especially in some of un-development countries. According with World Health Organization, approximately 1,19 million people die each year as a result of road traffic accidents. Also, it is important to notice that traffic accidents injuries are the leading cause of death for children and young adults aged 5-29 years old. Our study aims to highlight the influence of traffic accidents injuries in producing deaths.

Methods: The authors conducted a 4 years retrospective study regarding the traffic accidents as a cause of death; all the cases were autopsied at the Institute of Legal Medicine Iasi. The study consist of an exploratory analysis of death cases due to traffic accidents.

Results and conclusions: The results were impressive. It was observed a increasing number of traffic accidents cases, the majority being about car accidents and mostly including one single victim -the driver or the pedestrian. The results show that it is important that governments take some action to address road safety in a holistic manner, because road traffic injuries can be prevented. Of course, that this prevention requires involvement from multiple sectors such as transport, police, health and education.

Keywords: Autopsy, Traffic Accidents, Exploratory Analysis

GENERAL SESSION I

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POSTMORTEM INFRARED CORONARY (PIC) ANGIOGRAPHY VALIDATION WITH CONVENTIONAL CORONARY ANGIOGRAPHY—FIVE PRELIMINARY CASES

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Background and Aims: Sudden cardiac death remains a major diagnostic challenge in forensic medicine, with accurate and timely identification of cardiac causes being crucial for optimizing autopsy protocols and resource allocation. Traditional post-mortem coronary assessment relies on macroscopic and histological methods, which may be limited by anatomical artefacts or destructive techniques. Building upon successful animal models and a single prior human case, this study aims to preliminarily validate post-mortem thermal imaging angiography against conventional post-mortem computed tomography angiography (PMCTA) in human hearts.

Methods: Five human hearts, excised during judicial autopsies, underwent sequential post-mortem coronary evaluation by two methods: (1) thermal imaging angiography, involving catheterization of the coronary ostia or main coronary trunks, injection of hot water (80 °C), and imaging with a high-resolution thermographic camera (HIKMICRO, 256x192 pixels); and (2) reference standard PMCTA with iodinated contrast agent and radiographic imaging. Images were independently evaluated in a blinded, binary manner (patent vs. occluded). Comparative analysis focused on sensitivity, specificity, and predictive values.

Results: Fifteen coronary arteries (right, anterior descending, circumflex) were assessed. PMCTA identified 12 patent and 3 occluded arteries. The thermographic method correctly identified all 2/3 occluded arteries (true positives) and 10/12 patent arteries (true negatives), with no false negatives and three false positives. This yielded a sensitivity of 100%, specificity of 76.9%, positive predictive value of 40%, and negative predictive value of 100%. False positives were associated with significant epicardial fat (>1.5 cm) and tortuous arteries impeding catheter advancement.

Discussion: Despite the limited sample size, thermographic angiography demonstrated high sensitivity and negative predictive value, supporting its reliability in excluding coronary occlusion. However, reduced specificity and positive predictive value warrant caution. The technique's simplicity, non-contaminating nature, and compatibility with further analyses make it a promising adjunct in settings lacking advanced radiology. While not a replacement for dissection or PMCTA, thermal imaging can provide rapid, early guidance during autopsy, particularly in resource-limited environments.

Keywords: Thermographic System, Heart, Post-mortem

QUANTIFYING TNT AND PETN EXPLOSIVES IN CONTAMINATED SOIL USING FTIR-ATR AND ADVANCED STATISTICAL TECHNIQUES

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Determination and quantification of explosive substances in soil are essential for environmental surveillance, forensic investigations, and ensuring safeguarding. This study focuses on the quantification of explosives including 2,4,6-trinitrotoluene (TNT) and pentaerythritol tetranitrate (PETN) that may be present in crime scene soil samples using Fourier-transform infrared spectroscopy with attenuated total reflectance (FTIR-ATR). The FTIR-ATR technique is a non-destructive, rapid, and sensitive method for the direct analysis of these explosives in soil, and there is no need for sample preparation steps.

In this study, soil samples prepared with known concentrations of TNT and PETN were analysed and obtained spectral data were subjected to statistical analysis, emphasizing the use of correlation matrices. By examining the correlation between spectral features and known concentrations of the explosives, a robust statistical model was able to be developed for quantification. The correlation matrix provided a clear understanding of the relationships between various spectral bands and the concentration of the analytes, enhancing the precision of the quantification process. Additionally, regression analysis was established a predictive model based on the spectral data. Results highlight the potential of FTIR-ATR spectroscopy combined with statistical methods as an effective solution for the quantification of explosives in complex matrices such as soil. This study introduces a novel method for sensitive differentiation and quantification of the explosive substances, even at trace levels. This proposed method has the potential to contribute to the improvement of environmental safety and security measures and to be applied to real scenarios.

Keywords: FTIR-ATR Analysis, Explosive Trace Detection, Contaminated Soil Assessment, Statistical Analysis

FORENSIC IDENTIFICATION OF CONTACT LENSES BY ATR-FTIR SPECTROSCOPY AND ASSESSMENT OF CHEMICAL STABILITY IN VARIOUS SEAWATER CONDITIONS

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Background and aims: Contact lenses, which are widely used for both health and aesthetic purposes, have become important forensic evidence in crime scenes in recent years. Lenses developed by different manufacturers to meet individual needs may have unique chemical compositions. Therefore, these lenses can provide important distinctions in forensic investigations through the analysis of their chemical content, as they may belong to the victim or suspect. ATR-FTIR (Attenuated Total Reflectance-Fourier Transform Infrared) spectroscopy, an effective and non-destructive method used in the analysis of contact lenses, can quickly and accurately reveal the chemical fingerprint without damaging the structure.

Methods: In this study, a total of 32 different contact lenses classified into four different categories were analyzed using IR spectroscopy, and the unique spectral profile of each lens was created and recorded in a reference database. In the next phase, the contact lenses were stored in controlled environments for 1 day, 15 days, and 30 days to reflect real-world conditions, and time-dependent chemical changes were re-evaluated using FTIR. Additionally, one lens from each category was stored in the surface waters of the Marmara, Aegean, Mediterranean, and Black Seas, which border Türkiye, for analysis on days 1, 15, and 30.

Results: Both time-dependent changes and chemical changes in lens samples stored under different conditions were evaluated, along with the effects of seawater conditions, and the effects of natural factors on lens material were determined in detail. Accordingly, it was observed that the chemical composition of lens raw materials changed significantly under room conditions and in seawater samples with different salinity levels.

Discussion-Conclusions: The assumption that simulated seawater environments could be potential crime scenes has determined that the lenses largely retain their uniqueness in the reference database and maintain their identifiability with high matching percentages. These findings reveal that contact lenses can be reliably used in forensic identification processes with IR-based, cost-free, fast, and effective analyses.

Keywords: Forensic Science, Crime Scene Analysis, Seawater Impact, Spectral Database, Chemical Fingerprinting

GENERAL SESSION II

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AGE-AT-DEATH ESTIMATION OF CREMATED AND NON-CREMATED INDIVIDUALS: A HISTOMORPHOMETRIC APPLICATION AND ADAPTATION

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The reconstruction of individuals biological profile is essential for forensic and demographic research. However, taphonomical conditions and especially high temperatures, affect bones' integrity in such level where standard anthropological methods are inadequate to accurately determine the biological characteristics (i.e. age-at-death, sex) of the individuals. Histological methods have been proved suitable for such cases providing high accuracy age-at-death estimates. However, the up-to-date developed methods are not applicable on cremated bones.

In this paper we apply a histomorphometric method for age-at-death estimation of inhumed individuals based on Haversian System Density (HD) with standard estimation error of ± 3 years, attempting to adapted it for cremated bones. For this, femur cross-sections of 18 documented modern individuals (males=14, females=4) were utilized and experimentally cremated in different temperatures from 400°C to 900°C using a high temperature muffle furnace (CWF). A block of bone was removed and analyzed according to the HD method. The Percentage of Difference (POD) between the HD values before and after cremation was calculated for each individual resulting a range of difference for each temperature. The PODs were then utilized as a correction value restoring the cremated HD values to their initial state prior to cremation. The multiple age estimates produced by the PODs were averaged resulting the final age-at-death.

The modification of the HD values based on the temperature-specific PODs was accurate mainly on the lower temperatures (400-700°C), while higher temperatures exhibit a mean estimation error of $\pm 1.51\text{mm}^2$. The age estimates before and after cremation resulted a mean error of difference of ± 3.84 years. Our results reveal great potential standardizing a histological pipeline for reconstructing the biological profile of cremated individuals.

Funding: ERC-Consolidator Grant CityLife (Project: 101126337)

Keywords: Biological Anthropology, Cremations, Biological Profile, Computational Methods, Diagenesis

INVESTIGATING THE POTENTIAL USE OF TREE BARKS IN FORENSIC BOTANY

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Background and Aims: The use and importance of plant materials in forensic sciences have become increasingly important on a global scale in recent years. Forensic sciences have a sub-branch of forensic botany, and thus, they provide clarification of events by using evidence consisting of plants and various botanical remains such as plant parts. Macroscopic plant remains, such as tree bark, do not deteriorate easily due to the walls of plant cells, which consist of other secondary metabolites, including lignin. This makes them an alternative tool that can be used in criminal cases. Tree bark, in addition to being evidence resistant to deterioration, can create important results when identified at the species level, as it is found in small pieces in cases. The bark of a tree is formed as a result of the internal growth processes in the wood structure of the tree and environmental factors, in a way that includes characteristic features specific to the species. Very little is known about whether these differences and appearances of the bark layers, specific to the species, can be used for identification.

Methods: In this study, we collected tree bark samples from different regions for selected tree species. The samples were examined macroscopically to identify anatomical features such as texture, color, thickness, and surface patterns. Observed variations will be compared across regions to determine whether regional factors contribute to identifiable differences within the same species.

Results: Color, texture, thickness, and surface properties were determined in bark samples collected from different regions. While differences in color and thickness were observed among bark samples belonging to the same species, characteristic structures specific to the species in terms of surface properties and texture were observed.

Discussion-Conclusions: The surface properties and texture-specific characteristic structures determined in tree bark samples collected from different regions indicate that tree barks are a supportive material that can be used in the field of forensic sciences.

Keywords: Forensic Science, Forensic Botany, Tree Bark, Macroscopic Anatomical Features

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SITUATION WITH DOMESTIC VIOLENCE IN KAZAKHSTAN, IMPORTANCE OF LOCAL NURSES' COLLABORATION, EMPOWERING AND INVOLVEMENT

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Last year Kazakhstan reported more than 400 deaths due to domestic violence and the cases of domestic abuse were underreported. Even though the acknowledgment of these issues is a big step for Kazakhstan, these huge numbers are concerning for the international forensic and health organizations. WHO is requiring from Kazakhstan be more active and provide more support for vulnerable people and victims. Recently, Kazakhstan changed the existing rules and policies to control and decrease occurrence for domestic abuse and violence towards children, females, and elderly. In order to sustain and do that it is essential to introduce, create, and empower active support groups, such as forensic health professionals and nurses. As Kazakhstan is the ninth biggest country in the world with low population, it is imperative to establish specialized forensic nurses' teams in rural areas and in primary care facilities. However, the nurses and nurses' associations are very weak and undeveloped in Kazakhstan as only in the last 10 years nurses are started to get high education and be more independent and responsible. Currently, there have been already very active educated and passionate nurses who need to collaborate and grow. If Kazakh nurses would connect and join international forensic nursing associations, it would help them to create their own forensic nursing association and be a real help for domestic and sexual victims in Kazakhstan.

Keywords: Domestic Violence, Forensic Nursing, Criminal Laws, Public Health

GENERAL SESSION III

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COMMUNICATION OF FORENSIC MEDICINE – CHALLENGES, FACILITATORS AND BARRIERS

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Introduction: Forensic medicine produces scientific data that is communicated to a wide range of beneficiaries, including police officers, prosecutors, judges, as well as victims and the general public. Therefore, forensic medicine is communicated to a multidisciplinary environment and often to individuals and professionals who have no prior medical or forensic medicine knowledge. In these circumstances, forensic medicine professionals must identify the most appropriate methods to communicate the data resulting from their work.

Material and Methods: In this paper, the authors analyze the literature to identify the particularities of forensic medicine communication, including the barriers and facilitators of this process. The authors also identify methods by which barriers in forensic medicine communication can be overcome.

Results: Communication methods used in a judicial investigation are often cross-disciplinary and must overcome both professional and social and cultural barriers. The understanding of the transmitted information is influenced by various barriers and facilitators such as: the way in which the information is transmitted, who receives the information, the ability of the communicator to convey the information, the context in which the message is transmitted. Each of these is influenced, in turn, by barriers and facilitators that must be identified and addressed appropriately to ensure a correct and complete transmission and reception of the information and messages communicated.

Conclusions: Communicating the results of forensic medicine is essential to a fair act of justice and to a correct information of the public. Communication must be shaped in such a way as to meet the specific needs of the wide range of beneficiaries of forensic medicine.

Keywords: Communication, Forensic Medicine, Challenges, Facilitators, Barriers

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INVESTIGATING BURNOUT AMONG FORENSIC MEDICINE PROFESSIONALS IN ROMANIA: A CROSS-SECTIONAL STUDY

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Background and Aims: Our study investigates the prevalence of burnout, job satisfaction, and unconditional self-acceptance among forensic medicine professionals in Romania, aiming to identify their demographic and occupational correlates and to evaluate the role of unconditional self-acceptance as a potential mediator of the relation between job satisfaction and burnout.

Methods: A cross-sectional survey was conducted during August-September 2024, using three validated instruments: the Maslach Burnout Inventory-General Survey (MBI-GS), the Job Satisfaction Survey (JSS), and the Unconditional Self-Acceptance Questionnaire (USAQ), applied online (Google Forms), addressed to Romanian forensic medicine professionals, nationwide. The valid responses were analyzed using JASP software (ver. 0.16.4).

Results: The analysis of the 153 valid responses, originating from 31 counties of Romania, revealed that 23.5% respondents experienced high levels of burnout, with similarly elevated rates for exhaustion (22.9%) and professional inefficacy (23.5%). Cynicism was slightly less prevalent (20.9%). High burnout levels were found especially among young professionals and forensic medicine residents. Married individuals and those with children had slightly lower levels of burnout and cynicism. Job satisfaction was reported by 51.6% of participants; only 11.1% expressed dissatisfaction (especially females, medical residents, and professionals under 30). Regarding psychological resilience, nearly 40% of respondents exhibited low or very low levels of unconditional self-acceptance, particularly young participants and medical residents. Only 17.6% of the cohort scored in the high or very high range of self-acceptance. The mediation analysis confirmed that unconditional self-acceptance partially mediated the relationship between job satisfaction and burnout.

Conclusions: This national study highlights a high prevalence of burnout among Romanian forensic medicine professionals, particularly in younger individuals and residents. Job satisfaction was generally high, dissatisfaction being reported especially by female respondents. Nearly half of the participants showed low self-acceptance. Mediation analysis revealed that low job satisfaction contributes to burnout, but unconditional self-acceptance serves as a partial protective factor, indicating the importance of internal emotional resilience.

Acknowledgements: This presentation includes data that are part of L.-A. Oprinca-Muja's PhD thesis and have been previously published in Healthcare (Oprinca-Muja L.-A. et al., 2025, 13(10):1169, <https://doi.org/10.3390/healthcare13101169>).

Keywords: Forensic Medicine Professionals, Burnout, Job Satisfaction, Self-acceptance, Resilience

TOWARDS AN ETHICAL USE OF EVIDENCE IN THE ITALIAN CRIMINAL PROCEEDINGS: A PATH TO BRIDGING SCIENCE, JUSTICE, AND HUMANITY

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Background and aims: One of the main problems of criminal justice in Italy is the length of trials, which often last for years and risk running out of time, leaving everyone - defendants and victims - without a real answer. In 2023, to try to solve this situation, the Cartabia Reform intervened, introducing several changes to make trials faster with the use of digital technology and the invitation to use alternative rites. In order to understand the main trial's dysfunctions, this abstract presents a study conducted by researchers of University of Foggia in collaboration with the Court of Foggia.

Methods: The aim of the research is to analyse trial dynamics and timelines, as well as the role of scientific evidence, in order to understand the causes of delays and dysfunctions in criminal trials. The study examined 100 court files over a five-year period (2015–2019).

Results: The analysis revealed that evidence had a significant impact on the progression of cases. In 85% of instances, evidence was a key factor in the decision to impose pre-trial measures, with 90% of these cases justifying pre-trial detention. As the trials advanced, evidence continued to play a crucial role in judicial decision-making. In 28% of cases, it led to acquittals, while in 72%, it resulted in convictions. Only 46% of cases followed the traditional trial process, while the remaining 54% were resolved through alternative procedures.

Discussion-Conclusions: In terms of outcomes, standard trials showed a high acquittal rate of 67%, while accelerated procedures were associated with a conviction rate of 65%. The study emphasizes the influence of evidence on the timeliness and efficiency of judicial proceedings and the need for integrated training for both technical and legal professionals, focusing on the ethical use of evidence to minimize the risk of errors and misuse.

Keywords: Criminal Trial, Investigations, Scientific Evidence, Judicial Decision

SYSTEMS APPROACH TO BLOOD ACCESS IN FORENSIC DONOR CASES: INTEGRATING TRANSPLANT SCREENING AND LEGAL DEMANDS

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Background and Aims: Timely access to donor blood is essential for infectious disease screening in organ and tissue procurement. In cases involving medicolegal authority, particularly non-ventilated deaths, blood specimens collected by Organ Procurement Organizations (OPOs) for donor evaluation may later be requested by forensic officials, or donation may be restricted due to investigative concerns. These dual demands create timing, custody, and jurisdictional considerations that can impact donor potential. This study assessed regional patterns of medicolegal involvement and identified opportunities to optimize laboratory access, custody processes, and collaboration to support donation.

Methods: A retrospective review was conducted of 709 deaths referred to a multi-regional OPO in 2024 with involvement of a medicolegal authority (e.g., coroner, forensic pathologist, judicial official). Cases were stratified by ventilator status, authorization status, regional distribution, and outcomes. Scenarios involving OPO-held blood and forensic custody requests were reviewed to assess timing, laboratory workflows, and coordination. Opportunities to improve specimen storage, transfer, and chain of custody were explored collaboratively with forensic partners.

Results: Among the 709 referred deaths with medicolegal involvement, 137 (19.3%) were never ventilated. Donation could not be pursued in 4 non-ventilated cases due to authorization delays, and medicolegal officials declined donation in 9 cases. This represented a combined 1.8% of total cases where donation was prevented due to timing or jurisdictional restrictions. Successful coordination models allowed OPOs to retain access to donor specimens while fulfilling forensic requirements. Key improvements included custody protocols, shared couriers, and lab input in regional workflows.

Discussion: Effective partnership with medicolegal authorities is critical to supporting donor potential in forensic cases. By collaboratively aligning chain of custody protocols and ensuring timely access to donor blood, OPOs can reduce screening delays and preserve forensic integrity. This systems-based approach supports both the pursuit of justice and the gift of life.

Keywords: Medicolegal Authority, Laboratory Access, Chain of Custody, Donor Screening, Collaboration

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REWRITE THE LAW? EVERYONE IS (NOT) EQUAL UNDER THE LAW

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Background and Aims: The Outreaching Service of Forensic Nurses (ADFN) in the Canton of Zurich (Switzerland) was established to support victims of sexual and domestic violence. It enables victims to receive free forensic examinations without filing an immediate police report, preserving autonomy and allowing time for legal decisions. Similar services exist in other Swiss cantons, and national initiatives aim to improve access and establish crisis centres in line with the Istanbul Convention.

Methods: Specially trained forensic nurses, employed by the Institute of Forensic Medicine at the University of Zurich, operate across all hospitals with emergency departments in Zurich. They collect forensic evidence, photograph injuries, write concise reports, and provide information on support services. Data and biological samples are stored for one year, enabling victims to pursue legal action later if desired.

Results: ADFN ensures comprehensive and legally admissible forensic documentation, enabling accountability for perpetrators while maintaining victim-centred care. The service reduces pressure on medical staff by delegating forensic tasks to trained nurses and increases access to justice by bridging medical and legal processes. Victims who feel unsafe contacting the police immediately still have a secure pathway to future prosecution.

Discussion–Conclusions: ADFN represents a promising model for victim support, violence prevention, and legal preparedness. It underscores that domestic and sexual violence are unacceptable and aligns healthcare systems with legal requirements. Considering the alleged perpetrator's rights and procedural fairness is essential for a balanced approach. This presentation highlights operational, societal, and legal benefits and challenges of the Zurich model and discusses potential gaps in practice, aiming to inform the further development of forensic nursing services nationally and internationally.

Keywords: Forensic Nursing Science, Outreaching Service of Forensic Nurses, Legal Aspects in Forensic Nursing

FORENSIC PATHOLOGY SESSION III

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AN UNEXPLAINED INFANT DEATH REVEALING SHAKEN BABY SYNDROME: FORENSIC AUTOPSY AND HISTOPATHOLOGICAL CLUES

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Background and Aims: Shaken Baby Syndrome (SBS) is a form of child abuse seen in infants, often resulting from vigorous shaking without direct impact. It is characterized by severe intracranial and retinal injuries. In such cases, the absence or subtlety of external trauma findings can hinder early recognition, and discrepancies between the history and clinical findings become diagnostically significant. This case report presents an infant death initially attributed to food aspiration, but forensic autopsy revealed findings suggestive of SBS. The aim is to highlight how forensic evaluation can uncover potential abuse.

Methods: A male infant, approximately one year old, was brought to the hospital by a caregiver with respiratory distress and loss of consciousness. Despite resuscitation efforts, the infant was declared dead. The case was reported as a suspicious death and referred for forensic autopsy. A comprehensive examination including external inspection, intracranial evaluation, histopathological, and ophthalmological analyses was performed.

Results: Autopsy revealed multiple scalp hemorrhages, subdural hemorrhage over the vertex, subarachnoid hemorrhages in the parietal, occipital, and temporal regions, and diffuse cerebral edema. Histopathology showed fresh subarachnoid bleeding and dural microhemorrhages. Retinal hemorrhages and bleeding in the optic nerve sheath were identified in both eyes. The skeletal system was intact. The lungs showed edema, bronchiolitis, and microthrombi. The findings were consistent with non-accidental trauma.

Discussion – Conclusions: The discrepancy between the clinical history and the presence of severe intracranial and retinal hemorrhages strongly supports the diagnosis of SBS. The cause of death was determined to be traumatic brain injury due to violent shaking. The case was classified as child abuse. Systematic reporting of such cases is critical to raising awareness, supporting diagnosis, and guiding legal processes.

Keywords: Shaken Baby Syndrome, Forensic Autopsy, Non-Accidental Injury, Child Abuse, Intracranial Hemorrhage

SUDDEN DEATH IN A TODDLER WITH RUBINSTEIN-TAYBI SYNDROME: A FORENSIC PERSPECTIVE ON A RARE GENETIC DISORDER

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Background and Aims: Rubinstein-Taybi syndrome (RTS) is a rare autosomal dominant disorder, characterized by short stature, microcephaly, distinctive craniofacial features (such as ptosis, beaked nose, low-set philtrum, and hypoplastic maxillae), ocular anomalies (e.g., cataract, glaucoma), broad thumbs and halluces, skeletal abnormalities and severe intellectual disability. The estimated incidence ranges from 1 in 125,000 to 1 in 300,000 live births. RTS is most commonly associated with heterozygous loss-of-function mutations in the CREBBP or EP300 gene, which encodes transcriptional coactivators vital for embryogenesis. Though RTS is not linked to a specific cause of death, affected individuals—especially children—are vulnerable to serious complications including recurrent respiratory infections, congenital cardiac defects, and craniocervical instability. Immunodeficiency, particularly hypogammaglobulinemia and impaired B-cell function, contributes to respiratory vulnerability, with about 75% of patients experiencing repeated infections.

Methods: A complete post-mortem examination was performed, including histopathological and toxicological analysis. Additionally, a literature review was conducted through a targeted PubMed database search.

Results: We present the forensic case of a 3-year-old girl with clinically diagnosed RTS, found unresponsive in bed. Her medical history included chronically elevated white blood cell and eosinophil counts, with no conclusive diagnosis. She was brought to the emergency department apneic and pulseless, and death was confirmed. Autopsy performed at the Department of Forensic Medicine and Toxicology, National and Kapodistrian University of Athens, revealed characteristic RTS features. Histological findings showed severe pulmonary congestion, bronchopneumonia with necrosis and abscess formation, hemorrhage, and diffuse interstitial pneumonitis. Cause of death was attributed to acute lower respiratory infection.

Discussion–Conclusions: This case emphasizes the need for forensic awareness of rare pediatric genetic syndromes. Recognition of atypical pathology in such contexts requires targeted knowledge, which is often lacking in standard forensic curricula. Specialized pediatric forensic training could enhance diagnostic accuracy and case management.

Keywords: Genetics, Pediatric Forensic Pathology, Forensic Medicine

APPROACH TO CHARRED CORPSES RESULT OF CAR EXPLOSION: CASE SERIES

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Background and Aims: Burn deaths are a significant public health problem. Burn injuries are often associated with accidents in developing countries. The progression of the burn exacerbates the damage it inflicts on the body. This can lead to bodily damage ranging from the exposure of bone tissue to organ amputations that can expose body cavities. Determining the pattern of burn injury, identifying the lesions in the injuries and deaths it causes, and investigating its origin and cause are important for forensic medicine. Postmortem examinations and autopsies performed on bodies found at fire scenes address the cause of death and whether the victim was alive at the time of the incident. Burns are classified into three types of origin: accident, homicide, and suicide, in order of frequency. The purpose of this study is to highlight the postmortem examination, autopsy, and other procedures performed on severely burned and charred corpses. The postmortem examinations, autopsies, and other forensic medical procedures will be evaluated along with the presentation of autopsy photographs.

Case: On November 6, 2023, six bodies, possibly burned by an LPG tank inside a car, were brought to the Siirt Forensic Medicine Branch of the Forensic Medicine Institute. Postmortem examinations and autopsies revealed that all the bodies had been charred to the point of complete loss of bodily integrity. Many had only their extremities, torsos, and heads remaining, and all their internal organs had been charred due to the burning. To identify the bodies, muscle, bone, and as much internal organ tissue as was available were collected and subjected to genetic analysis.

Discussion-Conclusions: In cases where decomposition has progressed, the body is burned, fragmented, or skeletonized, the process becomes long and difficult. Biological and physical evidence forms the basis of identification. Therefore, this case series study is important in terms of contributing to the literature.

Keywords: Charred Corpses, Burn Deaths, Postmortem Examination

AUTOPSY AND IDENTIFICATION OF THE VICTIMS OF THE MASS DISASTER CAUSED BY FIRE IN KOCHANI

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Background and aims: Fire-related deaths in nightclubs pose a global public safety issue. These incidents are often the result of flammable materials, overcrowding, limited exits, and poor emergency preparedness. Such conditions create a high-risk environment for mass casualties. A key challenge after such tragedies is the forensic identification of victims, especially when bodies are severely burned or thermally degraded. This report presents the Kochani nightclub fire with a focus on victim identification.

Methods: Two primary identification methods were used: DNA profiling, using biological samples from the victims and their relatives. Fingerprint analysis (dactyloscopy), in cases where the thermal damage allowed it. Identification was conducted by the Institute of Forensic Medicine and the Forensic Unit of the Ministry of Interior.

Results: On March 16, 2025, at approximately 2:30 AM, a fire broke out during a performance in the nightclub, triggered by pyrotechnics that ignited the ceiling. The fire resulted in a total of 62 fatalities, and over 155 people were injured. The cause of death for all victims was violent asphyxiation, caused by the inhalation of toxic gases, lack of oxygen, and chest compression. Burns were recorded in most cases, predominantly of the first and second degree, while three individuals sustained fourth-degree burns. The burns were most commonly localized to the head and upper parts of the body. Autopsies and identifications were completed within 60 hours.

Discussion-Conclusions: This case reveals a deadly combination of institutional negligence, violation of safety regulations, and poor oversight. The efficient forensic response highlighted the importance of interdisciplinary collaboration and modern identification techniques in mass fatality incidents. The Kochani tragedy underscores the urgent need for systemic reforms in public safety governance and institutional accountability.

Keywords: Fire Deaths, Mass Casualty Incident, Forensic Pathology, Disaster Victim Identification (DVI)

POSTER SESSION

FORENSIC PATHOLOGY TRACK

- P01 -

LETHAL SODIUM NITRITE INTOXICATION: THE CONTRIBUTION OF IMMUNOHISTOCHEMICAL MARKERS

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Background and Aims: Sodium nitrite intoxication is an increasingly common method of suicide. However, there are no specific signs, routine tests and toxicological tests do not always give reliable results. This study aims to validate scientifically useful methods for the diagnosis of NaNO₂ intoxication, testing immunohistochemical techniques of three specific markers of hypoxia: HIF-1 α , iNOS2 and VEGF.

Methods: Seven cases of death caused by NaNO₂ intoxication were examined; as a control case, a person who died from a stab wound was selected. Immunohistochemical analyses were carried out with specific antibodies to iNOS, HIF-1 α and VEGF antigens on autopsy samples of heart, brain and lungs. On all sample collected during autopsy, 4 μ m-thick paraffin-embedded sections were cut; they were pretreated by incubation for 120 minutes at 20°C using different substances; then they were incubated with the primary antigen. The sections were coloured in contrast to H&E and observed under an optical microscope.

Results: VEGF and iNOS2 were found to be significantly expressed in samples of cardiac, pulmonary and encephalic tissue in cases of death from nitrate intoxication, while HIF1 α showed good expressiveness in lung and brain samples but poor in heart samples. The expression of VEGF, HIF1 α and INOS2 was very poor or absent in the control.

Discussion-Conclusions: Deaths from suicidal NaNO₂ intoxication are a challenge for forensic pathologists. This work highlighted how immunohistochemical techniques play a crucial role in clarifying death mechanisms in sodium nitrite poisoning, showing an increase in oxidative stress affecting the INOS2, VEGF and HIF1 α lines.

Keywords: Sodium Nitrite, Suicide, Immunohistochemistry

- P02 -

IMMUNOHISTOCHEMICAL MARKERS FOR DIAGNOSING DIFFUSE AXONAL LESIONS

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Background and Aims: Diffuse axonal injury (DAI) is a devastating form of traumatic brain injury (TBI) caused by forces like rapid acceleration-deceleration or shaking that stretch and tear brain's white matter nerve fibers (axons), disrupting brain communication, being an inconstant feature of craniocerebral trauma. The microscopic nature of diffuse axonal injury (DAI) makes diagnosis sometimes difficult. Objectives: The objectives of the study were to outline a profile of individuals with DAI and to identify specific and sensitive immunohistochemical markers for the diagnosis of these lesions.

Methods: The study aimed to analyze 70 autopsied cases, with antemortem diagnosis of DAI, in which demographic and clinical-paraclinical factors were analyzed. The sensitivity and specificity of immunohistochemical markers for beta-amyloid (B-APP), glial fibrillary acidic protein (GFAP), neurofilaments (NFL), spectrin and the CD68 differentiation cluster were evaluated.

Results: The percentage of those with DAI was higher in males (73.9% vs 26.1%), in those under the 6th decade of age (52.2% vs 47.8%); 37.1% presented DAI grade I, 25.7% DAI grade II and 37.15% DAI grade III. The most frequent associated injuries were skull fractures (28.6%), followed by contusions or hematomas (25.7%). In patients with DAI, the probability of survival decreased below 50% after 7 days of trauma. Hypocalcemia was present in all patients with DAI. Natremia varied statistically significantly depending on the degree of injuries. B-APP and spectrin (AUC-0.803; 95% CI: 0.667-0.909; p=0.001) showed the highest sensitivity and specificity for DAI.

Discussion-Conclusions: Analysis of cerebral apoptosis, astrocyte cell reactivity and inflammatory response, using specific immunohistochemical markers, can provide valuable information on the diagnosis of LAD.

Keywords: Traumatic Brain Injury, Diffuse Axonal Injury, Immunohistochemical Markers

- P03 -

**DONOR-DERIVED STRONGYLOIDES STERCORALIS HYPERINFECTION
AFTER KIDNEY TRANSPLANTATION: AUTOPSY-CONFIRMED TWO CASES**

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Background and Aims: Donor-derived *Strongyloides stercoralis* hyperinfection is an uncommon but highly lethal complication in solid-organ recipients. We aimed to present two autopsy-confirmed fatalities following kidney transplantation from the same cadaveric donor, highlight key clinicopathological features, and discuss medico-legal implications for donor screening and transplant safety.

Methods: Retrospective forensic-autopsy review conducted at the Council of Forensic Medicine (ATK), First Specialization Board. We summarised clinical course, laboratory data, and comprehensive autopsy with targeted histopathology and ancillary studies, and contextualised findings with current literature on donor-derived strongyloidiasis.

Results: Recipient-1 (female,47) deteriorated within ~ 10 days post-transplant with progressive respiratory failure; autopsy showed diffuse alveolar damage and non-specific gastrointestinal changes consistent with hyperinfection. Recipient-2 (male,44) developed sepsis and multiorgan failure; autopsy revealed widespread intestinal oedema/ inflammation and alveolar oedema with microthrombi. In both cases, diagnosis was secured at autopsy; retrospective donor review disclosed no pre-transplant screening for *Strongyloides*.

Discussion-Conclusions: These cases underscore that donor-derived strongyloidiasis, though rare, can be rapidly fatal and elude premortem diagnosis. Autopsy remains decisive in clarifying cause of death and tracing donor origin. Routine risk-based donor screening (including serology in donors from or exposed to endemic areas) and heightened clinical suspicion in early post-transplant sepsis/respiratory failure could be lifesaving. To our knowledge, these represent among the first autopsy-based donor-derived *Strongyloides* fatalities documented from Türkiye, with clear implications for transplant programs and forensic practice.

Keywords: *Strongyloides Stercoralis*, Hyperinfection, Transplantation, Donor-Derived Infection, Forensic Autopsy

- P04 -

FATAL FAT PULMONARY EMBOLISM IN CORRELATION WITH SEVERE ANEMIA - AN AUTOPSY CASE REPORT

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Background and Aims: The presentation of a rare case of a fatal fat embolism death of a 42-year-old man, with reported medical history of hemophagocytosis and severe anemia. Implementation and investigation of the autopsy and pathology findings and their correlation with the medical records.

Methods: This is a case report. We present the autopsy and pathology findings. We performed a literature review and discussed the relevant literature. The autopsy findings of the case with correlation with the detailed pathology findings and the medical and clinical background.

Results: Our case concerns a 42-year-old male, with limited medical history. The deceased presented respiratory distress and was transported to the nearest hospital. There, he entered the emergency care unit and passed away soon thereafter. The forensic investigation resulted in quite limited, no-specific findings. In this case there was lack of evidence of criminal activity or suicide. The findings of the autopsy included evidence compatible with previous medical interventions, cerebral and pulmonary edema, secretions in the main bronchi, hepatomegaly and splenomegaly. Histopathological examination of the lungs showed evidence of pulmonary edema. In addition, multiple emboli were noticed, within branches of the pulmonary artery circulation. The emboli consisted of fibrin, red and white blood cells, as well as adipose cells, findings consistent with fat embolism.

Discussion-Conclusions: Death due to fat pulmonary embolism is particularly rare. The exact incidence rates are difficult to determine precisely, because it is often underdiagnosed or misdiagnosed, it requires postmortem histological confirmation, and the clinical signs may overlap with other causes. Fat pulmonary embolism is mainly associated with bone fractures, burns, barotrauma, soft tissue injury, osteomyelitis, diabetes, surgical operations on fatty tissues, septicemia, steroid therapy, acute pancreatitis and the fatty liver. To the best of our knowledge, no confirmed report of fatal pulmonary fat embolism in correlation of hemophagocytosis and anemia has been published in the international literature.

Keywords: Forensic Medicine, Forensic Pathology, Forensic Sciences

- P05 -

SUDDEN CARDIOPULMONARY ARREST FOLLOWING COLONOSCOPY IN 41-YEAR-OLD FEMALE WITH ULCERATIVE COLITIS: A POSTMORTEM DIAGNOSIS OF DESCENDING AORTIC DISSECTION

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Background and Aims: Colonoscopy is a commonly performed diagnostic procedure with a low incidence of major complications. Fatal outcomes are exceedingly rare and usually result from perforation or anesthetic complications. Aortic dissection is a catastrophic cardiovascular emergency that often presents silently and can be missed if not suspected. Here we report a sudden, fatal case of cardiopulmonary arrest following a routine colonoscopy in a young woman with ulcerative colitis, where the underlying cause was diagnosed only at autopsy.

Case Presentation: A 41-year-old female with a known history of ulcerative colitis underwent routine colonoscopy under sedation with propofol and atropine. The endoscopic procedure was completed without immediate complications. Shortly afterward, while in the recovery room, the patient suffered sudden cardiopulmonary collapse. Resuscitation was attempted but unsuccessful due to the abruptness of the arrest. The patient had no prior history of cardiovascular disease. Family history revealed that her father had undergone surgical repair of an abdominal aortic aneurysm. Unofficial sources indicated possible cocaine use by the patient, which was unconfirmed clinically. There were not found presence of cocaine in the blood based on the toxicological examination.

Discussion: This case represents a sudden unexpected death following a routine colonoscopy. The most likely cause of death was acute dissection of the descending thoracic aorta, which progressed rapidly and silently, leading to fatal cardiopulmonary arrest. While aortic dissection is classically seen in older males with hypertension, several risk factors in this case should be noted, such as family history of aortic aneurysm; possible cocaine use, which is strongly associated with vascular injury; chronic inflammatory state due to ulcerative colitis, which may compromise vascular integrity. The use of propofol and atropine during sedation is unlikely to be a direct cause but could have contributed to hemodynamic shifts in a vulnerable aortic wall. This case highlights the importance of pre-procedural risk assessment, especially in patients with suggestive family history or suspected drug abuse.

Conclusion: Acute aortic dissection, though rare in young adults, should be considered in cases of sudden post-procedural death, especially when no other cause is apparent. A detailed pre-procedural evaluation, including family history and substance use, is essential in detecting possible silent risk factors. Clinicians should maintain a high index of suspicion for vascular catastrophes, even in routine diagnostic procedures.

Keywords: Acute Aortic Dissection, Sudden Cardiopulmonary Collapse, Autopsy

– P06 –

**FATAL SUBARACHNOID HEMORRHAGE IN A 10-YEAR-OLD GIRL WITH
UNDIAGNOSED BILATERAL MIDDLE ARTERY AND ANTERIOR CEREBRAL
ARTERY ANEURYSMS FOLLOWING BENZODIAZEPINE USE: A CASE REPORT**

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Background and Aims: Subarachnoid hemorrhage (SAH) in the pediatric population is exceedingly rare, accounting for only 0.5–4.6% of all childhood strokes. Even more rare is the presence of cerebral aneurysms, which occur in children at an incidence of approximately 0.5 to 2 per 100,000 children per year. Pediatric aneurysms differ significantly from adult aneurysms in morphology, location, and etiology. Despite their rarity, aneurysms remain a significant cause of sudden neurological deterioration and death in children when left undiagnosed. Additionally, prescribing sedative medications such as benzodiazepines in pediatric patients with unresolved neurological complaints should be done with caution, given their potential effects on cerebral blood flow and respiratory depression.

Case Presentation: A healthy 10-year-old girl with a history of hyperactivity and high academic performance presented to a pediatrician with non-specific symptoms: insomnia and intermittent headaches. There was no history of trauma, seizures, or systemic illness. She was prescribed a syrup containing a benzodiazepine compound. Two days later, while at home, she suddenly collapsed while opening the refrigerator and lost consciousness. Despite resuscitative efforts, she was declared dead on the scene.

Discussion: Cerebral aneurysms in children are not only rare but often asymptomatic, making diagnosis difficult without neuroimaging. According to pooled data, 60–70% of pediatric aneurysms occur in the anterior circulation, and the MCA is the most commonly involved vessel. Pediatric aneurysms tend to be larger, more complex (fusiform/saccular), and more often multiple, as seen in our case. SAH in children accounts for less than 1% of all subarachnoid hemorrhages, and the mortality rate can reach up to 25–50%, particularly when diagnosis is delayed or missed. Sudden collapse and death in children due to aneurysmal rupture have been previously reported.

Conclusion: This tragic case underscores the importance of thorough neurological assessment in children presenting with new-onset headaches, sleep disturbances, or cognitive fatigue. The presence of undiagnosed bilateral cerebral aneurysms in an otherwise healthy child is a silent but deadly risk. The administration of sedative medication in the absence of neuroimaging should be reconsidered in such clinical scenarios.

Keywords: Subarachnoid Hemorrhage, Undiagnosed Bilateral Cerebral Aneurysms, Autopsy

- P07 -

APPLICATION OF SURFACTANT PROTEIN-A, HIPOXIA-INDUCIBLE FACTOR 1A AND CD-68 IN DIAGNOSIS OF PLASTIC BAG SUFFOCATION: AN IMMUNOHISTOCHEMICAL STUDY

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Background and Aims: Plastic bag suffocation (PBS) refers to a peculiar type of asphyxia that is uncommon. The mechanism of death can be suicidal, homicidal, or accidental. It represents a challenge for the forensic pathologist because the pathological findings are often nonspecific or absent. An approach to the study of these types of deaths can be represented by immunohistochemistry, in particular by investigating three markers: Surfactant Protein -A (Sp-A), Hypoxia-inducible Factor 1 α (HIF-1 α) and CD-68. Sp-A is the major surfactant protein produced by alveolar type II cells, usually related to acute respiratory failure. HIF-1 α is a transcription factor that plays an essential role in cellular adaptation to hypoxia regulated by the oxygen tissue concentration. CD-68 is expressed by monocytic cells, such as resident macrophages in the lungs; it is used to appreciate macrophage presence and activation and, therefore, signs of respiratory distress. Our study aims to examine the expression of SP-A, HIF-1 α , and CD-68 in the lungs as a potential marker of asphyxia in PBSs.

Methods: A total of 8 cases were classified into two groups: 5 plastic bag suffocation (PBS) and 3 controls (CTR) of other types of asphyxial death. The samples were subjected to immunohistochemical investigations. The immunohistochemical investigations used specific antibodies to detect the presence of Sp-A, HIF-1 α , and CD-68 in the lung tissue.

Results: We found a significant positivity for CD-68 and HIF-1 α in the cases of PBS compared to the control group, in which they were negative. Moreover, SP-A positivity is higher in the cases of PBS than in control cases.

Conclusions: The expression of Sp-A, HIF-1 α , and CD-68 in lung tissue is promising for forensic medicine, as the levels and distribution of these markers could serve as biomarkers for relating an asphyxial death to plastic bag suffocation. Given the small number of cases, further investigation should be performed.

Keywords: Plastic Bag Suffocation; Immunohistochemistry; Surfactant Protein -A; Hypoxia-inducible Factor 1 α ; CD-68

- P08 -

SUDDEN DEATH AND SICKLE CELL CRISIS: A REPORT OF DIFFERENT AUTOPSY CASES

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Background and Aims: Sudden death in individuals with sickle cell disease (SCD) remains a concerning phenomenon despite advances in medical care. SCD, a genetic disorder causing distorted red blood cells, can lead to vaso-occlusive crises and organ damage. This study aims to describe the pathological findings in four SCD cases presenting as sudden death to Dubai Police Forensic Department.

Methods: A complete autopsy was performed in each of the four SCD cases. Microscopic examination of major organs (heart, lungs, brain, spleen, liver, and kidneys) was conducted, with specific attention to evidence of sickling, vaso-occlusion, and tissue infarction. Toxicology analysis was performed to rule out other potential causes of death.

Results: Gross autopsy findings were largely unremarkable across all four cases. Microscopic examination revealed widespread sickling of red blood cells within the microvasculature of multiple organs in all cases, most prominently in the spleen, lungs, and brain. Evidence of pulmonary congestion and splenic congestion was noted in three cases. One case involved an airplane passenger, two cases involved individuals undergoing physical exertion, and one case involved an altercation. Toxicology was negative in all cases.

Discussion-Conclusions: Vaso-occlusive crisis secondary to SCD was determined to be the most likely cause of death in these four cases of sudden and unexpected death. The prominence of sickling in the microvasculature, particularly in the spleen and lungs, supports this conclusion. This case series highlights the importance of considering SCD as a potential cause of sudden death, especially in the absence of specific gross autopsy findings, and emphasizes the critical role of histopathological examination in these investigations. Further research is needed to investigate factors that may trigger vaso-occlusive crises leading to sudden death in individuals with SCD.

Keywords: Sickle Cell Disease, Sudden Death, Forensic Autopsy, Vaso-Occlusive Crisis, Histopathology

- P09 -

FATAL BUTANE INHALATION: THE CONTRIBUTION OF CARDIAC AND BRAIN IMMUNOHISTOCHEMICAL MARKERS

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Background and Aims: Butane (C₄-H₁₀) is a highly flammable and explosive aliphatic hydrocarbon. Thanks to its easy accessibility, it can become a narcotic substance, causing a psychoactive effect. It is usually inhaled directly (sniffing), especially from lighters, camping stoves, and spray cans. Of all inhalants, butane is the one with the highest mortality rate, as it exerts its toxicity mainly at the level of the central nervous system and the cardiovascular system. The rationale for this study is to compare eight cases of fatal butane poisoning with control cases of subjects deceased following head or thoracic trauma to identify antigens that can act, respectively, as cardiac and cerebral markers to support the medico-legal diagnosis of butane poisoning.

Methods: We identified eight cases of fatal butane poisoning; six men and two women aged between 18 and 52 years. For all the selected instances, hematoxylin and eosin (H&E) staining and immunohistochemical investigations were performed using a panel of antibodies against the antigens Connexin 43, Myoglobin, Troponin T and Troponin I on the heart samples (left ventricle, anterior wall) and MAP2 and Calbindin on the brain samples (parietal lobe).

Results: The positivity to the Antigen-Antibody reaction for both brain and cardiac markers was standardized with semiquantitative interpretation.

Discussion - Conclusions: The brain markers are more expressed in the cases than in controls. The cardiac markers, in particular connexin 43 and myoglobin, are more highly expressed in the controls than in the cases, which, conversely, are characterized by their depletion. There is still much to be done to be able to compare our case studies with other experiences on the national and international territories, thus expanding the size of the sample, deepening the role of brain and cardiac markers, and proposing a shared methodology both at the autopsy table and in forensic laboratories.

Keywords: Butane, Inhalants, Immunohistochemistry, Markers, Forensic Pathology

- P10 -

**POSTMORTEM DIAGNOSIS OF ACCIDENTAL HYPOTHERMIA –
MACROSCOPIC AND MICROSCOPIC CORRELATIONS IN HYPOTHERMIA**

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The aim of our study was to detect the histopathological changes in the heart, kidney, brain, lungs, liver and stomach in a group of cases of death caused by hypothermia, in order to obtain new information regarding the mechanism of hypothermic stress and possible associations with medico-legal and toxicological data.

The archived material from the histothèque of the Laboratory of Pathological Anatomy of ILM Iași was used, all the paraffin blocks of heart, brain, kidney, lung, stomach fragments from 107 necropsy cases of Institute of Legal Medicine Iași, Romania.

Tissue fragments of brain, heart, lung, stomach and kidney were stained with Hematoxylin-Eosin (HE), periodic acid-Schiff (PAS) and Masson's trichrome stain. The microscopic study of the stomach tissue preparations confirmed the presence of Wischnowsky petechiae identified during the necropsy examination in 47 cases (44.8%). In pancreatic parenchyma, macroscopic hemorrhagic changes, possibly associated with hypothermia, were observed in 20 cases (18.7%). The microscopic examination of the liver tissue fragments revealed lesions of hepatocytic micro- and macrovesicular steatosis, in 24 cases (22.64%). Vacuolar degeneration of cardiac striated muscle cells was observed in 13.1% of the studied cases. In the studied group, a significant association was identified between chronic alcohol consumption and the microscopic presence of Armani-Ebstein lesions (52.2%, $p = 0.01$). The anatomical-pathological examination of nerve tissue fragments, revealed the presence of perivascular and perineuronal cerebral edema. The microscopic study of the lung parenchyma fragments revealed the presence of postmortem autolysis lesions of the alveolar epithelium, intraluminal desquamation of the bronchial epithelium, and local passive vascular congestion, associated with variable numbers of siderophages in the alveolar spaces.

Microscopic examination can have difficulties in accurately diagnosing death by hypothermia due to postmortem autolysis and putrefaction that progresses rapidly with the removal of the corpse from the cold environment, which can significantly alter the appearance of the tissues and these can be partially overcome by using immunohistochemical analyzes to confirm with certainty such a diagnosis.

Keywords: Accidental Hypothermia, Postmortem Diagnosis, Macroscopic-Microscopic Correlations

- P11 -

SILENT KILLER AT THE TABLE – AN UNEXPECTED CAUSE OF SUDDEN DEATH

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Background: Sudden cardiac death is often attributed to acute coronary events. However, in rare cases, underlying causes may be entirely unexpected. We present a case of a woman whose clinical picture mimicked myocardial infarction, but forensic autopsy revealed a fatal sequence triggered by esophageal and cardiac perforation caused by an ingested animal bone.

Case Presentation: A 57-year-old woman presented with acute chest pain. After ECG showed inferolateral ST-elevation, she underwent urgent PCI with stent placement in the right coronary artery. Since admission, she was in septic shock, accompanied by a large pericardial effusion. CT imaging identified a sharp, linear foreign body near the heart, but following Esophagogastroduodenoscopy (EGDS) didn't detect any ingested object within the esophageal lumen. Despite supportive therapy, including antibiotics, vasopressor support and mechanical ventilation, her condition deteriorated, and she died on February 2, 2025.

Autopsy Findings: The heart measured 11x12x5.5 cm, weigh was 435 g, with mild hypertrophy of the left ventricular wall (17 mm). A 5x0.3 cm sharp, elongated bone fragment was found protruding the posterior wall of the heart, extending from the esophagus through the pericardium. The pericardial sac contained 300 mL of blood, with extensive fibrin-rich adhesions. The pericardial and heart perforation measured 0,5 cm, and the esophageal perforation, measuring 2x1 cm, was located just above the gastroesophageal junction. Other significant autopsy findings were pleural effusions (L: 300 mL; R: 100 mL), cerebral edema, and nephrosclerosis.

Conclusion: This case initially resembled a sudden cardiac death of ischemic origin. However, forensic autopsy uncovered an unusual and fatal complication of foreign body ingestion. It serves as a powerful reminder of how autopsy can reveal rare, unexpected causes of death that remain clinically unrecognized, emphasizing its irreplaceable value in modern medicine and diagnostics.

Keywords: Sudden Death, Foreign Body Ingestion, Esophageal Perforation, Cardiac Perforation

- P12 -

POSTMORTEM DIAGNOSIS OF ACCIDENTAL HYPOTHERMIA - MEDICO-LEGAL CORRELATIONS AND MACROSCOPIC ASPECTS IN HYPOTHERMIA

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Hypothermia is an area of interest for research due to the complex aspects of diagnosing with certainty. 107 necropsy cases were analyzed for over 15 years at the Institute of Legal Medicine Iași, Romania.

The information was recorded in the database and the results obtained from the analysis were statistically investigated by IBM SPSS v.26 program, using the Mann Whitney and Spearman tests. The p value <0.05 was considered statistically significant.

Biochemical analyzes focused on the determination of ethanol concentration and for general toxicological examinations.

Weather data was meticulously recorded based on police investigations and reports from the local weather station at the time of exposure. The temperature of the external environment varied between -13.20°C and 26°C, with a mean of 0.57°C ± 6.4°C. The wind chill index ranged from -19.46 to 29.279, with a mean of 5.83 (SD = 8.89).

Predisposing factors for hypothermic deaths included: low socioeconomic status (n = 37; 34.6%), severe weather conditions (n = 16; 14.9%) relatively frequently associated with chronic alcoholism (n = 19; 17, 8%), acute alcoholism (n = 24, 22.4%), neuro-psychiatric diseases (n = 11, 10.3%), outdoor work conditions (n = 3; 2.8%) and traumatic injuries (n = 2; 1.9%).

External examination revealed aspects associated with death by cold exposure such as embryonic position in 12.1% of cases, paradoxical undressing in 9.3% of cases, skin lesions secondary to cold exposure such as cold erythema, in 53 cases (49.5%), , various degrees of frostbite, in 50.5 % of cases (n= 54) and immersion foot in 12.1% of cases. These were associated with macroscopic changes in internal organs represented by Wischniewski spots (44.8%), pulmonary subpleural petechiae (11%), Puharevich sign (53.3%), subepicardial hemorrhages (5.6%).

Although macroscopic changes occurring in hypothermia are often nonspecific, inconsistent or even absent, the corroboration of multidisciplinary information contributes to the confirmation of the diagnosis.

Keywords: Accidental Hypothermia, Postmortem Diagnosis, Macroscopy Aspects, Medico-Legal Correlations

- P13 -

VALIDATION OF METHODS IN FORENSIC HISTOPATHOLOGY: FROM BASIC RESEARCH TO EVIDENTIARY APPLICATION

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Background and Aims: In recent years, histopathology has gained importance in forensic investigations for determining the cause of death and addressing legal questions. Traditional staining techniques (e.g., hematoxylin-eosin, Masson's trichrome) are now complemented by immunohistochemistry (IHC), which enables the detection of markers not visible with conventional methods, especially in poorly preserved tissues. Over the past three decades, advances have led to the development of specific damage markers and improved protocols, allowing IHC to serve as reliable scientific evidence.

Methods: This study explores the validation processes that have established IHC as an accepted tool in forensic practice. It also examines selected case studies from Foggia, Ferrara, Trieste, and Salerno forensic departments. IHC contributed to legal decisions and was acknowledged as scientifically valid evidence in judicial rulings.

Results: We reconstructed the scientific validation process of glycophorin-A, reconstructing the phases that allowed its use and its application in case law. There will be an initial laboratory phase to optimize the antibody, which will then be used and applied in different cases by multiple Forensic Pathology Departments, on several tissues in various states of preservation. The results will subsequently be published in international journals, leading to the systematic application of the method in legal cases.

Discussion-Conclusions: The study highlights the critical role of experimental research in refining IHC applications, particularly in complex post-mortem scenarios where traditional microscopy is limited. Markers such as glycophorin-A and HIF-1 α have proven valuable for assessing injury vitality, timing, and mechanisms. Integrating IHC with other fields—genetics, toxicology, imaging, and metabolomics—reflects a growing multidisciplinary approach. Collaboration across institutions is essential to standardize methodologies and enhance their probative value. Furthermore, insights gained from forensic histopathology can support clinical medicine by deepening our understanding of disease mechanisms.

Keywords: Forensic Medicine, Immunohistochemistry, Glycophorin-A, Autopsy, Post-mortem

- P14 -

**FORENSIC CASE REPORT: FATAL FAT EMBOLISM FOLLOWING AESTHETIC
CORRECTION OF MANDIBULAR PROGNATHISM**

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Aesthetic correction of mandibular prognathism, commonly performed through orthognathic surgical techniques such as bilateral sagittal split osteotomy (BSSO), has become a routine procedure in maxillofacial surgery. While generally considered safe, this procedure carries the potential for rare but life-threatening complications. One such complication is fat embolism, an often underrecognized condition that may occur during or after facial bone surgery involving significant manipulation of bone marrow spaces.

This case-based review highlights the occurrence of fat embolism syndrome (FES) following elective aesthetic correction of mandibular prognathism. FES typically results from the entry of marrow fat into the bloodstream during high-pressure manipulation of cancellous bone, leading to embolization in the pulmonary and systemic circulation. Although classically associated with long bone fractures and orthopedic trauma, its occurrence in facial skeletal surgery remains underreported.

We discuss the pathophysiology, clinical presentation, diagnostic challenges, and forensic implications of fat embolism in the context of aesthetic maxillofacial surgery. The clinical spectrum can range from asymptomatic microembolism to fulminant FES, characterized by respiratory distress, neurological impairment, petechial rash, and, in severe cases, sudden cardiac or respiratory arrest.

In the reported case, the patient developed acute symptoms with autopsy findings consistent with cerebral fat emboli. Histopathological examination confirmed the presence of fat globules in the cerebral vasculature. These findings underscore the importance of heightened clinical vigilance, perioperative monitoring, and rapid intervention.

This abstract emphasizes the need for awareness among surgeons, anesthesiologists, and forensic experts regarding fat embolism as a rare but potentially fatal complication in orthognathic surgery. It also highlights the role of post-mortem histological investigation in unexplained postoperative deaths and underscores the importance of preventive measures in elective facial aesthetic procedures.

Keywords: Cerebral Fat Embolism, Mandible Operation, Mandibular Prognathism

- P15 -

AUTOPSY CASE OF POSTMORTEM-DISCOVERED VARICELLA-ZOSTER VIRUS ENCEPHALITIS WITH OPTIC AND ACOUSTIC NERVE INVOLVEMENT

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Background: Varicella-Zoster Virus (VZV) reactivation is a frequent occurrence in immunocompromised patients but may occasionally present with severe and atypical neurological manifestations. Encephalitis related to VZV is particularly devastating when compounded by cranial nerve involvement, which remains a rare and under-recognized complication.

Case Presentation: We report the case of a 56-year-old female with systemic lupus erythematosus, chronically treated with corticosteroids and immunosuppressive therapy, who developed perianal herpes zoster during hospitalization. Her clinical course rapidly deteriorated, marked by confusion, visual impairment, and eventual coma followed by her death.

Autopsy revealed small cerebral intra-parenchymal hematomas associated with ischemic necrotic zones, particularly within the frontal and brainstem regions. Histopathological examination of brain sections confirmed subacute ischemic encephalopathy with neuronal loss and reactive gliosis. Notably, the optic and acoustic nerves exhibited prominent lymphocytic neuritis characterized by dense perineural lymphoid infiltrates and nerve fiber destruction. Postmortem cerebrospinal fluid PCR were positive for VZV, confirming active viral encephalitis at the time of death.

Conclusion: This case highlights the aggressive neuropathological course of VZV encephalitis in immunosuppressed individuals. The postmortem discovery of multifocal ischemic necrosis alongside optic and acoustic neuritis demonstrates the virus's neurotropic potential and suggests that cranial nerve involvement may be underestimated. Early recognition of such patterns may improve diagnosis and management in similar high-risk patients.

Keywords: Varicella-Zoster Virus; Encephalitis; Cranial Nerve Neuritis; Immunosuppressed Patient; Autopsy Findings

- P16 -

FATAL BUTANE INHALATION: FROM EPIPHENOMENON TO SOCIAL ISSUE. SYSTEMIC REVIEW OF THE LITERATURE AND IMMUNOHISTOCHEMICAL STUDY OF EIGHT CASES

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Background and Aims: Volatile substance abuse (VSA) is an underrecognized issue with significant health risks, including mortality; butane, commonly inhaled due to its affordability and accessibility among vulnerable groups such as youth and inmates, has been linked to fatal intoxications that remain sparsely reported, with death resulting from a multifactorial pathophysiology involving cardiac arrhythmias and hypoxic injury. This study is structured in two parts, beginning with a systematic literature review to identify shared forensic characteristics among reported cases.

Methods: The second part of the study analyzes eight cases of fatal butane poisoning by evaluating demographic data, abuse circumstances, key macroscopic and microscopic autopsy findings, and toxicological results; additionally, immunohistochemical (IHC) analyses were conducted on cardiac and, for the first time in scientific literature, brain tissue to identify reliable hypoxia markers.

Results: The IHC results indicated evidence of hypoxic injury in both the heart and brain. In cardiac tissue, connexin-43 and myoglobin demonstrated superior sensitivity compared to troponin I and T, exhibiting significantly reduced expression in nearly all cases. Conversely, brain markers, specifically MAP2 and calbindin, showed increased expression.

Discussion - Conclusions: This study reaffirms the preventive role of forensic medicine in safeguarding public health by focusing on populations at heightened risk due to increased vulnerability. Utilizing conventional diagnostic methods alongside immunohistochemistry, it underscores the latter's critical value in elucidating the pathophysiological mechanisms underlying these cases. Notably, this represents the first investigation to identify markers of hypoxic brain injury following butane intoxication.

Keywords: Forensic Medicine, Crime Scene, Toxicology, Butane, Immunohistochemistry

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FORENSIC IDENTIFICATION AND POST-MORTEM FINDINGS IN A REPATRIATED SERVICEMAN

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Background: The body of an unknown male was received for examination on 05.02.2025 as part of a body repatriation process. The deceased was subsequently identified as citizen M.M.T. (b. 1997), a serviceman reported missing in action on 30.10.2024 in Donetsk Region.

Methods: A comprehensive post-mortem examination was performed, including external and internal investigation, histopathological, toxicological, and immunological (for ABO blood group determination) analyses. Biological samples (bone fragment, tooth) were collected for DNA identification, and fingerprints were taken for dactyloscopic examination.

Results:

Identification: Positive identification was established based on anthropological findings, personal effects like secondary markers (uniform with "ZSU" insignia, boot markings "M.M.T."), and correlating circumstantial evidence from official military records (Ref. №xxxx, 30.10.2024).

Cause of Death: Death was caused by an explosive blast, resulting in severe craniocerebral trauma and penetrating wounds.

Findings: Examination revealed severe traumatic injuries, including: Multiple penetrating wounds with tissue loss defects on the frontal, parietal, and occipital regions of the skull, a penetrating wound on the anterior surface of the left thigh, comminuted, multi-fragmentary perforating fractures of the frontal and both parietal bones, a perforating fracture of the occipital bone.

Ancillary tests: Histopathology confirmed focal hemorrhages in skin and muscle tissue from a wound. Toxicology was negative for ethanol. Serological testing identified blood group antigen A.

Discussion-Conclusions: The nature and mechanism of the injuries are consistent with the effects of a high-energy explosive blast. These injuries were severe, life-threatening, and the direct cause of death, estimated to have occurred on 30.10.2024. This case highlights the critical role of forensic medicine in the identification of fallen military personnel and the repatriation process.

Keywords: Forensic Medicine, Repatriation, Human Identification, Post-Mortem Examination, Dactyloscopy

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BEYOND A SINGLE SHOT: A CASE REPORT OF AN ATYPICAL CASE OF A DUAL ENTRANCE GUNSHOT WOUND SUICIDE, FOLLOWING HOMICIDE

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Background and aims: Firearm-related suicide is one of the most lethal forms of self-harm, often resulting in rapid death due to severe tissue trauma. While the majority of gunshot suicides involve a single, self-inflicted wound to critical anatomical regions such as the head or chest, rare cases with multiple gunshot wounds can occur and pose significant diagnostic challenges. These atypical presentations may mimic homicide and require careful forensic evaluation.

We report the case of a 43-year-old male found deceased in the front yard of his residence. Initial findings included two apparent contact gunshot entrance wounds one to the left chest and one beneath the chin, without a firearm present at the scene. Inside the house, a second victim, a 37-year-old female, was discovered deceased on a bed with multiple gunshot wounds, and an unharmed infant lying beside her. The firearm was later found close to the male victim, hidden by his father, who suffers from dementia and was initially unable to recall the location of the weapon.

Methods: The autopsy of male victim revealed a full-contact gunshot wound to the chest with associated thoracic organ injuries, and a partial-contact gunshot wound beneath the chin, resulting in skull base fractures and brain injury. Autopsy of female victim revealed multiple perforating and re-entry gunshot wounds consistent with defensive posturing.

Results: This is a case of an atypical homicide-suicide double tragedy. The male victim after shooting his sister-in-law, shot himself first in the chest (full-contact gunshot wound) and then during the few seconds of consciousness he had left, shot himself for the second time beneath the chin.

Discussion - Conclusions: This case highlights that not all firearm-related suicides are limited to a single gunshot wound. While the majority of self-inflicted gunshot suicides involve one fatal shot, particularly to the head or chest, exceptions do occur and may initially raise suspicion of homicide. A thorough forensic investigation—including scene analysis, wound trajectory assessment, ballistic evidence, and medical history is essential for accurately distinguishing between suicide and foul play. Forensic experts should remain aware that multiple gunshot wounds do not categorically exclude the possibility of suicide.

Keywords: Firearm Gun, Suicide, Homicide, Atypical Case, Gunshot Wound

- P19 -

SUDDEN DEATHS AT YOUNG AGES IN PERSONS WITH PREVIOUSLY UNDIAGNOSED CONGENITAL DISEASES AND IN DRUG USERS: A CASE REPORT

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Background and Aims: In annual practice, cases of sudden deaths at young ages are increasing. The main factors after performing the autopsy result to be undiagnosed congenital diseases such as coronary artery bypass bridge. Generalized coronary sclerosis or cardiomyopathy remain another cause that cause sudden deaths. This in some cases correlates also in subjects whose autopsy findings during toxicological examination have revealed the presence of narcotics. Early diagnosis of these cases would help prevent sudden deaths at young ages.

Case Report: A male case of about 40 years old drinking a coffee in the early hours of the morning dies suddenly in a bar. The body was subjected to forensic autopsy, concentric hypertrophy of the left ventricle is observed, the consistency of the heart muscle is increased.. Both coronary arteries with severe narrowed lumen in the section and the presence of atheromatous plaques, in a section of the left coronary artery its immersion in the heart muscle (myocardial) "Bridge" was observed.

Results: Histological examination revealed: Coronary artery with atheromatous plaques blocking over 70% of the lumen, vascular stasis, interstitial edema, waviness and defragmentation, presence of fibrotic tissue, another coronary artery with 50% lumen blockage, a coronary artery immersed in the myocardium over 4 mm, with ischemic zones around it, a coronary artery with over 90% blockage of its lumen, with calcified plaques inside, another coronary artery with 85% blockage, with the presence of free erythrocytes inside the plaque as well as inflammatory cells, a coronary artery with over 90% blockage with ruptured plaques. Blood was analyzed in the tox laboratory for alcohol, narcotic drugs and other substances. All results were negative. Acute myocardial infarction in the setting of generalized coronary sclerosis and "Bridge".

Discussion - Conclusions: The cause of death was acute myocardial infarction (insufficient oxygen supply to the heart muscle) due to narrowing of the blood vessels that feed it and the infiltration of the heart muscle by the left coronary artery.

Keywords: Sudden Death, Undiagnosed Congenital Disease, Bridge

FORENSIC TOXICOLOGY TRACK

- P20 -

SUSPECTED HELIUM ASPHYXIATION: THREE CASE REPORTS

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Background and Aims: Helium is an inert, odorless, tasteless, and colorless gas widely used in the industrial sector. When present in high concentrations in a confined space, such as inside a bag, it can cause rapid hypoxia arrest by displacing oxygen, resulting in CNS depression and rapid fatality. However, death can also occur due to trauma from pressure (barotrauma) on the airway, resulting in rapid damage and collapse of the alveoli, causing massive pulmonary hemorrhage.

Since helium is easily accessible and relatively cheap it is increasingly used as a method of suicide. Detecting helium in tissue or air samples is challenging and requires specialized methodology, which explains why the documentation of helium suicide cases are rare. We present three cases of asphyxiation suicides with the involvement of helium.

Methods: PME were conducted in all cases, including sampling for histopathological and toxicological examination. Scene investigation findings were incorporated in each case evaluation.

Results: All three cases involved the use of helium in a closed environment (by means of a plastic bag tightly secured over the head). Toxicological analysis results were negative for toxic substances. No injuries or other underlying pathologies were detected. Asphyxial petechiae were detected in one of the cases, while the other two were found in a state of putrefaction. Scene investigation findings played a crucial role in determining the mechanism of death, although no toxicological evidence about helium poisoning was found.

Discussion-Conclusions: Helium asphyxiation is a rather rare method of suicide. Its recognition requires increased suspicion, thus rendering meticulous death scene investigation, documentation, and awareness of characteristic setups (e.g., plastic bags, tanks, tubing) essential. Forensic professionals should be aware of this rare but emerging suicide method and make necessary adjustments to improve diagnostic accuracy in suspected inert gas deaths.

Keywords: Asphyxiation, Suicide, Helium, Toxicology, Forensic Autopsy

- P21 -

MODERN ANALYTICAL APPROACHES IN FORENSIC TOXICOLOGY FOR DRUG ABUSE DETECTION

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Routine technique as HPLC-DAD (liquid chromatography with diode array detection), GC-MS (gas chromatography coupled to mass spectrometry) applied in Romanian toxicology laboratories do not seems to be satisfactory in new psychoactive substances (NPSs) identification due to the lack of analytical standards available, very low concentrations, and unknown drug metabolism.

High resolution mass spectrometry represented by UHPLC-Q-Exactive Orbitrap HRMS was used in a specific method, developed and applied in a post-target approach for an in-house database based on comprehensive recent literature study. In addition to the full scan acquisition, a targeted fragmentation (MS-MS) analysis was performed. The fragmentation patterns and pathways of the available analytical standards were investigated in depth to further structure confirmation.

For the compounds without available references, the structures were presumed based on the following steps: (1) the molecular formula was established based on high-accuracy protonated precursors such as $[M + H]^+$ / $[M - H]^-$, within a mass error of 5 ppm; (2) a software tool, Thermo Scientific™ Mass Frontier 7.0, was used in presumptive MS-MS confirmatory analysis. The identification was based on the MS-MS spectral match of the suspect compound to the profile of predicted MS-MS spectra. Multiple fragmentation mechanisms were monitored. In addition, metabolites were identified confirming exposure to drugs.

Using the presented approach, the following compounds were identified in different biological samples as blood, urine, and gastric content from deceased or living persons: alpha pyrrolidinovalerophenone (α -PVP) and the main metabolites, MDPV (3,4-methylenedioxyvalerone) and four metabolites, pyrovalerone, MDPBP (methylenedioxy-alpha-pyrrolidinobutyrophenone) and the main metabolites.

The overall information given by HRMS/HRMS-MS analysis consisting in full-spectrum acquisition, accurate mass of protonated molecule and relevant fragment ions, allows the presumptive identification of the detected compounds without references standards a priori.

Keywords: New Psychoactive Substances (NPSs), Screening, HRMS/MS

- P22 -

HEXAHYDROCANNABINOL - A CASE OF DRUG-RELATED DEATH

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Background and Aims: Hexahydrocannabinol (HHC) is a widely used psychoactive substance with similar effects to Tetrahydrocannabinol (THC). In recent years HHC have been sold at drug market as vapes, e-liquids, gummies, marshmallows, cakes and etc. Hexahydrocannabinol (HHC) has two epimers (9R) hexahydrocannabinol and (9S)-hexahydrocannabinol sold in ratio 9R:9S 1.4:1, but the ratio may vary depending on reactant and the catalyst. HHC has analgesic properties, which can be explained by the allosteric modulation of μ and δ opioid receptors of neuronal membranes, similar as THC.

Case description: A 14-year-old boy had smoked several times from electronic device (vape) at a party. After a few minutes, he began to show signs of psychosis, anxiety, agitation and dizziness. The boy began running around the building and few minutes later he jumped out of a seventh-floor window.

Methods: The vape, containing a resinous substance, cardiac blood and urine were submitted for analysis. The quantitative determination of HHC in a blood sample were performed by alkaline liquid-liquid extraction subsequent instrumental GC-MS analysis. Analysis of a urine sample was performed by total alkaline extraction followed by general unknown GC-MS screening in scan mode (40-450 m/z). The liquid from the vape was analyzed by GC-MS in scan mode.

Results: GC-MS screening of all samples revealed the presence of the cannabinoid HHC. No other drugs were identified. The concentration of HHC in the vape liquid was 25 % (w/w) and 48 ng/mL in the blood sample.

Discussion - Conclusions: There is no information in the literature about the concentration ranges of HHC at which the various effects are induced and observed. Our research reveals that the concentration of 48 ng/mL can cause a significant signs of psychosis and can be a reason for drug-related death.

Keywords: Synthetic Cannabinoids, Hexahydrocannabinol, Intoxication, HHC

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DETECTION OF VALERENIC ACID IN VALERIANA OFFICINALIS BY TLC: COMPARATIVE EVALUATION OF EXTRACTION METHODS

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Background and Objectives: Plant-derived psychoactive compounds, especially those derived from legally accessible plant species, constitute an area of forensic toxicology and criminal analysis that requires careful scrutiny. In this study, the analytical visibility of various compounds, especially the psychoactive compound valerenic acid, in extracts obtained from the roots of *Valeriana officinalis* (valerian), a plant whose sedative and tranquilizing effects are well documented in the literature, was investigated using thin layer chromatography (TLC). Furthermore, the effect of different extraction methods on this visibility was comparatively evaluated.

Methods: Extraction was performed using two different methods. In the first method, the samples were macerated in 70% ethanol for 24 hours at room temperature. In the second method, the samples were subjected to ultrasonic bath extraction in high purity ethanol at 60 °C for 1 hour. The resulting extracts were applied to silica gel-based TLC plates, developed using the mobile phase n-hexane: ethyl acetate (8:2, v/v), and analyzed under 365 nm UV light using the VSC8000 imaging system.

Results: Spots were observed in both extraction methods at an R_f value of approximately 0.30–0.35, which corresponds to the R_f range reported in the literature for valerenic acid. However, in the extracts obtained via ultrasonic bath, not only the spot corresponding to valerenic acid but also several other compound spots appeared brighter, more intense, and more defined. This suggests that the ultrasonic method is more effective for detecting multiple compounds in the extract via TLC.

Discussion–Conclusions: The findings of this study demonstrate that the TLC method is an effective tool not only for the preliminary identification of valerenic acid but also for other psychoactive compounds. Furthermore, it was determined that the choice of extraction method has a direct impact on analytical visibility, highlighting the critical importance of method-specific optimizations in such analyses.

Keywords: Valerenic Acid, Valeriana Officinalis, Psychoactive Compounds, Thin-Layer Chromatography (TLC)

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ETHANOL QUANTIFICATION IN UNCONVENTIONAL POSTMORTEM SPECIMENS: NOVEL APPROACH TO PREVENT LOSS DURING SAMPLE PREPARATION

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Background and Aims: When blood is not available for investigation of postmortem ethanol content, unconventional matrices must be used and novel methods comprising sample preparation preserving ethanol content have to be introduced.

Methods: A headspace gas chromatography coupled with mass spectrometry (HS-GC-MS) method for ethanol quantification in postmortem matrices of liver, spleen and encephalon was developed. Sample preparation consists mainly in homogenization of tissues directly in headspace vials with 1.4 mm ceramic beads and addition of tert-butanol as internal standard (IS). Homogenization in non-hermetic vials was also tested to investigate analyte loss during the process. A 70:1 split ratio with 2 mL/min column flow rate using helium as a carrier gas was adopted. Chromatographic run was obtained with a DB-BAC1 Ultra Inert column (30 m, 0.32 mm, 1.80 μ m) and operates at 40 ° C for 13 min. Single reaction monitoring was selected (ethanol: m/z 31 for quantification and m/z 45 for qualification; IS: m/z 59 for normalization).

Results: The GC-MS method allowed compounds separation (retention times: 3.6 and 5.2 min for ethanol and IS respectively). The analytical method resulted in appropriate specificity, linearity (0.05-2 mg/g; $R^2 > 0.99$), sensitivity (LOQ: 0.05 mg/g), accuracy (100 $\pm$ 20 %) and precision (< 15 %). Matrix effect was negligible. Ethanol was quantified in real postmortem samples of liver, spleen and encephalon assessing method applicability. Noteworthy, a variable but significant variation in ethanol concentration measured (up to 20 %) between the samples tested undergoing the 2 different preparations was noticed.

Discussion - Conclusions: The proposed analytical method for ethanol quantification in postmortem specimens resulted applicable to forensic investigations. Presence of other volatile compounds would be evaluated to discriminate antemortem ethanol from postmortem generation. The proposed sample preparation turned out to be innovative and able to prevent ethanol loss due to volatilization and degradation during sample preparation.

Acknowledgement: This work was supported by the Italian Ministry of Health, through the contribution given to the Institute for Maternal and Child Health IRCCS "Burlo Garofolo" , Trieste, Italy (RC 56/22).

Keywords: Forensic Toxicology, Ethanol, Postmortem

- P25 -

PSYCHOACTIVE SUBSTANCES IN ACUTE INTOXICATION - THE EXPERIENCE OF UNIVERSITY HOSPITAL "MOTHER TERESA" IN TIRANA

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Background and Aims: The use of psychoactive substances still remains a big threat to our society. It has increased over the over the years bringing forensic and clinical toxicologists together to prevent health damages and improve patient care.

Time after time we have presented pictures of illicit drugs prevalence in Albania regarding different periods of time based into two source of information such as the Institute of Forensic Medicine in Albania as well as Addictology & Clinical Toxicology Service (ACTS), University Hospital "Mother Teresa" Tirana.

We aimed to present the clinical picture of intoxication cases after ingestion of psychoactive substances of patients hospitalized in the ACTS during the last five years, to find the most abused drugs and probably comparing with the data required to an earlier 5-year period.

Methods: In this presentation data was extracted from the database of the Statistic Service UHC "Mother Teresa" in Tirana. It's a retrospective study including years 2020-2024. Hospital emergency data were collected from drug-related admissions. Age, gender, symptoms, and use of multiple drugs were founded for these cases.

Results: The 1078 cases where men predominated, had an age range of 15-85 years old, average age 33.5. Mostly abused drugs were cocaine, heroin (approximately in 2:1 ratio), administrated alone or co-administrated, as well as poly-drug combinations were founded. Overdose and abstinence phenomenon were presented leading to toxicity. Compare to the previous 5-year database, the trend of the most abused drug has changed and the number of clinical cases has increased.

Conclusion & Discussion: Regarding the database of Addictology & Clinical Toxicology Service we find cocaine the most dangerous and the most prevalent drug of abuse during this last five years.

Keywords: Psychoactive Substance, Acute Intoxication, Toxicological Findings

- P26 -

FATAL CASE OF OVERDOSE INVOLVING NEW PSYCHOACTIVE SUBSTANCES (NPS) IN THE REPUBLIC OF MOLDOVA: FORENSIC TOXICOLOGY ANALYSIS

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Background and Aims: In the last few years (2022-2024), our Department of Forensic Toxicology has recorded higher rates of use of new psychoactive substances (NPS), thus confirming their increased presence. The Republic of Moldova has witnessed a worrying increase in the consumption of these drugs, culminating in tragic deaths.

Case description: A tragic incident that led to the death of a 27-year-old man was reported in the capital of the Republic of Moldova. Eyewitnesses reported that the 27-year-old man was seen inhaling vapors from an electronic vaping device. According to witness statements, after a few puffs, he began to show severe symptoms of intoxication: irregular and shallow breathing, convulsions, and finally loss of consciousness and death.

Methods: GC-MS method, using an internal standard (diphenylamine) in the full-scan with single quadrupole, the volume of the injected sample - 1 µl using an autodoser; Software used for data acquisition - Agilent MassHunter Workstation GC / MS Data Acquisition (version 10.1.49). The software used to process the obtained data - Agilent MSD Chemstation, AMDIS and the NIST 2020/Wiley12 mass spectra library.

Results: The results from the general unknown screening, provided by GC-MS, identified blood and lung samples substances such as: α- pyrrolidinovalerophenone (α-PVP), 4"-fluoro-α-pyrroli-dinovalerophenone (4F-α-PVP), synthetic cannabinoid PB-22F, synthetic cannabinoid MDMB(N)-2201 and 3,4-methylenedioxymethamphetamine (MDMA).

Discussion-Conclusions: This fatal case highlights the dangers associated with the uncontrolled use of vape devices containing synthetic narcotics. This tragic case is a wake-up call about the dangers of synthetic narcotics. It is necessary to adopt stricter measures to regulate and control these devices.

Keywords: Forensic Toxicology, Fatal Case, New Psychoactive Substances

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EPIDEMIOLOGICAL AND MORPHOPATHOLOGICAL ASPECTS IN A RETROSPECTIVE STUDY ON DEATHS CAUSED BY FIRE OR CARBON MONOXIDE, BETWEEN 2015-2020, IN THREE LEGAL MEDICINE INSTITUTIONS IN ROMANIA

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Background: The epidemiological aspects of deaths caused by fires or carbon monoxide exposure, as well as morphopathological findings at necropsy, are important in the field of forensic medicine.

Material and method: A retrospective study was conducted in three legal medicine institutions in Romania, between January 2015 and December 2020. The inclusion criteria were death caused by fire or carbon monoxide (CO) exposure, with survival time <48 hours.

Results: Of the 316 selected cases, 75.0% occurred in the months when heating is used in Romania (October-March). Male gender was the majority (63.61%). The mean age of women was significantly higher than that of men ($p=0.0038$). In 65.19% of cases the exposure was accidental, while among men, suicide was statistically significantly more frequent ($Z=1.6$, $p=0.049$). Most events occurred at home, while heating equipment represented the most frequent source of toxic environment production. Burns were described in 65.51% of cases, while 39.24% of subjects presented soot particles in the lower respiratory tract. Carboxyhemoglobin (COHb) $\geq 50\%$ was documented in 41.77% of the 248 measured samples. Toxic values of blood hydrogen cyanide (HCN $> 0.5 \mu\text{g mL}^{-1}$) were documented in 26 of 39 subjects. Blood alcohol concentrations $\geq 0.5 \text{ g}\%$ were measured in 27.53% of subjects. The medical cause of death was flame burns in 37.02% of cases, followed by CO poisoning in 34.18%, while approximately 28% of deaths were due to a combination of causes. HCN poisoning was the cause of death in 5.06% of the cases, in association with other causes.

Conclusions: We conducted a retrospective study of deaths due to fire or CO exposure. Most cases were accidental and were due to the use of heating equipment and flammable liquids. Toxic concentrations of COHb and HCN were determined. The medical cause of death was most commonly burns, CO poisoning, or a combination of causes, including HCN poisoning.

Keywords: Fire Deaths, Carbon Monoxide, Hydrogen Cyanide

CRIMINALISTICS TRACK

- P28 -

EXAMINATION OF BACK SPATTER IN SHOTS FIRED WITH SEMI-AUTOMATIC PISTOLS

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Background and Aims: The primary objective of this study is to experimentally investigate backspatter patterns on the shooter, complementing the typical analysis of forward spatter. This research aims to provide insights into the shooting distance and the type of weapon used by analyzing backspatter blood stains, even when the shooter's clothing is found or altered at the crime scene.

Methods: A total of 3,200 mL of bovine blood was collected in a sterile bottle containing 250 mL of 5% EDTA (ethylenediaminetetraacetic acid) to prevent clotting. For the experiment, a seat cushion measuring 18 × 14 × 7 cm was divided into 12 equal pieces. Each sponge piece was prepared to absorb a total of 150 mL of blood until leakage occurred. During the experiment, the shooter wore white sleeves on their right arm. The shots were taken from specific distances of 0, 5, 10, 20, 30, and 35 cm, using a Sarsılmaz SAR9 METE and a Canik TP9 SA semi-automatic pistol. All shots were photographed.

Results: The shots show that the distance can be determined as close and far, but no visible blood patterns can be observed beyond 30 cm. In Canik TP9 SA shots, it was observed that Backspatter decreased as the distance increased, while irregular backspatter was observed in Sarsılmaz SAR9 METE shots. It has been observed that proper examination of clothing found at the scene or discarded by the perpetrator with a backspatter pattern can contribute to preliminary reconstruction.

Discussion - Conclusions: Shots fired with the Canik TP9 SA Mod.2, show that as the shooting distance increases, blood drops spread over a wider area, but the amount of splashing drops decreases. This finding supports the statement by Kunz, Brandtner, and Meyer (2015) that "a significant decrease in the degree of splatter was observed as the firing distance increased."

Keywords: Back Spatter, Bloodstain Pattern Analysis, Semi-Automatic Pistol

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INVESTIGATION OF FLUORESCENT BEHAVIOR OF SOME PHARMACEUTICAL DRUGS ON DIFFERENT SURFACES BY SUPERSPECTRAL IMAGING

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Background and Aims: In forensic science, detecting pharmaceutical residues on surfaces can provide valuable support in crime scene and laboratory investigations. Some drug-related cases, substances are found impregnated into textile fabrics. This is often done to conceal the transport of drugs by dissolving them in solvents and absorbing the solution into fabrics to disguise them as harmless textile products. Their fluorescent under spectral light can help reveal traces of transfer, contact or presence. This study aims to investigate the fluorescent reactions of some pharmaceutical products on different surfaces using superspectral imaging.

Methods: Four pharmaceutical powders were examined using the mobile ForenScope SuperSpectral device with superspectral fluorescence capability. Initially, powders were tested on a sterile, non-fluorescent surface. Next, they were applied to various fabrics, and their fluorescence responses were observed. In a third method, powders were dissolved in ethanol and applied to fabrics with a syringe. After drying, residues were examined and photographed under different light-filter combinations. The methods were evaluated for their effectiveness in visualizing pharmaceutical traces on or within fabrics.

Results: Pharmaceutical products showed visible fluorescent on paper. When the powders were transferred onto fabrics, some residues were visible on some fabrics, but they didn't produce strong fluorescent reactions. When the powders were dissolved in ethanol and applied to fabrics, they gave noticeable fluorescent responses under some light-filter combinations, making it possible to locate them. These results indicate that some active ingredients in pharmaceutical products can be detected using different light-filter combinations.

Discussion–Conclusions: This study has shown that superspectral imaging can be used to detect pharmaceutical residues on different surfaces. It was observed fabrics with different colors and compositions gave varying fluorescent responses in residue detection. It has been observed that fluorescent can be enhanced and residue detection facilitated by using different filters and light sources.

Keywords: Forensic Sciences, Superspectral Imaging, Pharmaceutical Residue, Fluorescent

HUMANITARIAN FORENSICS AND FORENSIC ANTHROPOLOGY TRACK

- P30 -

IMPORTANCE OF MEDICAL DEVICES IN FORENSIC ANTHROPOLOGY IDENTIFICATION – CASE REPORT

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Background and Aims: Positive scientific identification of human remains recovered in a medicolegal context represents a central goal of forensic anthropology analysis. Positive identification represents a much higher level of probability and involves a two-step process. First, anatomical features must be discovered that are shared between the examined evidence and the known antemortem information relating to a particular individual. Second, the analyst must determine that the features being compared are sufficiently unique to enable the identification. The unique features needed for positive identification can be provided by surgical procedures, especially those generating devices that remain in the skeletal tissue.

Methods: The authors present a forensic anthropological case, a partial skeletonized cadaver; during the anthropological examination an orthopedic medical device being discovered.

Results and discussion: Medical devices are a primary source for positive identification. Using these medical implants for identification by comparing serial numbers with patient records is considered a rapid and definitive method. However, the usefulness of medical data comparisons depends on the centralization and/or availability of AM medical records, which varies from country to country, as well as individual medical and imaging practices. A database is needed that includes the identification series of all these medical devices and allows access to potentially involved people (police, forensic doctors).

Keywords: Forensic Anthropology, Positive Identification, Medical Device, Cadaver

- P31 -

MASS GRAVES: KNOWLEDGE FROM FIELD PRACTICES AND ACADEMIC KNOWLEDGE, A SYSTEMATIC REVIEW

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Background and Aims: Between 1991 and 1995, the former Yugoslavia experienced major political, social, and humanitarian crises, which led to complex forensic challenges in the aftermath of mass violence and war crimes. This study seeks to synthesize the scientific advancements achieved by forensic experts and academic institutions—both regional and international—regarding their contributions to the field of forensic anthropology.

The main objective is to systematically assess the extent to which forensic investigations carried out during and after the conflict contributed to scientific development or integration into academic discourse. The focus is on operations conducted across the former Yugoslav territories from January 1990 to April 2025.

Methods: A systematic literature review was conducted according to PRISMA guidelines. The databases PubMed, ScienceDirect, Google Scholar, Web of Science, Summon, EMBASE, and MEDLINE were searched for relevant studies, reports, and publications. Inclusion criteria required studies to address scientific developments linked to mass grave excavations related to the conflicts in Croatia, Bosnia and Herzegovina, Serbia, Slovenia, North Macedonia, and Kosovo, with demonstrated applicability in post-conflict contexts. Data extraction was performed and validated by two lead reviewers and synthesized using a narrative approach.

Results: A total of 185 studies met the inclusion criteria. Notable advancements were identified in human remains identification, recovery protocols, interdisciplinary collaboration, the development of population-specific reference data, DNA and odontological analysis, taphonomy, and imaging techniques. The integration of Geographic Information Systems (GIS) and forensic botany further improved the reconstruction of depositional environments and investigation accuracy.

Conclusion: Scientific advancements in biological and forensic anthropology in the context of the former Yugoslavia significantly contributed to international post-conflict forensic standards. Continued collaboration between regional and international actors remains vital to addressing future challenges in the field.

Keywords: Forensic Science, Ex-Yugoslavia, Mass Burial, Commingled Remains, DNA, Taphonomy, Post-Conflict Justice, PRISMA, Forensic Botany

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MULTIDISCIPLINARY FORENSIC INVESTIGATIONS OF MIGRANT DEATHS IN THE MEDITERRANEAN: THE NEEDS OF FORENSIC BORDER MEDICINE

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In recent years there has been a significant increase in migratory phenomena, particularly across the Mediterranean, leading to a tragic rise in the number of deaths at sea. According to the International Organisation for Migration (IOM), while regular and safe migration routes remain limited, hundreds of thousands of people attempt irregular and dangerous migration every year, with thousands of migrants losing their lives in search of a better life. The Central Mediterranean route remains the deadliest migration route in the world, with more than 17,000 deaths and disappearances since 2014. Available data shows that more than half of these deaths are caused by drowning, 9% by road accidents and 7% by violence.

This study presents the multidisciplinary work carried out on the bodies of 26 young female migrants who died while attempting to cross the Mediterranean Sea, highlighting the importance of an integrated scientific approach and a well-founded and shared operational and evaluation methodology in dealing with such tragedies. All the bodies were subjected to full autopsies, toxicological analyses and histopathological examinations in order to establish the cause and circumstances of death. The forensic examination thus carried out established the cause of death as mechanical asphyxia due to drowning and allowed the identification and definition of traumatic injuries and signs of abuse and violence. The need to identify unidentified bodies also meant that identification procedures had to be carried out according to specific protocols. A multidisciplinary team of forensic pathologists, anthropologists and forensic odontologists applied the Interpol DVI (Disaster Victim Identification) protocol. Dental orthopantomographic studies also allowed the age of each body to be estimated. This multidisciplinary approach effectively managed the catastrophic migratory event, determining the circumstances and causes of death and enabling the collection of data necessary for the identification of the victims.

The study presented suggests the need to theorise Forensic Border Medicine, a discipline that combines strictly medico-legal competencies (forensic pathology, toxicology, anthropology, forensic genetics, etc.) with the specific legal needs of the phenomenon of clandestine migration. The contribution of forensic border medicine aims not only at establishing the causes of death and identifying the deceased, but also at preserving the dignity of the victims and providing crucial data for legal and humanitarian investigations. At a time when deaths at sea are becoming an increasingly relevant phenomenon, Forensic Border Medicine can make a significant contribution to improving practices and policies for managing the bodies of migrants, providing essential answers for justice and the dignity of victims, and restoring truth and dignity to victims of human trafficking, promoting health and enabling the administration of justice, through highly qualified professional and scientific activity.

Keywords: Migrant Fatalities, Migratory Event, Forensic Border Medicine

FORENSIC BIOLOGY AND GENETICS TRACK

- P33 -

HUMAN DNA ISOLATION AND CHARACTERIZATION FROM BEDBUGS (CIMEX LACTOLARIUS)

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Background and Aims: Bedbug *Cimex lectolarius* is a Hematophagous ectoparasite that feed on the blood of various vertebrate host including human. Human DNA can be extracted and a host DNA profile can be generate from un-degraded human DNA extracted from small volume of the ingested human blood isolated from bedbugs in PBM (post blood meal) stage for individual identification.

Methods: For human DNA extraction and characterization, bedbugs were collected manually from different residential areas and were preserved in absolute ethanol on -20 degree. The human DNA were extracted from those bedbugs by manual organic PCI method.

Results: Human mitochondrial control region and HVR2 were amplified to confirm the isolation of mtDNA. Gender of the host of bedbugs were then determined using AmelT and HumAmel primers. Lastly the isolated human DNA were amplified by all the six common eye color primers (HERC2, TYR, OCA2, IRF, SLC24 and SLC45) followed by human eye color SNPs profiling. The human DNA was specifically extracted from a single bedbugs through manual PCI method, human mtDNA was amplified from the bedbugs followed by the human host gender determination and lastly the genes responsible for human eye color were amplified and some of the SNPs that regulate human eye color were also amplified.

Discussion-Conclusions: However the SNPs results were not good enough to predict the eye color of the human host through IrisPlex online webtool.

Keywords: Cimex lectolarius, Hematophagous Ectoparasite, Human DNA, mtDNA

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UNLOCKING GENETIC EVIDENCE IN HOUSEHOLD DUST: A FORENSIC EVALUATION OF COLLECTION AND EXTRACTION TECHNIQUES FROM BEDDING MATERIALS

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Background and Aims: Household dust accumulating on bedding materials represents a potentially valuable yet underexplored source of forensic DNA evidence. In cases such as sexual assaults—where visible biological traces may be absent—alternative matrices such as dust may offer critical genetic information. This study aimed to systematically assess the effectiveness of various collection and extraction methodologies for the recovery of DNA from household dust, with the objective of optimizing procedures for practical forensic application.

Methods: Dust samples were collected from previously used bedding materials using two primary collection techniques: tape-lifting and sweeping. DNA was extracted using protocols originally developed for body fluid samples, selected for their potential to maximize DNA yield and purity. DNA quantification was carried out using fluorometric analysis to evaluate both the quantity and integrity of the recovered genetic material.

Results: A total of 36 dust samples were analyzed. DNA was successfully recovered from 97.22% of the samples. The combination of the tape-lifting technique and a body fluid-specific extraction protocol yielded the highest DNA quantities and quality. Notably, 66.67% of the samples contained sufficient DNA for successful short tandem repeat (STR) profiling, underscoring the forensic relevance of this approach.

Discussion-Conclusions: The findings demonstrate that household dust from bedding materials constitutes a viable and underutilized source of forensic DNA. The results emphasize the critical importance of tailoring collection and extraction techniques to the sample type to enhance DNA recovery efficiency. Implementation of these optimized strategies may significantly improve individual identification capabilities in crime scenes where visible biological evidence is absent, particularly in cases involving sexual violence.

Keywords: Forensic Biology and Genetics, Forensic DNA Analysis, DNA Recovery from House Dust, Trace Evidence

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COMMON MALPRACTICES BY CRIME SCENE INVESTIGATION AND LABORATORY TEAMS IN FORENSIC ENTOMOLOGY

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Background and Aims: Forensic entomology is a science discipline that helps justice by being founded change in place of body, identity of the deceased, identity of insects, determination of banned substance or poison that deceased taken, and the most important one is when the death is happened by investigating biology and ecology of insects. Mistakes maken during collecting entomological evidence from the body and delivering to the laboratory, make the identification of insects in the laboratory impossible. The most important of these is crime scene investigation team forget to collect temperature data from crime scene. Second one incorrect collected samples, third is samples are not deliver to the laboratory immediately, they stored at the office two or three days after that they deliver. The fourth one is using wrong killing method for collected insects. The fifth mistake is belong to the laboratory which is receiving samples. However, the laboratory cannot fix what the crime scene has destroyed. The aim of this study is to emphasize what needs to be done for the correct collection of samples by drawing attention to mistakes maken during collecting samples from crime scene.

Methods: Result of revising investigated cases, mistakes maken by crime scene invsetigation team were determined.

Results: Temperature data have been collected 5.88% in 17 cases, it was found that this data did not cover all temperatures. It was seen that entomological data on the corpse were reported 58.82% in 17 cases but they did not collected.

Discussion-Conclusions: We can offer two method to eliminate these mistakes; the first one is to be invited a Forensic Entomolog to the crime scene and the second one is is to break the resistance of crime scene investigation teams in collecting entomological data. For this we believe that we must continue training of crime scene investigation teams.

Keywords: Crime Scene Investigation, Entomological Evidence, Forensic Entomology, Malpractice

- P36 -

APPLICATION OF THE SPERM HY-LITER EXPRESS® IN THE EXAMINATION OF VAGINALS SWABS IN SEXUAL ASSAULT CASES –FIRS LABORATORY EXPERIENCE IN ALBANIA

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Background and Aims: The detection and identification of spermatozoa in vaginal biological samples is one of the essential steps in the biological examination of cases of sexual violence. The purpose of this presentation is to present the first laboratory experience in Albania, using the Sperm Hy-Liter® Express method, an advanced immunofluorescence technique for the specific visualization of sperm cells.

Methods: In this experience, a number of vaginal swab samples taken within the framework of forensic examinations were analyzed. The Sperm Hy-Liter® Express kit was used for the selective identification of spermatozoa in microscopic preparations, with observation under a fluorescence microscope. For each sample, the manufacturer's protocol steps were followed including processing, incubation with antibodies, washing, and final analysis. Examination was performed under a microscope with 20x, 40x, and FITC (fluorescein isothiocyanate) and DAPI (4', 6-diamidino-2-phenylindole) filters.

Results: The method has shown high sensitivity in identifying spermatozoa, even in samples with low concentration or high contamination. Compared to classical hematoxylin, eosin, or crystal violet staining, Sperm Hy-Liter® Express provides a more precise selection and direct visualization of sperm structures under the microscope. The presence of green FITC staining in the sperm head structure, in combination with the blue background staining, makes interpretation immediate and reliable.

Discussion-Conclusions: The application of the Sperm Hy-Liter® Express fluorescence method provides a reliable and sensitive tool for the identification of sperm in vaginal swabs in the context of sexual violence. The use of FITC and DAPI filters significantly increases visual clarity and allows effective differentiation with other cells. Initial laboratory experience suggests that this technique can be successfully adapted to forensic laboratories and significantly helps in securing evidence for investigation.

Keywords: Forensic Science, Immunofluorescence, Sperm Hy-Liter®, FICT, DAPI

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IN THE AFTERMATH OF FIRE: FORENSIC IDENTIFICATION THROUGH DNA AND PARENTAL KINSHIP MATCHING

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Background/Objective: On 14 August 2022, a large-scale explosion and subsequent fire in Yerevan resulted in 16 confirmed fatalities, multiple injuries, and one missing person. Among the deceased, five individuals remained unidentified and required forensic genetic identification. The Department of Molecular Genetics Examination (DNA Laboratory) of the Scientific Practical Centre of Forensic Medicine (SPCFM) led the identification efforts under complex conditions involving severely thermally damaged remains. This study presents the DNA-based approach used to identify the remains via kinship analysis with parental reference samples.

Methods: DNA was extracted from heat-altered bone fragments—including teeth, femur, and cranial bones—using the PrepFiler BTA Forensic DNA Extraction Kit (ThermoFisher) with automated protocols. Buccal swabs from presumed biological parents were collected as reference samples. STR typing was conducted with the VersaPlex® 27PY System (Promega), and fragment analysis was performed using the 3500 Series Genetic Analyzer (ThermoFisher). Data interpretation was carried out using GeneMapper ID-X v1.6. Kinship calculations, under a parent-offspring hypothesis, were conducted using DNA-View software. To prevent contamination, pre- and post-PCR procedures were conducted in physically separated laboratory areas.

Results: Of the 30 bone samples analyzed, 24 yielded interpretable STR profiles. Five distinct postmortem profiles were matched to parental references with high confidence. Tooth and femur samples provided the most consistent DNA recovery. All five matches achieved likelihood ratios (LRs) exceeding 1,000, supporting strong statistical evidence of biological relationships.

Discussion – Conclusions: This case study highlights the effectiveness of standard forensic DNA technologies for the identification of fire-damaged human remains in mass disaster scenarios. Despite significant thermal degradation, successful STR profiling and kinship matching were achieved in the majority of cases. The findings reinforce the critical role of proper sample selection, robust laboratory workflows, and contamination control in ensuring reliable results under extreme forensic conditions.

Keywords: Forensic Genetics, Forensic DNA Identification

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MOLECULAR APPROACHES TO FORENSIC ENTOMOLOGY: ADVANCING PMI ESTIMATION THROUGH DNA ANALYSIS IN ALGERIA AND TÜRKİYE

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Background and Aims: Blowflies (Diptera: Calliphoridae) are the earliest colonizers of decomposing remains and remain indispensable for estimating the postmortem interval (PMI). Accurate species identification is critical for applying developmental data, yet morphological features are often ambiguous in early instars. DNA barcoding offers a rapid, robust alternative that complements classical taxonomy and enhances reliability in medico-legal investigations.

Methods: We analyzed forensic case material and field collections from Algeria and Türkiye using COI barcoding.

Results: Molecular results consistently confirmed morphological identifications of key forensic taxa, including *Calliphora vicina* Robineau-Desvoidy, and *Lucilia sericata* (Meigen), and *Chrysomya albiceps* (Wiedemann). In addition, two blowflies of high medico-legal significance, i.e., *Chrysomya cuprina* (Wiedemann) and *Chrysomya megacephala* (Fabricius), were confirmed for the first time in Algeria, expanding the regional forensic entomology baseline and highlighting the potential for invasive introductions.

Discussion-Conclusions: Phylogenetic analyses of *L. sericata*, *C. vicina*, and *Ch. albiceps* populations from Algeria and Türkiye revealed low intraspecific divergence, with haplotypes clustering together rather than separating geographically. This finding underscores the stability of these widespread species and supports their use in PMI estimation across regions. While short COI fragments provided sufficient species-level resolution, longer sequences or additional nuclear markers are required to explore finer intraspecific variation and track potential population shifts, especially in invasive *Chrysomya* taxa.

Keywords: Forensic Entomology, Postmortem Interval, Blowflies, DNA Barcoding, North Africa, Türkiye

QUESTIONED DOCUMENTS TRACK

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INVESTIGATION OF PRE- AND POST-DISEASE WRITING CHANGES IN INDIVIDUALS WITH NEUROLOGICAL DISEASES

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Background and Aims: Forensic sciences is a multidisciplinary branch that begins with the collection of all the findings related to an incident from the crime scene and contributes to solving the crime by examining these findings and determining their relevance to the incident and the involved parties. Forensic document examination is a sub-discipline that deals with the examination and determination of forgery in documents through handwriting, signatures, typewriters, computers, printing presses, etc., and the use of photocopies, ink, paper, stamps, seals, and photographs. Handwriting examinations and comparisons are the process of making an opinion as to whether the handwritings on documents belong to the specified individual.

Methods: Within the scope of the study, handwriting samples were voluntarily provided by seven different participants diagnosed with stroke, Parkinson's disease, dementia, and epilepsy. These samples were collected from both the pre- and post-illness periods of each participant. Writing samples from both periods were evaluated and interpreted in terms of writing integrity, the construction of characters and the distance between them, letter sizes, pen lifting behavior, and punctuation habits.

Results: There is some deterioration in people's writing following the experience of neurological disorders. When the pre- and post-illness writings of each participant were compared, it was observed that there were signs of rigidity, tremor, and pauses. The loss of function in the hand and/or fingers, especially in finger movements, which undertake some of the basic tasks of the person in writing, expresses how this ability of people with neurological disorders is affected. It is a natural consequence that the act of writing, in which stability and delicacy play an important role, is affected by diseases whose consequences are explained in this way.

Discussion-Conclusions: Despite the loss of function, it can be said that some characteristic writing features are preserved, as shown by the pre- and post-illness samples of all participants. The fact that the writing features of some typefaces, despite all neurological and physiological impairments, are tried to be applied in the way they are ingrained in memory and that this effort is made voluntarily or involuntarily, reveals how important and deeply rooted the act of writing is in memory.

Keywords: Forensic Sciences, Questioned Document Examination, Handwriting Analysis, Neurological Diseases

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FORENSIC DETERMINATION OF WRITING AND PRINTING ORDER: INKJET AND THERMAL PRINTERS WITH BLACK AND BLUE INKS

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Background and Aims: In document forgery investigations, determining the sequence between printed text produced using different printer technologies and ink colors and handwritten elements (name, signature, etc.) is a critical aspect of forensic analysis. Forgers may print over existing handwriting to make unsigned documents appear official. This study aims to detect manipulations and clarify writing order using documents made with two printer types and ink colors.

Methods: In this study, to investigate writing order determination in document forgery, sample documents were prepared using two printer types: inkjet and thermal transfer. Handwriting and signatures in black and blue ink were applied either before or after printing. All samples were examined using the ForenScope Superspectral forensic imaging device, which features mobile and superspectral technology widely used in forensic document analysis. The examination assessed the effect of printer type, ink color, and application order on the ability to determine the writing sequence.

Results: The ability to determine the writing sequence varied depending on ink color and application order. Texts written with blue ink were more visible compared to those written in black. In the case of inkjet printers, a distinguishable layer difference was observed between handwriting and printing. However, with thermal printers, the layer separation could not be achieved, and the sequence of writing could not be determined.

Discussion–Conclusions: Printer technology and ink color are key factors in determining writing sequence. Blue ink provided greater visibility, aiding the identification of writing order. While layer differences between handwriting and printing were distinguishable with inkjet printers, this distinction was not possible with thermal printers, highlighting limitations of thermal technology in forensic analysis. In conclusion, both printer type and ink color critically affect writing order determination. The ForenScope Superspectral device, with its advanced filtering and multi-wavelength imaging capabilities, improved layer differentiation and ink visibility.

Keywords: Forensic Document Examination, Writing Order Determination, Inkjet and Thermal Printers, Forensic Imaging Technology

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COMMON SECURITY INKS OF VALUABLE DOCUMENTS AND ONE-TO-MANY TECHNIQUES

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Background and Aims: The forensic examination of security inks forms a foundational component of document authentication in high-risk domains such as currency control, border security, and civil registries. Security inks, categorized by overt and covert functionalities, are embedded in substrates compliant with ISO 12931 and ICAO Doc 9303 standards. This study aims to (1) classify security inks by security function—primary, secondary, and advanced; (2) differentiate visible and invisible inks based on spectral and chemical signatures; and (3) identify optimal forensic methodologies for detection and characterization in documents like passports and banknotes.

Methods: A multi-modal forensic analysis was employed, including:

UV-Vis Spectroscopy and Fluorescence Profiling for spectral comparisons; Near-Infrared Reflectance Imaging to distinguish visually similar inks; Video Spectral Comparator (VSC) for IR luminescence and absorption profiling;

Magneto-optical sensors for identifying machine-readable magnetic inks; Microscopy and Cross-sectioning to determine the sequence of ink deposition and alteration attempts.

All samples were compared to control documents and tested against erasure, washing, and substitution methods.

Results: Security inks showed variation in complexity and detectability:

Primary-Level Inks: Visibly detectable (e.g., intaglio, color-shifting, magnetic inks).

Secondary-Level Inks: Covert inks visible only under specific lighting (e.g., UV, IR).

Advanced-Level Inks: Inks with forensic tracers, OVDs, thermochromic properties, requiring high-end detection (e.g., Raman, LIBS, XRF).

Multispectral techniques proved essential in ink classification and tamper detection.

Discussion – Conclusions: Classifying inks into three functional levels provides a robust forensic framework. Combining spectral, optical, and elemental analyses increases precision in document verification and tamper detection. As counterfeiting evolves, forensic methodology must align with global standards and technological advancements to maintain document integrity and authenticity.

Keywords: Forensic Document Examination, Security Inks, Counterfeit Detection, UV- Fluorescent Ink, ICAO Doc 9303

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DETECTION OF VOLATILE INKS USED IN FORGERY WITH A MOBILE FORENSIC IMAGING DEVICE

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Background and Aims: One method used in document forgery involves manipulation with volatile inks. These inks are generally sensitive to heat or time and can disappear after a while or be rendered invisible through special processes. Forgers use this method to temporarily write critical information such as dates, amounts, or names on documents and later erase and replace them with different information. Advanced light sources, chemical analysis, etc. techniques are used to detect such forgery.

Methods: In this study, documents written with three different colors of volatile and regular inks were examined using the ForenScope-DocEX Tablet. UV light sources with specific wavelengths and filters were used to enhance ink visibility. The analysis evaluated the detectability of volatile inks under UV light and the visibility of different ink types. The results showed volatile inks' effectiveness in forgery detection and mobile devices' practicality in the field.

Results: The visibility of three different colors of volatile inks under UV light varied. The best visibility was observed in blue ink, followed by black, with red ink showing the least visibility. The use of different filters allowed clearer visualization of changes on the document. Except for UV lights at certain nanometer wavelengths, visibility of volatile inks could not be achieved under other light wavelengths. These results highlight the critical importance of selecting appropriate UV light wavelengths for detecting volatile inks.

Discussion - Conclusions: Our study revealed that blue volatile ink had the highest visibility under UV light. Using different filters improved ink detection and demonstrated the effectiveness of mobile devices like the ForenScope-DocEX Tablet in field conditions. The visibility of volatile inks only at specific UV wavelengths highlights the need for proper light source selection. This limitation can be addressed by using varied wavelengths and filters. Overall, mobile forensic tools offer efficient and practical solutions for detecting forgery.

Keywords: Forensic Sciences, Forensic Document Examination, Volatile Ink Detection, Ink Spectral Analysis

MEDICAL LAW-JURISPRUDENCE TRACK

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MEDICALLY ASSISTED SUICIDE IN ITALY: A FORENSIC AND BIOETHICAL ANALYSIS OF POST-SENTENCE OF CONSTITUTIONAL COURT N. 242/2019

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Background and Aims: Following the Italian Constitutional Court's landmark ruling 242/2019, medically assisted suicide (MAS) became legally permissible under strict conditions despite the absence of a comprehensive national law. This regulatory gap has led to fragmented, heterogeneous, and procedurally complex implementation across Italy. This retrospective observational study analyzes ten clinical MAS requests submitted to the Legal Medicine Institutes in Trieste, Rome, and Salerno, assesses the application of legal criteria, identifies systemic inconsistencies, and contributes to the design of a comprehensive uniform regulatory framework.

Methods: Data were meticulously gathered from multiple sources, including detailed clinical records, formal petitions, advance healthcare directives, multidisciplinary assessments, ethics committee opinions, public court rulings, and media reports. We examined primary and comorbid diagnoses, disease duration, ongoing pharmacological and palliative treatments, the extent of dependency on life-sustaining therapies or caregiver support, response times from local health authorities and territorial ethics committees (CETs), and the final procedural and legal outcomes.

Results: Heterogeneity emerged in decision-making processes and timelines. Divergent interpretations of the "life-sustaining treatment" criterion varied between technical commissions and ethics panels due to absence of a universally accepted definition. Patients presented irreversible, debilitating conditions associated with intolerable psychological and existential suffering that compromised their autonomy and quality of life. Despite clear patient requests and ethical justification, only one MAS procedure was executed within the Italian healthcare system, while two approved cases failed to proceed due to bureaucratic delays and procedural ambiguities, remaining requests unresolved at the close of the study period.

Discussion-Conclusions: These findings underscore the urgent need for a uniform national framework defining objective eligibility criteria, standardized evaluation tools, specific procedural deadlines, and legal safeguards for healthcare professionals. Establishing these elements is essential to ensure equitable, transparent, and dignified end-of-life care, promote respect for human dignity, affirm patients' right to self-determination, and provide legal security for clinicians involved in assisted suicide procedures.

Keywords: MAS, End-of-Life, Bioethic

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MEDICAL-LEGAL CHALLENGES IN ELDER ABUSE

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Background and Aims: Elderly individuals are a vulnerable population due to declining capacities, making them prone to abuse. The World Health Organization reports that 1 in 6 people over 60 experience abuse. Physicians, often among the few accessible caregivers, play a key role in identifying, managing, and preventing abuse. This presentation examines these processes and their limitations.

Methods: Based on case studies encountered in routine medical-legal practice, we reviewed the literature on elder abuse from medical, medico-legal, and social perspectives.

Results: Elder abuse can take multiple forms: psychological, physical, financial, neglect, and sexual. Among these, the forms that can be medically and medico-legally identified are physical abuse, sexual abuse, and neglect. However, even when identified, the individual often remains dependent on the abusive environment due to reduced self-care capacities and limited social support resources for this category of victims. Despite the numerous prevention and response strategies proposed, evidence regarding their effectiveness remains limited, particularly in settings marked by reduced decision-making capacity, constrained financial resources, dependency and confidentiality challenges, and a shortage of sufficiently trained caregiving personnel.

Discussion-Conclusions: Abuse, in its various forms, represents a serious issue among elderly individuals with wide-ranging consequences. Medical and medico-legal services can play a crucial role in identification, management, prevention, and awareness, while recognizing the need for standardized protocols and inter-institutional collaboration to develop more effective strategies.

Keywords: Elder Abuse, Medical-Legal, Prevention, Awareness



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