National Association of Medical Examiners

Abstracts of the 58th Annual Meeting

September 19 – 23, 2024

Hyatt Regency Denver at Colorado Convention Center

Denver, Colorado

NOTES

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1.1 Delineating Fat Embolism Syndrome from Nonlethal Fat Embolism at Autopsy

Lo Tamburro MD, Allen Burke MD
University of Maryland School of Medicine, Baltimore, MD, USA

Introduction: Fat embolism (FE) is frequently seen several hours to days following trauma, especially long bone and pelvic fractures, though it can be seen in nontraumatic conditions as well. Only a small percentage of those with FE develop clinically apparent fat embolism syndrome (FES), which is potentially fatal. Minor degrees of FE can be seen histologically at autopsy following cardiopulmonary resuscitation (CPR), complicating the diagnosis of FES. We compared cases of FE following CPR to FE resulting in death to present an approach to FES diagnosis.

Methods: Retrospective analysis of 1,500 autopsies identified 8 cases where FES contributed to the cause of death. An equivalent number of control cases with rib fractures secondary to CPR were studied similarly. The degree of FE was graded on hematoxylin and eosin (H&E)-stained lung slides using a scoring system defined by Scully and Glas and modified by Mudd et al where grade 0 was no emboli (4x), grade 1 was one to ten emboli (4x), grade 2 was one to five emboli (10x), grade 3 was one to five emboli (40x), and grade 4 was five or more emboli (40x) in a majority of fields. The grade of FE between FES cases and controls was compared.

Results: Of the FES cases, there was an overall mean age of 61.4 (47-85) years with a female sex predilection. The most common clinical cause of FES was hemoglobinopathy (62.5%), with others being acute pancreatitis, diabetes mellitus, hepatic steatosis, and septicemia. All causes of death were atraumatic, though CPR was performed in all but one FES case. Systemic FE was identified in one FES case. There was a clear delineation in FE grade between CPR-induced FE and FES cases, with controls ranging from grades 0-2, with intra-case variability, and all FES cases being grade 4.

Discussion: Identification of FE at autopsy does not directly correlate with a diagnosis of FES, or imply that FE contributed to the cause of death. A semiquantitative grading of FE on H&E-stained lung slides reveals there is a clear distinction between the severity of FE seen in FES and FE that is noncontributory to the cause of death. By implementing this approach to histologic FE grading in conjunction with relevant clinical history and laboratory findings, pathologists should be better able to diagnose FES at autopsy.

1.2 A Pediatric Series of Sudden Death and Congenital Coronary Artery Anomalies

Jessicia Schmitt MD[1,2], Lily Marsden MD[3,4], Ben Murie DO[3], Phillip Bennett DO[1,2]
[1]University of Utah, Salt Lake City, Utah, USA. [2]ARUP Laboratories, Salt Lake City, Utah, USA. [3]Utah Office of the Medical Examiner, Salt Lake City, Utah, USA. [4]University of Utah School of Medicine, Salt Lake City, Utah, USA

Sudden cardiac death (SCD) has two defining features: (1) occurrence within one hour after symptom onset and (2) occurrence in a previously healthy individual with no known cardiac abnormalities. With the myriad of pathologies that can occur in the cardiovascular system (e.g., myocardial infarction, myocarditis, thrombosis, congenital anomalies), it is imperative to take into account the decedent's age, clinical history, circumstances surrounding death, and any anatomical anomalies identified at autopsy when determining the cause of death.

Anatomic anomalies vary in significance, but congenital malformations are the leading cause of death in infancy and rank second in ages 1 to 4, fourth in ages 5 to 9, and fifth in ages 10 to 14. Though many of these deaths are related to structural congenital malformations, specifically of the heart, there is a small percentage of cases that can be attributed to anomalies of the coronary arteries. In the statewide medical examiner system of Utah, there have been 12 sudden and unexpected deaths in young people referred to the Office of the Medical Examiner in the last 33 years that have been attributed totally or in part to previously undiagnosed coronary artery anomalies.

This case series includes four infants, two children aged 3 years, and six adolescents ranging from ages 12 to 19 years. Three cases showed one or both coronary arteries originated from the pulmonary circulation, five cases showed the left coronary artery originating from the right sinus of Valsalva and coursing between the aorta and pulmonary trunk, one case showed the right coronary artery originating from the left sinus of Valsalva and coursing between the aorta and pulmonary trunk, two cases showed either posterior or superior displacement of both coronary artery ostia with proximal artery stenoses, and the last case showed abnormal formation of the anterior coronary circulation composed of multiple small caliber arteries instead of a single large anterior descending vessel. Eight of eleven cases in which histology was taken showed evidence of acute and/or chronic ischemic injury of the myocardium. Of the six adolescents autopsied, five collapsed during physical exertion.

Though rare, coronary artery anomalies represent a well-recognized cause of sudden cardiac death. When dealing with pediatric and adolescent deaths, it is important to identify the various anomalies that can occur and ascribe appropriate significance to these findings if the clinical scenario aligns.

1.3 Subway and Other Train System-Related Electrocution Deaths in New York City

Hae-Sun La MD, Peter Lin MD
New York City Office of Chief Medical Examiner, New York, NY, USA

Introduction: Subway system-related fatalities in New York City (NYC) have increased in the postpandemic period. Most subway-related fatalities are due to blunt trauma, but a subset of these fatalities are due to electrocution or a combination of blunt trauma and electrocutions, usually from contact with an electrified third rail, which typically carries electricity with a voltage of 600-750V. In order to better understand the characteristics of subway train-related electrocution deaths, we examined the case files of the NYC Office of Chief Medical Examiner (OCME) for such deaths over a five-year period.

Methods: The NYC OCME case management system (CMS) was searched for cases where "electrocution" was included in the cause of death statement for the years 2018 to 2023. Documents in the case file (investigation reports, autopsy reports, death certificates, toxicology reports, and autopsy photos) were examined in order to determine the cause and manner of death, how injury occurred, date, time and location of injury, autopsy findings, toxicology findings and other circumstantial information. Data was tabulated and analyzed in Microsoft Excel.

Results and Discussion: In the years between 2018 and 2023, in NYC, there were 57 deaths due to electrocution. Of these, 33 were due to electrocution occurring on the NYC subway system, one on the Long Island Railroad (LIRR) system, and one on the Port Authority Trans Hudson (PATH) system. Of these 35 total deaths, 25 were due to electrocution only and 10 were due to a combination of electrocution and blunt trauma. The manners of death among these 35 deaths were: 21 accident, nine undetermined, four suicide, and one homicide. There were two deaths of individuals fleeing from police when they contacted the third rail, both of which were certified as accidents. There was one work-related death and the one homicide involved an individual who fell onto the third rail following an altercation. In 33 of 35 of these deaths, significant charring of the skin was present on at least one part of the body. In most cases, charring was present on more than one part of the body. Notably, in two cases, only relatively minor electrothermal injury was identified, which likely corresponded to a low-voltage electrocution from contact with an electrified component of the subway car rather than direct contact with the third rail.

1.4 Increased Pulmonary Embolism Deaths Among Southwestern United States Truck Drivers During the COVID-19 Era

Yonatan Carl MD[1,2], Garon Bodor MS[1,2]
[1]University of New Mexico, Albuquerque, NM, USA. [2]New Mexico Office of the Medical Investigator, Albuquerque, NM, USA

Introduction: Prolonged stasis, such as endured by long-distance truck drivers, is a known risk factor for thromboembolism and pulmonary embolism (PE), as is COVID-19-positivity. This research compares the incidence of PE-associated deaths in long-haul truckers and the general population in pre- and post-COVID-19 pandemic time frames.

Methods: A retrospective analysis of all New Mexico Office of the Medical Investigator (NM OMI) natural deaths was performed, defining two cohorts: 2009-19 (pre-COVID-19-19) and 2020-23 (post-COVID-19). A total of 7,785 natural deaths were analyzed: 7,721 non-truckers and 64 on-the-job truckers. We identified on-the-job truckers using a key-term search and manual review of scene descriptions. Cause of deaths (COD) attributable to PE were codified a dependent variable while race, BMI, age, sex, trucker status, and Hispanic identification were coded independently. Logistic regression analyses were performed on the pre-COVID-19 and post-COVID-19 cohorts, as well as nonparametric odds ratio comparisons of PE COD rates.

Results: The rate of PE as COD significantly increased in the general population, rising from 4.17% pre-COVID-19 to 6.03% post-COVID-19 (Fischer E odds ratio [FE OR] of 1.47; $p<0.05$). The rate also increased in truckers, rising from 4.19% to 25.0% (FE OR of 7.67; $p<0.005$). The increase of PE as COD rate is significantly greater in truckers (δ=1.65; z=1.77, one-tailed $p<0.05$). Before COVID-19, truckers did not have greater risk of PE as COD compared to the general population (FE OR of 1.01; $p>0.05$), while across the post-COVID-19 cohort, truckers have a significantly greater rate of PE as COD compared to the general population (FE OR of 5.19; $p<0.05$). Logistic regression analysis of pre-COVID-19 10-year and post-COVID-19 3-year cohorts identified variables significantly contributing to risk of pulmonary embolism as COD (only pre-COVID-19 herein reported [95% CI of OR]): BMI (1.02-1.06); male sex (0.36-0.79); Hispanic identification (0.189 to 0.632); and Black race (2.85 to 104). Strikingly, being a trucker was not a significant factor in the pre-COVID-19 cohort (0.0442 to 4.03) but was in the post-COVID-19 cohort (1.48 to 33.6); similarly striking, neither age nor COVID-19 positivity were significant.

Discussion: In the three years since COVID-19 testing at NM OMI, there is a greater rise in PE as COD rate among truckers compared to the general population. This increase is not directly related to COVID-19 positivity but might be attributed to increased driving times caused by pandemic-driven disruptions. We are currently investigating whether increased wait times or route lengths contribute to higher incidence of PE as COD in truckers.

1.5 Intrauterine and Neonatal Deaths: A 10-Year Review of Referred Cases in Cuyahoga County, OH

Zachary Alan Wilkinson MD[1], Alison Krywanczyk MD[2], Kaitlin Weaver MD[2]
[1]Cleveland Clinic Foundation, Cleveland, OH, USA. [2]Cuyahoga County Medical Examiner's Office, Cleveland, OH, USA

The investigation of intrauterine and perinatal deaths in a forensic setting can be challenging, given their relative infrequency. The presence of maternal substance use, trauma, and various socioeconomic factors adds to the complexities.

To assess how one forensic office has historically examined such cases, intrauterine and perinatal deaths investigated by the Cuyahoga County Medical Examiner's Officer (CCMEO) between 2013 and 2023 were reviewed. 128 cases were identified (83 stillborn and 45 live births). The predominant indications for referral were concern for maternal substance use (57.8%) or maternal trauma (53.7%). 21.6% of cases were referred for both possible maternal substance use and trauma.

The gestational ages ranged from 11.5 weeks to 42.5 weeks; 36.7% were less than 22 weeks and 18% were less than 25 weeks' gestation. 10.2% were full term (>37 weeks) and 1.6% were post-term (>41 weeks). Maternal age ranged from 16 to 41 years, with the majority (65.2%) between 20 and 34 years. Reported races included Black non-Hispanic (48.8%), White, non-Hispanic (44.9%), and other/unknown (6.3%).

Potentially confounding socioeconomic factors unrelated to the reason for referral were identified in most cases. Maternal age was less than 20 years in 14.1% and greater than 35 years in 20.7%. Of the cases with available prenatal care information, (83/128) 53.0% received no prenatal care. When zip code information was available (104/128), 81.7% involved mothers in zip codes with household incomes in the bottom quartile of the state. 8.7% of cases did not include placental examination.

Causes of death included maternal substance use (acute and/or chronic) in 29.7% and placental pathology in 46.1% (including chorioamnionitis in 21.9% and abruption in 19.5%). 82% of liveborn cases included prematurity in the cause of death statements. Manners of death for liveborn infants included natural (53.3%), accident (26.7%), homicide (8.9%), and undetermined/unassigned (11.1%). Of those with suspected maternal substance use, 67.7% were certified as natural and 32.3% were certified as accidents.

There was a high coincidence in this cohort of confounding factors associated with worse birth outcomes, including maternal substance use, absent prenatal care, poverty, pre-term labor, and Black, non-Hispanic race. Multiple cases had no placental examination. This demonstrates the importance of considering these limiting factors, and exercising caution when assigning specific causes and manners to intrauterine and perinatal deaths.

1.6 Correlation of Corpora Amylacea Deposition in Patients with Reported Seizures: A Prospective study

Keenen Smith MD, Samantha Champion MD, Lorenzo Gitto MD
Cook County Medical Examiner's Office, Chicago, IL, USA

Corpora Amylacea (CA), also known as "bodies of starch," are concentrically lamellated bodies most often found in the brain, prostate gland, lung, and uterus. While their origin and function are largely unknown, they are thought to accumulate in individuals with increasing age. In the brain, specifically, it is theorized that aging and neurodegenerative processes create waste products that are stored in CA. The accumulation and significance of CA in individuals with reported seizures has not been widely described. This study aims to establish a case series aimed to depict the presence and quantify the amount of CA in brains of patients with reported seizures.

Between 2022 and 2023, the brains of sixteen decedents were examined at the Cook County Medical Examiner's Office, Illinois. The study population

included subjects between 24 and 64 years old with a reported history of seizures and no remote history of head trauma. No limits for sex or race were imposed. Brain findings were then compared to age-matched controls using gross and histological analysis. The control group population included subjects with no reported history of seizures or head trauma. Targeted histologic sections, including hippocampus, amygdala, basal ganglia, and periventricular occipital cortex were obtained and compared to controls.

Literature review of the correlation between CA and seizures yields scarce results. CA accumulation in individuals with seizures may suggest a pathologic condition that increases seizure activity and mortality in this population, or its accumulation may represent byproduct of seizure-induced brain tissue damage. The research study is currently ongoing. A thorough discussion of the results will be presented to conference attendees.

1.7 Hidden Trauma: An Analysis of the Identification of Contusions on Different Skin Tones

Lydia R Du MD[1], Dr. David M Waters MD[2], Dr. Meredith A Reynolds MD[2], Dr. Lorenzo Gitto MD[2]
[1]Allegheny Health Network, Pittsburgh, PA, USA. [2]Cook County Medical Examiner's Office, Chicago, IL, USA

Detection of blunt force trauma is an important task for the forensic pathologist. While abrasions and lacerations are typically easily identified, darker pigmentation of the skin might obscure contusions on the skin surface. Traditional forensic pathology textbooks and forensic literature show a disproportionate number of illustrations of contusions produced on individuals with lighter skin tones compared to those with darker skin tones. Proposals to improve identification of signs of trauma on darker skin tones include soft tissue dissections, infrared photography, and alternate light sources (ultraviolet, narrow band, and blue light). Skin and soft tissue dissection is considered the most reliable method to confirm the presence of contusions, especially when direct visual identification is questionable.

In this study, the authors seek to establish a correlation between skin tone and the visual identification of contusions on skin, confirming their presence by soft tissue dissection. As a secondary goal of the study, the authors seek to determine the utility of specialized dissections in identifying contusions on different skin tones, aiming to establish which cases may benefit from such procedures.

A retrospective review of cases from the Cook County Medical Examiner's Office (CCMEO) in Chicago from 2014 to 2024 was conducted. The database of the office was searched for the following categories: deaths in custody, cause of death including the word "assault," and cause of death including the phrase "child abuse." Only cases in which soft tissue dissections of the trunk and/or extremities were performed were included in the study. Exclusion criteria included severe burns, significant decomposition, and sharp force injuries. Three forensic pathologists from the CCMEO independently reviewed the study material. Autopsy cases performed by the reviewers were excluded. Autopsy photos were compiled into pre-skin dissection and post-skin dissection sets. The pre-dissection sets were reviewed, and each reviewer assigned the decedents a skin tone, using the 10-point Massey-Martin skin color scale. The reviewers then assessed whether contusions were visually present for each case based on their examination of the pre-skin dissection photos, indicating their approximate locations if so. Subsequently, the post-dissection sets were reviewed for final confirmation of the presence or absence of soft tissue hemorrhage.

Compared to the existing literature, this is the first study to evaluate the reliability of visual identification of contusions stratified by skin tone with confirmation by soft tissue dissection. This study is currently ongoing. A detailed discussion of the results will be presented to the attendees.

2.1 WITHDRAWN

2.2 True or False: The Curious Case of the Foraged Mushrooms

Kaileigh M Bingham Abujasen MD[1,2], Neil G Haycocks MD, PhD[3,4], Kacy Krehbiel MD[3,4]
[1]University of Utah, Salt Lake City, UT, USA. [2]ARUP Laboratories, Salt Lake City, UT, USA. [3]Utah Office of the Medical Examiner, Salt Lake City, UT, USA. [4]University of Utah School of Medicine, Salt Lake City, UT, USA

Foraging edible wild mushrooms is a niche outdoor activity, most common in the Northeast and Pacific Northwest regions of the United States. Enthusiasts harvest varieties such as morels, chanterelles, and oyster mushrooms. Care must be taken, however, to distinguish them from poisonous types, including false morels, death caps, and funeral bells. It has been said that bold mushroom foragers do not become old mushroom foragers.

The present case is that of a 69-year-old man who was on a camping trip. He developed a fatal gastrointestinal illness after consuming a stew that contained dried morel mushrooms that he had harvested the previous year. Autopsy examination demonstrated severe acute necrotizing gastritis. Ancillary testing (toxicology, microbiology, and vitreous analysis) was unremarkable and there was no evidence of significant natural disease. Some false morel mushrooms produce gyromitrin, which is hydrolyzed in acidic environments to form the toxic substrate monomethylhydrazine (MMH). The decedent was reportedly an experienced outdoorsman and mushroom forager, and while it seemed unlikely that he would erroneously harvest false morels, the autopsy findings were nonetheless consistent with ingestion of a toxic substance potentiated by acid.

This case of death following consumption of foraged mushrooms overlapped with an outbreak of gastrointestinal illness that was traced to a single restaurant in the decedent's home state. The outbreak involved 41 patrons who experienced varying degrees of symptoms, resulting in three hospitalizations and two deaths. The illness was traced to consumption of mushrooms at the restaurant, with the quantity eaten correlating with the severity of the disease. Autopsy examinations of the two fatalities showed acute necrotizing gastritis, similar to what was observed in our case. The mushrooms were purchased from a commercial farm in China, and DNA sequencing confirmed their identity as *Morchella sextelata*, a species of true morel.

The incidents described above raise the possibility that true morel mushrooms, including cultivated varieties, can be poisonous. The offending toxin has not been identified, but autopsy findings suggest it is activated in an acidic environment. While rare, any unexplained death where severe necrotizing gastritis is found at autopsy should initiate a careful search for mushroom ingestion as the possible cause, including farmed varieties that are considered safe for consumption.

2.3 Assessing Trends in Drug Positivity in Traffic-Related Fatalities in Connecticut

Amanda LA Mohr MS[1], Grace Cieri MS[1], James R Gill MD[2], Barry K Logan PhD[1,3]
[1]CFSRE, Horsham, PA, USA. [2]Office of Chief Medical Examiner, Farmington, CT, USA. [3]NMS Labs, Horsham, PA, USA

Beginning in 2019, data acquired through the Fatality Analysis Report System (FARS) showed an increase in motor vehicle fatalities despite several years where numbers had been steadily declining. Moreover, deaths resulting from traffic related fatalities reached a 16-year high in 2021 according to the National Highway Traffic Safety Administration (NHTSA). Trends related to increases in motor vehicle fatalities are likely attributed to numerous factors, including returning to pre-COVID-19 roadway traffic and the ongoing opioid/polydrug epidemic among other factors.

Deaths of drivers, passengers, and/or pedestrians from Connecticut were used for the data set. Blood toxicology testing was performed by NMS Labs and included the basic postmortem toxicology panel, which tests for all Tier I drugs recommended by the NSC-ADID. The manner and cause of death

along with basic demographic information were provided by the Connecticut Medical Examiner's Office.

A total of 907 cases were sent for toxicology testing between 2019-2022. Drug positivity was investigated for drivers (n=590), passengers (n=103), pedestrians (n=195), and other (e.g., cyclists) (n=19) across all four years. Ninety-four percent (94%) of all deaths reported the manner to be accidental. In drivers, 23% of the cases were negative for any drugs. The most frequently detected drugs in drivers included ethanol (51%) and THC (50%), followed by fentanyl (15%), cocaine (12%), and PCP (5%). Ethanol and THC were also two most frequently detected drugs in both passengers and pedestrians (48% positivity for both drugs in passengers, ethanol 42%, and THC 29% in pedestrians). Both ethanol and THC were found together in 23% of drivers, 24% of passengers, and 9% of pedestrians. With respect to drivers, co-positivity of ethanol and THC was 16% in 2020, increased to 18% in 2021, and declined to 16% in 2022.

Tier I drug positivity ranged from 75% in drivers to 65% in passengers and pedestrians. Without additional investigation information, the significance of the contribution of these drugs cannot be definitively determined, however, it should be noted that all drugs within the Tier I category are known to have the potential to cause significant impairment. As traffic-related fatalities continue to increase, the likelihood of drug detection in these cases also increases. Continued vigilance and comprehensive testing aligned with testing recommendations is necessary to assess the impact of drugs in fatalities among drivers, passengers, and pedestrians.

2.4 Understanding the Current State of Synthetic Cannabinoids: Newly Emerging Drugs, Changing Drug Market Trends, and Implications on Jail Deaths

Dr Alex J Krotulski PhD[1], Sara E Walton MS[1], Max T Denn MS[1], Dr Joshua S DeBord PhD[1], Donna M Papsun MS[2], Dr Barry K Logan PhD[1,2]
[1]Center for Forensic Science Research and Education, Horsham, PA, USA.
[2]NMS Labs, Horsham, PA, USA

Synthetic cannabinoids are a subclassification of novel psychoactive substances (NPS) with varying chemical properties and pharmacological effects. Synthetic cannabinoids first emerged in the late 2000s and by the mid-2010s had become the largest class of NPS, contributing to adverse events and death. Changes in synthetic cannabinoid markets have largely been driven by national and/or international control and scheduling efforts, with a general trend toward increasing potency. The global synthetic cannabinoid market changed significantly in the early 2020s following a Chinese class-wide legislative action. This led to increased diversity of chemical structures, innovations in manufacturing and distribution, and increased variability in product potency with generally less potent (or inactive) drugs appearing. As a result, today's synthetic cannabinoid landscape is different and complex, but health concerns for synthetic cannabinoids remain.

The Center for Forensic Science Research and Education (CFSRE), through its NPS Discovery drug early warning system, facilities novel surveillance efforts to track emerging drug trends and changing drug markets. Through collaborations with medical examiner/coroner offices, crime laboratories, and correctional institutions, the CFSRE receives drug materials and toxicology specimens for comprehensive testing of synthetic cannabinoids and other relevant drugs. Drug materials commonly consist of legal papers, personal correspondence, or greeting cards soaked with synthetic cannabinoid solutions, as well as plant materials and powders. Toxicology specimens consist of postmortem blood, urine, antemortem serum/plasma, and other biological fluids. Comprehensive qualitative drug testing is performed by liquid chromatography quadrupole time-of-flight mass spectrometry (LC-QTOF-MS) using an extensive in-house library database of more than 1,200 substances. When possible, quantitation of synthetic cannabinoid is performed by liquid chromatography tandem quadrupole mass spectrometry (LC-QQQ-MS).

Synthetic cannabinoid positivity dipped in the early 2020s but appears to be rebounding. MDMB-4en-PINACA remains the most detected synthetic cannabinoid despite its DEA Schedule I status and inclusion in the Chinese class-wide ban. MDMB-4en-PINACA is often detected alongside its precursor, MDMB-INACA, indicating changes in manufacture. MDMB-BINACA (MDMB-BUTINACA) was detected in a blood sample collected after a jail death for the first time in the U.S. in October 2023. MMB-4en-PINACA was detected on a paper confiscated from a jail for the first time worldwide in February 2024. Case history and autopsy findings will be included in this presentation.

Synthetic cannabinoids remain of high public health concern, especially among jail and prison populations. Toxicology testing for synthetic cannabinoids in medicolegal death investigations should be pursued, especially methodologies and workflows with dynamically updated testing scopes.

2.5 From Leaf to Lethality: Investigating Kratom-Associated Deaths

Justin Brower Ph.D., F-ABFT, Donna Papsun M.S., D-ABFT-FT, William Schroeder M.S., D-ABFT-FT
NMS Labs, Horsham, PA, USA

Kratom is an herbal substance prepared from the leaves of the tropical evergreen tree, *Mitragyna speciosa*. It has a centuries-long history of use in Southeast Asia, where users make decoctions or teas for drinking, and over the last decade, kratom has emerged in the United States. At low doses, kratom exhibits stimulant-like properties, and at higher doses exhibits CNS-depressant effects. Kratom's opioid-like activity fuels its usage, with many users consuming it to combat chronic pain or to stave off opioid withdrawal symptoms. Contributing to its popularity is kratom's legality. As an herbal supplement, kratom is minimally regulated by the FDA, and it is not a scheduled drug by the DEA and is legal at the federal level.

While there are many documented benefits of kratom, it is not free from harm or abuse. Among the dozens of compounds present in kratom, the primary alkaloid is mitragynine, which acts as a partial agonist on opioid receptors. Although the pharmacology of mitragynine and other kratom alkaloids is complex and not completely understood, it is implicated in many drug overdose deaths, either alone or in polypharmacy situations.

Over the last six years at NMS Lab from 2018 through 2023, the number of mitragynine cases has grown from 788 to 1883 cases. Along with the increased prevalence, mitragynine's mean and median concentrations have increased from 352 and 120 ng/mL in 2018 to 466 and 150 ng/mL in 2023, respectively. One of the most startling and toxicologically significant trends, however, is the increase in cases greater than 1000 ng/mL, a concentration widely considered lethal on its own or in combination with other drugs. In 2018, there were 70 cases greater than 1000 ng/mL, representing 8.9% of mitragynine-positive cases, which rose to 248 and 13.2% in 2023.

Presented here will be a brief overview of kratom, kratom use, and the current state of mitragynine's pharmacology, and a more in-depth discussion on postmortem casework with an emphasis on mitragynine-only deaths.

2.6 Case Series: Hepatic and Splenic Titanium Dioxide Deposition in Association with Intravenous Drug Use

Griffin C Phenegar BS[1], Dr. Jamie E Kallan MD[2], Dr. Robert F Corliss MD[2]
[1]University of Wisconsin Hospitals and Clinics, Madison, WI, USA.
[2]University of Wisconsin School of Medicine and Public Health, Madison, WI, USA

Titanium dioxide is a versatile compound that is found in a variety of consumer products, medical hardware, and pharmaceuticals. Although oral and topical ingestion of this compound is common, intravenous introduction is much less common. We present three cases where significant titanium dioxide deposits were identified in liver and splenic tissue of three decedents, all of whom died of illicit drug overdose in the same geographic

area and had fentanyl and its metabolites in blood on postmortem toxicologic testing. At autopsy, liver sections had a granular texture with fine white stippling grossly, and histologic examination of hepatic and splenic tissues showed scattered patches of black granular material with pink birefringence. Energy-dispersive x-ray spectroscopy performed on these tissues revealed the presences of clusters of titanium dioxide. Immunohistochemical staining of both the liver and spleen with CD68 confirmed the titanium dioxide clusters were within macrophages. Intravenous titanium dioxide nanoparticle elimination studies in rats suggest a time sensitive period for this elimination, with a transient period of pigment deposition between one and 58 days following injection. If a time-dependent link between titanium dioxide pigment deposition within tissues and intravenous drug use can be shown, this could be a valuable tool for pathologists.

3.1 An Accidental Death Due to Ingestion of Isobutyl Nitrite

Hannah P. McQueen B.S.[1], Dr. Nicholas I. Batalis M.D.[2], Dr. Christopher Sullivan M.D., M.P.H.[2]
[1]MUSM, MUSC, Charleston, SC, USA. [2]MUSC, Charleston, SC, USA

Isobutyl nitrite is a malodorous chemical compound that is part of the larger group of alkyl nitrites. This group of chemicals is known to have potent vasodilation effects and, as such, was historically used to treat heart conditions like angina, though these have been replaced by other medications over time. Currently, alkyl nitrites are most frequently encountered as drugs of abuse as inhalation of the chemicals induces vasodilation, creates a "head rush" and feeling of euphoria, and increases pleasure. While there is some toxicity associated with inhalation, it is generally not considered to be fatal. However, if the nitrites are instead ingested orally, the effects are much more profound, causing severe methemoglobinemia and potentially death. Reports of deaths due to nitrite ingestion are relatively rare overall and frequently are suicidal in nature. We report a death due to accidental ingestion of a vial of isobutyl nitrite with the aim of educating death investigators about the toxicity of this chemical along with the pertinent autopsy findings and toxicology workup to aid them in the event they encounter such a case.

A 70-year-old female was drinking all day long with her partner and engaging in sexual activities. At some point, she intended to grab a vial of an energy drink but instead grabbed a bottle of Rush (isobutyl nitrate), and her partner redirected her. Some time passed by, and the decedent again grabbed the bottle of Rush but this time ingested it before she could be stopped. Minutes later, she became intermittently unresponsive and began vomiting. Authorities were notified and she was taken to a hospital where death was pronounced shorty after arrival and before methylene blue could be administered. An autopsy was performed approximately two days later and was remarkable for generalized blue-gray discoloration of the skin, chocolate-colored blood, and increased pulmonary edema. Standard toxicology testing on autopsy blood (no admission blood available) was notable for ethanol (0.176%), gabapentin (18 mcg/mL), naloxone, and caffeine. Directed testing for methemoglobin was 20% and nitrite/nitrate was >1000 mmol/L. Further investigation did not show any current or prior evidence of intentional self-harm. As such, the cause of death was determined to be the toxic effects of isobutyl nitrite and the manner of death was deemed accident.

3.2 Preventing Fentanyl-Related Overdoses with Naloxone: Insights from a Medical Examiner's Office

Gabriel Alexander[1], Pamela Ferreira MD[2], Stephanie A. Dean MD[2], Russell Alexander MD[2]
[1]Gilman School, Baltimore, MD, USA. [2]Office of the Chief Medical Examiner, State of Maryland, Baltimore, MD, USA

Introduction: An epidemic of fentanyl-related overdose deaths has led to nonprescription community use of Naloxone to save lives and it has been suggested that public businesses face legal liability for failing to provide naloxone.

Methods: The records of the Maryland Office of the Chief Medical Examiner were searched to find overdose deaths involving fentanyl or fentanyl analogs in 2022. These deaths were reviewed to determine whether widespread community availability of naloxone would have had a reasonable possibility of preventing the death; note was made of the subset of cases where public businesses would have provided the naloxone.

Results: There were 2050 fentanyl related overdose deaths in 2022. A preliminary analysis of the first 1425 deaths revealed 41 (2.9%) that were thought to have been possibly preventable by community use of naloxone and 1384 (97%) nonpreventable deaths. The most common locations of preventable overdoses were seven in motor vehicles (17%), six on sidewalks outside of public businesses (15%), five in transit buses (12%), four in hotels (10%), four in restaurants (10%), and three in group homes (7%). The most common persons who discovered the preventable overdoses were 13 unrelated bystanders (32%), eight friends (20%), five bus drivers (12%), 2 family members/significant others (4.9%) and 2 coworkers (4.9%). The most common locations of nonpreventable overdoses were 1067 private residences (77%) and 34 group homes (3%). The most common persons who discovered the nonpreventable overdoses were 630 family members/significant others (46%), 191 friends (14%), 122 roommates (8.8%), 36 property owners/managers (2.6%) and 31 neighbors (2.2%). Naloxone availability in all public businesses was deemed to have been able to prevent only 20 (1.4%) of the total deaths in the study.

Discussion: Widespread community availability of naloxone would likely have prevented only a small fraction (2.9%) of the deaths in this study. Mandating all public businesses to have naloxone would be a relatively inefficient method of preventing these deaths; however, transit buses may be a practical location to mandate naloxone availability. We do not interpret this study as suggesting that community-based naloxone is ineffective since we are not looking at lives already saved by current naloxone use. Additionally, overdoses were commonly found by a family member/significant other, friends or roommates; a targeted effort to educate and supply naloxone to these contacts of known chronic drug abusers may offer the best chance of reducing fentanyl related overdose deaths.

3.3 Postmortem Indicators of Venous Thromboembolism: Elevated D-Dimer and Ferritin

Mohamed Said BSE, Jessica Adamczyk BS, Patrick Hansma DO, Prentiss Jones PhD
Pathology Division, Toxicology Department, Western Michigan University Homer Stryker MD School of Medicine, Kalamazoo, MI, USA

Introduction: Venous thromboembolism (VT) may include deep vein thrombosis, pulmonary embolism (PE), or both. VT represents a significant cause of sudden death, often eluding diagnosis due to its subtle onset, nonspecific symptoms, and prevalence. The decline in hospital autopsies exacerbates the challenge of determining cause of death, widening the gap between antemortem diagnoses and postmortem findings. This study aims to bridge this diagnostic divide by examining the utility of postmortem inflammatory markers in vitreous fluid as an adjunct to visual identification of emboli, especially for cases where vascular imaging is unavailable.

Methods**:** We conducted a case-control study, analyzing postmortem vitreous fluid samples from 26 subjects confirmed to have died from PE, using a fully automated Biochip Array Technology (BAT) to measure concentrations of various biomarkers, including interleukins, Monocyte Chemoattractant Protein-1, tumor necrosis factor-alpha, interferon-gamma, Ferritin, and D-Dimer (n=12). Results from the BAT allowed a focused evaluation of additional samples using a sandwich enzyme linked immunosorbent assay (n=14). All findings were compared to nonpathological controls, gunshot wound decedents to pinpoint markers significantly associated with the condition.

Results: Elevated D-Dimer and Ferritin concentrations were notably associated with PE cases ($p < 0.05$), whereas variations in other markers were not statistically significant. These results underscore the relevance of D-Dimer and Ferritin in the VT-related inflammatory response.

Discussion: The prominence of D-Dimer and Ferritin in our findings supports the complex diagnostic landscape of VT, characterized by a high incidence of false negatives and the intricate symptomatology and comorbidities complicating antemortem identification. Highlighting these markers as crucial postmortem indicators introduces a new avenue for enhancing PE diagnostic precision, potentially influencing prophylactic and therapeutic decision-making and addressing the notable gap in postmortem diagnostics.

Investigating vitreous fluid D-Dimer and Ferritin as key postmortem markers not only corroborates the documented diagnostic challenges of VT but also marks a significant step forward in autopsy methodology. This research augments the accuracy of postmortem diagnoses of thromboembolic diseases, contributing to the alignment of clinical suspicion with pathological evidence and setting the stage for further studies into clinical implications, patient care improvement, and cause of death determinations.

3.4 Our Growing Understanding of SUDC: The First 10 Years of the SUDCRRC

Laura A Gould MSc, Orrin Devinsky MD
NYU Grossman School of Medicine, New York, NY, USA

Approximately 400 U.S. children die inexplicably after their first birthday each year, accounting for more than 31,000 life years lost annually. Sudden unexplained deaths in childhood (SUDC) affects children 12 months and older whose deaths remain unexplained after a thorough autopsy and investigation. Most SUDC are previously healthy toddlers, aged one to four years, representing the 5th leading category of death in this age group. SUDC associations include male predominance, unexpected sleep-related deaths, and febrile seizures in ~28% of cases. Cardiac, neurologic, metabolic, genetic, and immunological etiologies are identified in a minority of cases. Since inception in 2014, the SUDC Registry and Research Collaborative (SUDCRRC) has enrolled >370 cases of unexpected pediatric deaths aged six weeks to 18 years; more than 80% are 1-4 years of age at time of death. Our 17 research publications to date have improved our understanding of SUDC by explaining previously unexplained deaths, identifying genetic mechanisms and modes of inheritance, and discovering insights from omics data that differentiate SUDC from explained deaths, evidence of SUDC underestimation by the U.S. death investigation system, and video evidence of seizure-related deaths. This presentation, on behalf of the SUDCRRC team members (sudcrrc.org), will review SUDC research advances and areas of future research.

3.5 Analysis of First and Second Sleep Environments in Infant Deaths Based on Scene Re-Enactment Data

Gregory A. Vincent MD[1], Kirsten Becthel MD[2], Brooke Sullivan[2]
[1]State of Connecticut Office of the Chief Medical Examiner, Farmington, CT, USA. [2]Yale University School of Medicine, New Haven, CT, USA

The American Academy of Pediatrics (AAP) recommends that a safe sleep environment consists of an infant being laid supine in a separate, uncluttered sleep space on an approved sleep surface. Many caregivers report that they do not adhere to these safe sleep recommendations. Infant night awakenings present another complication, as they may lead to a caregiver moving the infant from a first sleep environment, defined as the initial place an infant is laid to sleep, to a second sleep environment, defined as the environment they are moved to after the nighttime awakening. We examine the circumstances of the first and second sleeping environments based on re-enactment data.

The Connecticut Office of the Chief Medical Examiner (CT OCME) investigates all unexpected, violent, and suspicious deaths in Connecticut. The CT OCME electronic database was searched from 2018 through 2022 for deaths under one year of age with nonhomicidal manner determination in which CT OCME death investigators performed scene re-enactments. We identified 85 such infant deaths, all of which had complete forensic medical autopsies. The following data were abstracted: demographic characteristics of infants (age, sex, race/ethnicity, gestational age); maternal characteristics (prenatal care, breastfeeding); usual caregiver; caregiver at the time infant was found unresponsive; prenatal exposure to maternal substances; first sleep environment; and if the infant was moved, the second sleep environment. The majority of the causes of death respectively were due to sudden unexpected infant death (SUID) with unsafe sleep environments (64.7%) and asphyxia (22.4%). The remainder were due to previously unrecognized medical causes (12.9%). 71.8% of the infants were found unresponsive in a nonrecommended sleep environment. 83.5% of the cases only had a first infant sleeping environment, and 16.5% involved a second sleep environment. 77.8% of the second sleep environments were less safe than the initial sleep environment, and 27.8% had evidence of airway obstruction when found unresponsive. Only 3.5% of the infants were found unresponsive supine and in a separate, non-bedsharing, recommended sleep location.

We report that infant awakenings do not often lead to the child being moved to a second sleep environment. When they are moved, the second environment is often less safe than the first. This study reinforces the importance of scene re-enactments in death investigation and further demonstrates the role that the sleep environment plays in infant deaths.

3.6 Investigating Neuropeptide S-Positive Neurons in Brains of Unexpected Infant Deaths

Lorenzo Gitto MD[1], Rudolph J Castellani MD, PhD[2], Jared Tyler Ahrendsen MD, PhD[2], Samantha N Champion MD[1], Mojde Mir[1], Ponni Arunkumar MD[1]
[1]Cook County Medical Examiner's Office, Chicago, IL, USA. [2]Northwestern University, Feinberg School of Medicine, Chicago, IL, USA

Sudden unexpected infant death (SUID) involves deaths occurring among infants less than one year and encompasses both cases where a cause is identified and cases where it remains elusive. The three commonly reported types of SUID include sudden infant death syndrome (SIDS), unknown cause, and accidental suffocation and strangulation in bed.

Despite constant research efforts, the nature and mechanisms of SUID remains elusive. An interesting SUID research topic involves the evaluation of specific brain neuropeptides in the regulation of numerous physiological processes. Among these, neuropeptide S (NPS), an endogenous peptide produced by specialized neural cells, seems to be implicated in several physiological functions including arousal, wakefulness, and respiration. Previous animal research in vivo suggested that NPS increases respiratory frequency. More recently, a research study suggested that a cluster of NPS+ neurons located in the lateral parabrachial area in the brainstem represents an unexplored subpopulation of specialized cells involved in the regulation of breathing and wakefulness promotion in mice. No studies on human have been reported in the English literature.

The hypothesis of the present research is that disturbances in NPS+ controlled mechanisms might be linked to a failed arousal or abnormal respiration functions. Based on the notion that these fatalities are related to a vulnerable child exposed during a certain developmental time window to an external stressor such as hypoxia or hypercapnia, the failure of sleep/awake mechanisms or reduced response to decreased oxygen or increased carbon dioxide in the bloodstream might be potentially associated with abnormalities in NPS+ cells. The proposed research specifically aims to evaluate the location of the NPS+ neurons in the brainstem in SUID cases observed in the Cook County Medical Examiner's Office in Chicago, Illinois, to detect potential abnormalities that could explain disturbances in the respiration and arousal processes in the affected infants.

NPS+ cells will be detected by immunohistochemical analysis of paraffin-embedded infant brain slides using NPS Antibody. As a primary goal of this project, brain slides will be independently reviewed by forensic pathologists and neuropathologists to determine the location of NPS+ cells in human brains and to detect potential differences in NPS+ location and concentration between full-term and preterm infants.

This is the first study attempting to detect potential abnormalities in NPS+ neurons in humans. The study is currently ongoing. A discussion of the results will be presented to the attendees.

3.7 Pediatric Fatality Trends in Pierce County WA: Utilizing Data to Guide Prevention Strategies

Nicole K Johnson DO, MS[1], LaRhonda Osborn[2]
[1]Pierce County Medical Examiner's Office, Tacoma, WA, USA. [2]Tacoma-Pierce County Health Department, Tacoma, WA, USA

Introduction: In Pierce County, the Tacoma-Pierce County Health Department conducts review of pediatric fatalities via the Sudden Unexplained Infant Death and Child Mortality and Prevention Review Teams. The Teams' vision is to engage in a prevention-oriented process to review the circumstances surrounding the death of a child to improve the health and safety of the community via a core team of committed professionals. The mission of the Teams is to promote the safety and well-being of children and reduce preventable deaths. During the first annual prevention review meeting, it was recognized that shaping prevention strategies is difficult without utilizing pediatric fatality data. Funding to support prevention strategies is available from the Tacoma-Pierce County Health Department but cannot be used most effectively without identified targets.

This study aims to analyze trends in the causes and manners of death from 2000-2023 in the Pierce County pediatric population and to identify targets for prevention strategies.

Methods: Search queries were performed in the Pierce County Medical Examiner's Office's database, MEDIS, using the query function. Two queries were performed: decedent age between one and 18 and decedent age less than one with an output including case number, decedent age, and jurisdiction. The data were restricted to cases in which jurisdiction was accepted and further information was collected including cause of death, manner of death, and if location of event occurred in Pierce County. Data were further restricted to those events which occurred in Pierce County for analysis.

Results and Discussion: There has been a recent increase in the number of pediatric fatalities in Pierce County and the specific trends in causes and manners will be discussed. These data will be generated into reports to be shared with local and state health departments and will most importantly be used to identify potential points of intervention to reduce pediatric fatalities.

3.8 Expanding Access to Molecular Autopsy through the Military Health System

Emma M Schopp ScM, LCGC[1,2], Austin Pagani MGC, LCGC[3,4], Dr. Lydia Hellwig PhD, ScM, LCGC[3,4,5], Dr. Mauricio De Castro MD[6], Dr. John Walsh MD[7], Dr. Molly House MD[8], Dr. John Schacht DO[9]
[1]Military Cardiovascular Outcomes Research, Department of Medicine, Uniformed Services University of the Health Sciences, Bethesda, Maryland, USA. [2]The Metis Foundation, Bethesda, Maryland, USA. [3]The Henry M. Jackson Foundation for the Advancement of Military Medicine, Inc., Bethesda, Maryland, USA. [4]Center for Military Precision Health (CMPH), Uniformed Services University of the Health Sciences, Bethesda, Maryland, USA. [5]Department of Pediatrics, Uniformed Services University of the Health Sciences, Bethesda, Maryland, USA. [6]DHA Genetics Reference Laboratory, Keesler Air Force Base, 81st Medical Diagnostics and Therapeutics Squadron, Biloxi, Mississippi, USA. [7]School of Medicine, Uniformed Services University of the Health Sciences, Bethesda, Maryland, USA. [8]Armed Forces Medical Examiner System, Dover, Delaware, USA. [9]Walter Reed National Military Medical Center, Bethesda, Maryland, USA

Postmortem genetic testing, also known as molecular autopsy, may elucidate the cause of sudden unexplained death in up to 35% of cases. In addition to providing an explanation for a grieving family, subsequent familial cascade testing for a pathogenic variant identified in the decedent can provide lifesaving information. A positive genetic test result can be invaluable in determining the cause of death and in guiding clinical screening and management recommendations for family members. Sudden death occurs in all populations, including in the military. However, utilization of postmortem genetic testing remains low. For example, postmortem genetic testing was performed in only 3% of cases of sudden death in young, healthy NCAA athletes.

Following the release of NAME's sample collection recommendations for consideration of genetic testing in all cases in which an autopsy is performed, utilization of postmortem genetic testing appears to have increased. However, barriers to postmortem genetic testing persist, including cost and access issues as postmortem genetic testing is not typically covered by insurance. The Uniformed Services University and Walter Reed National Military Medical Center cardiogenetics team collaborates with the Armed Forces Medical Examiner System (AFMES) and the Defense Health Agency (DHA) Genetics Reference Laboratory to provide postmortem genetic testing in sudden death cases or cases with a suspected hereditary diagnosis in the military health system. A multidisciplinary evaluation including postmortem genetic testing and counseling is available free of charge for decedents who are Military Health System beneficiaries. The multidisciplinary postmortem team assists with pre- and post-test counseling, selection and logistical coordination of genetic test, medical management recommendations for surviving family members, and providing support to families grieving the loss of a loved one. Three recent positive postmortem genetic testing cases illustrate the variety of cardiovascular conditions that can be associated with a sudden death in young, apparently healthy individuals and the impact of these findings on the healthcare of their at-risk family members.

Offering genetic testing and counseling in cases of sudden death is critical to providing a comprehensive evaluation. In each of the three cases presented, access to genetic testing clarified the cause of death, provided answers to grieving family members, and directly impacted medical management recommendations for relatives. By facilitating access to postmortem genetic testing through the military health system, this program provides a service to military families and generates knowledge about the etiology of sudden unexplained death, both in the military and in the general population.

Disclaimer: The opinions and assertions expressed herein are those of the author(s) and do not reflect the official policy or position of the Uniformed Services University of the Health Sciences, Walter Reed National Military Medical Center, Armed Forces Medical Examiner System, or the Department of Defense. The opinions and assertions herein are those of the author(s) and do not reflect the official policy or position of the Henry M. Jackson Foundation for the Advancement of Military Medicine, Inc.

The authors have no conflicts to declare.

3.9 Improving Trainee Perspective toward Death Certificate Completion: A Resident-Led Death Certificate Education Initiative

Eleanor Dyer MD[1], Marina Mosunjac MD[1], Lauren Hudak MD, MPH[2], Rachel Geller MD[3]
[1]Emory University School of Medicine, Department of Pathology, Atlanta, GA, USA. [2]Emory University School of Medicine, Department of Emergency Medicine, Atlanta, GA, USA. [3]Georgia Bureau of Investigation, Division of Forensic Science, Decator, GA, USA

Introduction**:** Death certificates (DCs) are legal documents used for numerous government, administrative, and public health services, while providing closure for families. Although it is essential to complete accurate DCs, errors are common with studies describing them in as many as 53% of reviewed cases. Prior studies have addressed this issue with various educational and quality improvement focus. A hospital and state specific pathology resident-led didactic with interactive cases was presented to clinical residents. Initial data demonstrates the intervention improved resident understanding of and attitudes towards DCs, with the ultimate goal of improving DC accuracy and turnaround time.

Methods: Between 2/1/2024 and 3/26/2024, consented Internal Medicine and Emergency Medicine trainees at Grady Hospital completed a pre-presentation survey, watched a presentation, and completed a post-presentation survey examining attitudes towards DCs. All data was deidentified and maintained in a secure database. Statistical data was obtained by utilizing chi squared for total pre-survey and post-survey results and fisher's exact test was used for individual resident department results.

Results: A total of 42 participants completed both surveys. 19 residents were from Internal Medicine (45.2%), 19 were from Emergency Medicine (45.2%), and 4 were from other departments (anesthesia, neurology transition year, medical students). Years ranged from PGY1 (22; 52.4%), PGY2 (6; 14.3%), PGY3 (6; 14.3%), PGY5/fellow (1; 2.3%), and MS3 Medical students (2; 4.7%); 5 surveys left that field blank. Five of 42 participants (11.9%) had some DC training in medical school, and three of 40 residents (7.5%) had training in residency. 24 of 40 residents had completed a DC before (60.0%), and of those residents, only four had had previous DC training (16.7%). Following the lecture, there were statistically significant improvements in agreement with all survey statements addressing attitudes towards and understanding of DCs (P value <0.001), including: I feel comfortable making a DC, I understand what cause/manner/mechanism of death means, I understand what constitutes a medical examiner case, I understand what a DC is used for.

Discussion: Our preliminary results show that a single one-hour presentation that focuses on hospital specific DC training during residency can significantly improve trainee comfort level, understanding, and attitude towards completing these important legal documents. With hopes of evaluating downstream DC accuracy through simulation or DC audit, we believe this simple, cost-effective quality project will improve DC accuracy and timeliness, decrease unnecessary reporting to local medical examiners, and improve continuity of care into death for local families.

3.10 Forensic Pathologists and Clinical Trauma Reviews: Performance Improvement, Public Health, and a High-yield "Quick Reference" Autopsy Documentation Guide for Medical Examiners and Coroners

Deland Weyrauch MD[1], Jacqueline Nunez MD[2], Christopher C. Borck MD[2], Jonathan Gates MD, MBA[3], Monika Nelson MSN, RN[3], Tyler J. Jones MD[4], Lisa Henneberry BSN, RN[4], James R. Gill MD[2]
[1]Montana State Medical Examiner's Office, Billings, MT, USA. [2]Connecticut Office of the Chief Medical Examiner, Farmington, CT, USA. [3]Hartford Hospital, Hartford, CT, USA. [4]Yale New Haven Hospital, New Haven, CT, USA

Two maxims in forensic pathology are that 1) forensic pathologists are experts in trauma and 2) forensic pathologists practice preventative medicine and public health by making the study of the dead benefit the living. These tenets coalesce when pathologists participate in performance improvement reviews conducted by clinical trauma teams. As a powerful tool for discovering and documenting traumatic injury, the forensic autopsy has been incorporated into trauma care quality improvement. Trauma service medical directors use autopsy results to educate, improve patient care, and bolster the quality of information used in epidemiological and injury prevention studies. Despite these benefits, little has been written by forensic pathologists on their role in these reviews.

This project is a collaboration between forensic pathologists and members of local (Connecticut) clinical trauma teams, including trauma surgeons and trauma performance improvement coordinators. Addressed topics include the most frequent pathologist "pitfalls" in terms of important injury details often overlooked or poorly described in autopsy reports, specific examples of how autopsies and forensic pathologist input help improve trauma care, the medical examiner/coroner cases which will most benefit from attention to specific injury details, and how trauma review participation also benefits the forensic pathologist.

A primary use of autopsy reports in these reviews is to translate the described injuries into an Abbreviated Injury Scale (AIS) score to assess the total Injury Severity Score (ISS), which is a validated tool used by the trauma community to quantify the overall severity of a patient's trauma. Therefore, this collaboration also: summarizes for the forensic pathologist what the AIS/ISS system is, and how it is used; demonstrates how differences in injury description impact AIS/ISS scores; and transforms the 160+ pages of the AIS manual into a practical, high-yield "quick reference" autopsy documentation guide to help the forensic pathologist. The AIS manual's contents were simplified, prioritized, and/or paraphrased based on pragmatic autopsy considerations, autopsy limitations, perceived importance to trauma clinicians, clarity to trauma registrars and coders, and by what would be reasonable for the forensic pathologist to include in everyday practice. This guide is not intended to be a standardized or prescriptive way of documenting injuries in autopsy reports and should never supersede the important forensic considerations of the case. Rather, it is a tool to help the pathologist share their findings in a more clinically-relevant manner to further benefit the living.

3.11 Recent Rise of *Streptococcus pyogenes* Group A-Related Deaths in Cook County: Case Series and Implementation of Postmortem Testing

Samantha A Stephen DO[1], Benjamin J Soriano MD[1,2], Lorenzo Gitto MD[1]
[1]Cook County Medical Examiner's Office, Chicago, Illinois, USA. [2]Rush University Medical Center, Chicago, Illinois, USA

Group A Streptococcus (GAS) is a group of gram-positive bacteria that cause assorted localized and systemic infections, ranging from milder "non-invasive diseases" such as pharyngitis, impetigo, and scarlet fever, to "invasive diseases" like cellulitis with the presence of sepsis, streptococcal toxic shock syndrome, pneumonia, necrotizing fasciitis, sepsis, and septic shock. The Centers for Disease Control and Prevention (CDC) estimates that millions of GAS infections occur in the US annually, and severe GAS infections reached a 20-year high in 2023, with cases increasing in the US post-COVID-19 pandemic. Invasive GAS disease is a CDC-reportable illness, with estimates of 14,000 to 25,000 cases occurring in the last five years, resulting in approximately 1,500-2,300 deaths annually. Deaths due to *Streptococcus pyogenes* can occur rapidly, even before decedents have the opportunity to seek diagnosis or treatment. As such, fatal cases must be identified swiftly in the interest of public health.

There has been a recent surge in cases of fatal sepsis attributed to *Streptococcus pyogenes* in Cook County, Illinois. A retrospective review of cases from the Cook County Medical Examiner's Office was performed to identify deaths due to *Streptococcus pyogenes* Group A between January 2022 and April 2024. The digital database of the office was queried for the following keywords: "*Streptococcus Pyogenes,*" "group A streptococcus." "streptococcus," and "sepsis." No limits for ages, sex, or race were imposed. Only cases in which the body was examined in the office were included in the study. Records review-only cases were excluded.

Results showed a wide breadth of decedent demographics and presentations. Due to the increased number of these deaths and in an attempt to identify the source of infection, postmortem pharyngeal swabs have been implemented in the Office in suspected cases.

The cases and the increasing frequency of Group A *Streptococcus pyogenes*-related deaths highlight the need for identification of patient risk factors and suggestive examination findings as well as the utilization of proper postmortem testing. Notifying public health authorities of reportable diseases is crucial for several reasons, including preventing the spread of contagious diseases, monitoring and surveillance, early detection of outbreaks, and public awareness and education.

The study is currently ongoing. A thorough discussion of the results, including the new implemented test will be presented to the attendees

4.1 Mortality Statistics from the National Vital Statistics System
Margaret Warner PhD
CDC, Hyattsville, MD, USA

Mortality data from the National Vital Statistics System (NVSS) are used to monitor trends in deaths in the United States, track the characteristics of those who have died, and inform decisions about public health challenges. NVSS mortality data are collected from death certificates filed in the 57 vital registration jurisdictions. NVSS functions with states maintaining autonomy in their vital registration operations and the federal government providing support, including coordinating functions and developing agreed upon standard specifications. Medical examiners play a central role in the system by determining cause and manner of death for many sudden and unexpected death and in some instances providing training and other oversight of death certification within their jurisdictional area.

In 2022, there were 3.28 million deaths in the United States with an age-adjusted death rate of 798.8 deaths per 100,000 U.S. standard population. In 2022, unintentional injuries were the third leading cause of death with a death rate of 64.0. In 2022, the infant mortality rate was 560.4 per 100,000 live births, which was 3.1% increase from 2021. In 2022, there were an estimated 107,941 drug overdose deaths, resulting in an age-adjusted rate of 32.6. Overall, the age-adjusted rate of drug overdose deaths nearly quadrupled from 8.2 in 2002 to 32.6 in 2022.

Overall and for certain causes, provisional mortality data are available, based on a current flow of mortality data, and are useful for monitoring trends including for COVID-19. This closer to real-time surveillance is due to improved timeliness in death certification systems and processes. In 2022 about 65% of deaths were registered with 10 days of the date of death. Drug overdose death data continue to lag behind other causes due to the time to investigate the deaths. Even with the delay, provisional drug overdose counts are available with a four-month lag.

This presentation will provide an overview of mortality trends from the NVSS and will cover the process for collecting and compiling data from death certificates. In addition, methods for coding causes of death according to the International Classification of Diseases 10th Revision and data modernization initiatives such as increases in electronic death registration systems as well as examples of interoperability with medicolegal death investigation case management systems will be covered. Medical examiners and coroners play an important role in mortality surveillance, including the NVSS. In recognition of their critical contribution, CDC established the Collaborating Office for Medical Examiners and Coroners.

4.2 An Unusual Death from Penetrating Cranial Trauma: The Importance of Investigating the Primary Scene of Injury
Kelli Oxborrow B.S.[1], Dr. Laura D Knight M.D.[1,2]
[1]Washoe County Regional Medical Examiner's Office, Reno, NV, USA. [2]University of Nevada - Reno School of Medicine, Reno, NV, USA

A 65-year-old man was found dead after his elderly mother reported he had "fallen" the day prior and never moved from that position. He also had a history of having fallen six days prior to his death; after the fall, he had "black eyes" and complained of headaches. First responders found the deceased prone on the carpeted kitchen floor; no objects were noted around him. The decedent had extensive medical history including hypertension, coronary artery disease, and methadone use.

Autopsy revealed findings of significant penetrating head trauma, with two cutaneous lacerations of the anterior left forehead, extensive underlying subcutaneous hematoma and left frontal deep scalp contusion, periorbital ecchymoses, a penetrating defect of the left frontal bone, congealed left-sided cerebral subdural hematoma with mild organization, left-sided subarachnoid hemorrhage concentrated over the left frontal pole, and left frontal cerebral laceration (penetrating injury extending to a depth of 2-3 cm) with associated intraparenchymal hemorrhage. Cerebral edema and uncal fullness with slight notching (impending herniation) were noted. The cutaneous injuries were not consistent with gunshot injury, and x-rays taken before autopsy revealed no radiopaque foreign bodies. The penetrating defect of the left frontal bone was circular, of 0.5 cm diameter, with beveling on the inner table of the bone.

Immediately following the autopsy, the Medical Examiner discussed the findings with the medicolegal death investigator and requested a secondary scene investigation regarding the etiology of the penetrating trauma, which was not consistent with having collapsed onto a carpeted floor. The investigator was instructed to determine the location of the first fall and identify any thin cylindrical objects that could have penetrated the skull. The investigator determined that the decedent was in a neighbor's yard working on a project when he fell onto his hands and knees onto a metal trellis within debris behind a shed. He was bleeding but refused medical attention and went home; the neighbor called to check on him later that evening and he was "fine". A 60-inch metal trellis with bent bottom portion was photographed; apparent blood was noted on one of the metal tips, and bloody towels were in a trash burning can in the yard.

This case highlights the importance of investigating the primary scene of injury, especially when death is delayed and the individual is no longer at the injury location. The second scene investigation was the key to determining etiology of the injury in this case.

4.3 Naming the Nameless: The Implementation of the Bureau of Justice Assistance (BJA) Missing and Unidentified Human Remains (MUHR) Program
Claire L. Waliczek MPH, Jason P. Crawford MS, BS, Shana N. Wooldridge BA
DeKalb County Medical Examiner's Office, Atlanta, GA, USA

In 2022, the DeKalb County District Attorney's Office successfully applied for and received funding for the 2022 Missing and Unidentified Human Remains Program. These funds were awarded in order to help DeKalb County catalog, investigate, and identify the 27 sets of unidentified human remains cases dating back to 1987.

The DeKalb County Medical Examiner's Office has played a vital role in the implementation of this grant program. This project would include additional forensic anthropology examinations, exhumations, updated photos, and uploading each case to multiple databases (i.e.,ViCAP). The lab required multiple pieces of new equipment which included autopsy tables, a Vulcan kettle, cameras, and more. Multiple partnerships were created, one of which included hiring a forensic anthropology consultant to perform examinations of our skeletal remains. In the meantime, having an anthropologist on permanent staff was beneficial to the work that needed to be completed before a forensic anthropologist was consulted. Some of these tasks include performing an inventory of the remains needed to be examined, cleaning and processing these remains, supervising exhumations, and ensuring the lab and exam area is equipped with everything the forensic anthropologist would need during their exams. A private DNA lab was also needed in order to perform FGG testing, mitochondrial DNA testing, SNP testing, as well as a lab that would be able to assist in uploading the DNA profiles into CODIS.

In addition to the scientific work being done, the medical examiner's office and the district attorney's office also hosted multiple missing persons day events in order to bring awareness of these cases to the community. These events were planned in a way that included all citizens of DeKalb County to help us identify these sets of remains.

This presentation will provide a recent case study on actions taken in order to acquire funding and provide closure for families of unidentified individuals. Medical Examiner offices across the country deal with a number of unidentified cases each year. In providing data and results from the undertaking of this project, it is possible for a strategic, efficient process for identifying majority of human remains.

4.4 Update on The American Journal of Forensic Medicine and Pathology: The Official Journal of the National Association of Medical Examiners

Kimberley Molina MD
American Journal of Forensic Medicine and Pathology, San Antonio, USA

This presentation will provide an update on *The American Journal of Forensic Medicine and Pathology*, the official journal of the National Association of Medical Examiners. Subscription to the journal is included in NAME membership but members may not be aware of all that the journal offers. The update will include a review of journal features and collaborations including the newest additions of Journal Club, Firearm News and Tox News. It will also include ways to engage with the journal via social media and as authors or reviewers.

4.5 Small Unmanned Aircraft Systems (sUAS): The Implementation of Drones in Medicolegal Death Scene Investigations

Philip Miller BS, F-ABMDI[1], Angela Berg MA[1], Samantha (Sami) Richardson BS, BA, D-ABMDI[1], Eric Pfeifer MD[2], Joshua Lanter MD[1], Jeremy Benavides BS[3]
[1]Oklahoma Office of the Chief Medical Examiner, Tulsa, OK, USA. [2]Oklahoma Office of the Chief Medical Examiner, Oklahoma City, OK, USA. [3]Life Share of Oklahoma, Oklahoma City, OK, USA

Introduction: The United States national airspace system defines an sUAS as a small aircraft, including its communication and control components. These systems, also known as drones, are less than 55 pounds and can be operated by a remote pilot. With the rapid changes in advanced technology, the Oklahoma Office of the Chief Medical Examiner (OCME) implemented a Drone Program in 2021. The aim of the program was to utilize drones to collect aerial data of medicolegal death scenes, and to examine the impact, benefits, and limitations of medicolegal death investigations using the advanced equipment.

Methods: Since 2021, data was collected using two separate sUAS that were equipped with photographic and videographic payloads capable of producing advanced imagery including thermal options. The sUAS was operated by an FAA certificated Part 107 pilot, and when deemed necessary, utilizing the LAANC (Low Altitude Authorization and Notification Capability), and COA (Certificate of Authorization) Waiver awarded to the OCME by the FAA (Federal Aviation Administration). Collected data were processed using a Comprehensive Drone Management and Collaboration Platform, as well as Next Generation Photogrammetry Software to transform the data into 2D and 3D digital evidence. Encrypted live streaming was also utilized in certain scenarios providing a first-person view from scene-to-appropriate personnel.

Results and Discussion: The implementation of the OCME Drone Program was found to be advantageous, especially for documentation purposes including mapping by GPS coordinates and providing measurements at centimeter accuracy. This furnished investigators a unique overview of their death scenes to identify crucial parts that were evidentiary and to make preliminary determinations. In most cases, the data aided forensic pathologists and anthropologists with a clear understanding of what transpired, and ultimately strengthened their supporting evidence of a cause and manner of death. Drones were deployed in various all-weather outdoor scenes but were not limited to the following: Motor vehicle and aircraft accidents, Water related deaths, Structural/Non-structural fires, Weather related deaths, Skeletal remains, Dismembered bodies, Clandestine graves, Explosions, Hazardous materials and surrounding areas, and Scenes in austere conditions prior to a special teams' recovery of decedent. Advantages were not only in the form of documentation, but time was saved, and overall safety was increased while allowing for assessment of scenes without disturbance to them, evidence searches in multi-faceted areas, use of a laser range finder, and use of a spotlight and thermal camera at night. In final, the OCME Forensic Air Unit was officially established.

4.6 Unearthing the Past: A Review of Autopsy Reports and Photographic Archives for Enriching Pathology Education

Jonathan K Lai MD, MSc, Sarah Sutherland BSc, Richard Fraser MDCM, MSc
McGill University, Montreal, Quebec, Canada

Introduction: The department of pathology of the Royal Victoria Hospital (RVH) was established at the Hospital's inception in 1893. Starting in the early 1940s, selected reports illustrated high quality black-and-white photographs that included common and rare diseases. We initiated a project to curate these photographs with the aim of enhancing medical educations by illustrating decompensated diseases that are rarely seen in the present and to shed light on the insights that can be gleaned from past medical practices and the visual records that accompany them.

Methods: We reviewed autopsy records in the RVH archives from 1946-1956. The methodology aimed to review, catalogue and digitize the high-quality photos in prioritizing their preservation for future generations. In parallel, an effort was made to locate and consolidate the photographic records associated with these autopsies, which are often stored in disparate locations or overlooked in the annals of medical records.

Results: 4713 autopsies were identified, of which 997 (21%) had photographs; 327 (32.7%) were neoplastic, 198 (19.8%) were infectious cases, and 261 (26.2%) were death related to cardiovascular pathologies. There were numerous images of decompensated neoplastic conditions and infectious diseases such as tuberculosis, diphtheria, and syphilis, that are rarely seen in modern practice. The images were used in four resident didactical sessions and images of tuberculosis were presented in our department's annual conference.

Discussion: The reports provided high resolution images of rare that are less prevalent today. A historical project provided a glimpse into the diagnostic challenges and clinical practices in a bygone era, enabling residents to gain a deeper appreciation for the evolution of pathology as a discipline. This project explores the benefits of integrating this historical archive into pathology residency programs. Pathology residents can use these resources to develop their diagnostic skills, refine their understanding of disease processes, and engage in comparative analyses between historical and current cases. Additionally, the collection serves as a bridge between the past and the present, fostering a sense of historical continuity within the field of pathology.

4.7 WITHDRAWN

5.1 Going the Extra Mile in Transportation Accident Investigations

Daniel Morgan MFS, Elias Kontanis PhD, JE Tuttle MD, Turan A. Kayagil MD
National Transportation Safety Board, Washington, DC, USA

The National Transportation Safety Board (NTSB) is an independent federal agency that investigates accidents and other significant events in all major modes of transportation to learn what went wrong and to make recommendations aimed at preventing future events.

NTSB investigators rely on data from medicolegal death investigation authorities to inform human performance and survival factors investigations. Medicolegal authorities provide important autopsy and toxicological data, but also may encounter devices valuable to NTSB investigations while performing autopsies or handling personal effects. Implanted medical devices such as pacemakers and defibrillators, and personal electronic devices (PEDs) such as mobile phones, video recorders, and wearable technology, can provide important information about medical and other factors that may have contributed to an NTSB-investigated event.

The NTSB's Transportation Disaster Assistance (TDA) division is responsible for the agency's family assistance program, which addresses concerns of families of people involved in NTSB-investigated events. TDA serves as the point of contact for families, communicating sensitive and complex information, as well as facilitating referrals to other government and non-government entities for information and support. These family assistance responsibilities put TDA specialists in contact with medicolegal authorities regarding families' concerns. In addition, TDA medicolegal coordinators support NTSB investigations by engaging medicolegal authorities to request autopsies and to coordinate sending toxicological specimens ("tox boxes") to the Federal Aviation Administration for testing, even in non-aviation events. TDA specialists also inquire about personal effects including PEDs. Even damaged medical devices and PEDs can be valuable to NTSB investigations, because specialists may be able to recover useful data.

Using case examples where possible, this presentation aims to illustrate the importance of thorough investigations of transportation accidents including autopsy, postmortem toxicology testing, and interrogation or retention of electronic devices, regardless of whether the cause of death seems obvious. By "going the extra mile," medicolegal death investigation authorities can uncover information critical to determining how transportation accidents happened and how they may be prevented.

5.2 An Update to a Drowning Death Scene Investigation Pilot Project

Gabrielle Fraley MPH, Susanna Joy MA
National Center for Fatality Review & Prevention, Okemos, MI, USA

Drowning is a significant cause of mortality among children. Over 800 children under the age of 18 died from drowning in 2022 and drowning is the leading cause of death among children one to four years of age. There are persistent disparities in drowning, with children of some races and children with disabilities at increased risk of drowning. In 2022, the Centers for Disease Control and Prevention, in partnership with the National Network of Public Health Institutes and the National Center for Fatality Review and Prevention, launched a pilot project to create a standardized death scene investigation (DSI) form, the Death Scene Investigation Form-Beta, to be used in pediatric drowning deaths and collect enhanced data to inform prevention.

Since January 1, 2022, six pilot sites have entered data on drowning deaths of 94 children less than 18 years old, with data collection ongoing. The majority of deaths were among children ages 1-4 (60.6%). Over half (55.3%) were among White children and one-quarter (24.5%) were among Black children. Nearly 70% of decedents were male. A quarter (24.5%) had a known history of maltreatment. Nearly 14% had a known prior disability or chronic illness. Six deaths (6.4%) mentioned the child had diagnosed or suspected autism.

Qualitative data analyses of the enhanced pilot data revealed findings that can meaningfully inform prevention, including elopement behaviors commonly contributing to drowning, prevalence of children placed outside of their biological parent's home among the drowning cohort, and multiple instances of children recreating in crowded urban public water at the time of the incident.

We revised the enhanced DSI tool based on key informant interviews with interdisciplinary professionals including death scene investigators, boating law administrators, and law enforcement. Revisions included a title change to the DSI tool itself. We also obtained feedback from sites in the recruitment process to make the tool more applicable across the spectrum of drowning that can occur in the United States, including adding response options relevant to snowmobiles falling through ice. A finalized version of the tool, now called the Water-Related Death Scene Investigation Protocol, is slated to be launched in spring 2024. It will continue efficient collection of enhanced DSI and autopsy data in addition to rich information on the child's home and family life. The protocol will be available nationally regardless of pilot participation. Project participation is ongoing and opportunities for partnership will be discussed.

5.3 New Autopsy Guidelines for Myocarditis: Practical Considerations and Implications for The Forensic Pathologist

Stanley J Radio MD
University of Nebraska Medical Center, Omaha, NE, USA

The histopathologic diagnosis of myocarditis remains a challenge for pathologists in many settings. The Society for Cardiovascular Pathology and the Association of European Cardiovascular Pathologists have proposed guidelines for the diagnosis of lymphocytic myocarditis. The author will provide a brief overview of myocarditis and the give keys to the new diagnostic terminology with illustrative examples.

5.4 Autopsy of the Pregnant Woman: An Overview of the Intersection of Women's Health and Forensic Pathology

Marianne Hamel MD, PhD
Jersey Shore Forensics, Bethlehem, Pennsylvania, USA

This presentation seeks to review recent developments regarding the autopsy of the pregnant woman. Although studies indicate that pregnancy itself is an independent risk factor for homicide (almost exclusively at the hands of a current or former intimate partner) and that approximately 20 percent of women who die during pregnancy are murdered, the topic is largely overlooked in forensic pathology literature.

This presentation aims to offer an overview of the issue, evaluate the validity of postmortem pregnancy testing and postmortem paternity testing, and touch on legislation that governs the administration of justice after the violent death of an expectant mother. Topics of discussion include the use of over-the-counter pregnancy tests to detect early pregnancy at autopsy, appropriate sampling of fetal tissue for paternity testing, and the extreme disconnect between information gathered during the postmortem examination and state laws delineating the point at which one charge of homicide becomes two.

The topics reviewed are part of a larger protocol for the autopsy of a pregnant woman, particularly one that has died violently. However, the recent Supreme Court decision to overturn Roe v. Wade makes it likely that maternal mortality due to all causes including violence are likely to increase, making the findings applicable to a potentially greater number of cases.

6.1 Standardized Approach to Autopsy in Sudden Unexplained Death in Childhood (SUDC): A Review of 186 Cases

Leah Geiser Roberts DO[1,2], Laura Gould MSc, MA, PT[2], Orrin Devinsky MD[2]
[1]NYU Grossman School of Medicine, New York, NY, USA. [2]SUDCRRC, New York, NY, USA

On behalf of the SUDCRRC pathology review committee: Andrew Guajardo, MD, Melissa Guzzetta, DO, Nicole R Jackson, MD, MPH, Heather Jarrell, MD, Kelly Lear, MD, Dominique Leitner, PhD, Katherine Maloney, MD, Declan McGuone, MBBCh, Kathy Pinneri, MD, Christopher William, MD, PhD, and Alex Williamson, MD

Sudden unexplained death in childhood (SUDC) is a tragic, complex and poorly understood event that lacks a standardized approach for evaluation. To classify a case as SUDC, there should be no evidence of a definitive cause of death after thorough case investigation, which includes review of the clinical history and circumstances of death, and performance of a complete autopsy with appropriate ancillary testing. Cases showing evidence of a specific cause of death are certified accordingly, while those with inconclusive findings and insufficient information are labeled undetermined. In our study, 186 cases were enrolled from across the United States, Canada and UK from October 2014 to December 2022. Every case underwent complete SUDC Registry and Research Collaborative (SUDCRRC) blinded multidisciplinary review including whole exome sequencing. The established cause of death in each case fell into one of six categories: nine (5%) undetermined due to lack of sufficient data for review, 11 (6%) infection, one (0.5%) asthma exacerbation, six (3%)

seizure-related deaths, 11 (6%) sudden cardiac deaths, and, the majority, 148 (80%) unexplained sudden deaths. Based on our analysis, we propose a standardized decision-making approach for the investigation process from intake to certification.

6.2 A Paradigm Shift in the Interpretation of Posterior Rib Fractures in Children?

Dr Judith Fronczek[1], Dr Sarah Parsons[1], Dr Padma Rao[2], Dr Chris O'Donnell[1]
[1]Victorian Institute of Forensic Medicine, Melbourne, Victoria, Australia. [2]The Royal Children's Hospital, Melbourne, Victoria, Australia

Posterior rib fractures in children are considered to be highly suggestive of nonaccidental injury. Several studies have concluded that posterior rib fractures are not encountered after cardiopulmonary resuscitation (CPR). In these studies, rib fractures were diagnosed on radiographs and not on postmortem CT scan (PMCT). However, PMCT is superior to radiography in diagnosing rib fractures.

Around 2000 a new technique for CPR in infants was recommended in the United States of America and Australia, the so-called two thumb chest compression method. Several cases of posterior rib fractures in infants have been described in the literature after the use of this technique.
The authors will give an overview of the literature and will present two thought-provoking cases of infants with posterior rib fractures after CPR.

6.3 SUID and SDY Case Registry: Diagnostic Genetic Testing

Heather M MacLeod MS[1], Meghan Faulkner MA[2], Erik Buczkowski MPH[2], Krisha Felzke MPH[2], Kristin Burns MD[3]
[1]Data Coordinating Center for the SUID and SDY Case Registry, Okemos, MI, USA. [2]Michigan Public Health Institute, Okemos, MI, USA. [3]National Institutes of Health, Bethesda, MD, USA

Understanding how and why infants, children, and young adults die suddenly and unexpectedly is the goal of the Sudden Unexpected Infant Death (SUID) and Sudden Death in the Young (SDY) Case Registry. Diagnostic genetic testing is increasingly utilized at autopsy as a tool to determine cause of death. This testing is not only critical to determining cause, but can also inform family members of their own risk for sudden death. Many barriers (e.g., availability of testing, sample type, cost) to genetic testing have decreased, but logistics (e.g., protocols for what cases to test, funding for testing, and return of results) remain challenging for some medical examiner and coroner offices. We will review the status of diagnostic genetic testing among Case Registry states and jurisdictions, including what cases are tested, how testing is funded, what lab is used, and what panels are ordered. We will also review how results are incorporated into the autopsy report, how variants of uncertain significance are handled, and how families are notified and referred for follow-up.

6.4 An 8-Year-Old With… Wait…What? Acute Aortic Dissection and Review of the Literature

Karen L Kelly MD
Brody School ouuf Medicine East Carolina University, Greenville, NC, USA

Aortic dissection typically occurs in middle-age to older persons with a history of systemic hypertension or in young persons with an inherited aortopathy (Ehlers-Danlos or Marfan syndrome). An acute aortic dissection can also occur as a result to a traumatic deceleration injury, often seen in a motor vehicle crash.

We present a case of an 8-year-old boy, with no significant past medical history, complaining of difficulty breathing and head and leg pain, who presented to a local Emergency Department after collapse. An ECG showed biventricular hypertrophy, abnormal secondary repolarization and ST elevation. The clinical differential diagnosis included active myocarditis with congestive heart failure. Despite aggressive resuscitation attempts, he was pronounced dead less than seven hours after onset of symptoms.

Autopsy external examination showed an 8-year-old boy without traumatic injuries and no physical characteristics of typically associated genetic diseases associated with aortic medial weakness. Internal examination demonstrated an intimal-medial tear in the ascending thoracic aorta leading to an acute aortic dissection involving the entire aorta and the right coronary, right brachiocephalic, left renal and both common iliac arteries. The heart was slightly enlarged with a tricuspid aortic valve. Histology confirmed the presence of acute dissections as described. Additional findings included dissection of the right renal artery and acute myocardial ischemic changes. Additionally, several of the arteries were occluded by acute thrombi. The aortic media has a nearly disorganized appearance with areas lacking elastic fibers and increased medial fibrosis.

Review of the literature shows few cases of aortic dissection in a child without a history of trauma. Our case demonstrates an acute aortic dissection in a child without a history of significant trauma, characteristic features of the usual associated genetic entities, or congenital heart disease. We will discuss the important types of inherited aortopathies and what might be overlooked during a forensic autopsy.

6.5 Scientific Update: Sudden Unexplained Deaths in Infants and Children and Upcoming Changes to ICD-11

Richard D Goldstein MD
Robert's Program on Sudden Unexpected Death in Pediatrics, Boston Children's Hospital, Boston, Massachusetts, USA. Harvard Medical School, Boston, Massachusetts, USA

In this presentation, we will look at research on Sudden Infant Death Syndrome, Sudden Unexplained Infant Death, Sudden Unexplained Death in Childhood, and other sudden unexpected deaths in the pediatric age range, and also the conceptualization and classification of this problem. We will review new developments in neuropathological research, genetics research, and the impact of similarities with Sudden Unexpected Death in Epilepsy. We will review the basic conceptual framework of sudden unexplained infant deaths and consider how new capabilities and findings are leading to a reconceptualization of biological vulnerabilities in these deaths.

We will then shift our attention to longstanding difficulties with the classification of Sudden Infant Death Syndrome and other related diagnoses in infants and children. These problems of nomenclature and diagnostic criteria in unexplained pediatric deaths have been an issue for U.S. medical examiners, but there are many countries with similar or other difficulties with the existing mortality schema. In 2018, the 3rd International Congress on Sudden Infant and Child Death produced consensus proposals for changes to the ICD-11, in an attempt to improve international accounting of the mortality and to address limitations to the statistical reliability of the current classification. In the intervening period, those proposals have undergone further revision in collaboration with the World Health Organization and leaders in the nosology of international mortality. The modified proposals are in the final phases of revision. The proposals will be incorporated into the ICD-11 either in next year's release (ICD-11 2025) or, if the requested changes are judged to be of major statistical impact, in ICD-11 2027. (In line with the statistical-epidemiological consensus that minor changes can be enacted every year and major ones every 5 years). We will review the many complications of classifying unexplained infant and child deaths using the current ICD-11 classification scheme, the priorities to be addressed, and the classification categories heading towards implementation.

7.1 Types of Cognitive Bias and a Discussion of Forensic "Error"

Paul S Uribe MD
Fort Bend County Medical Examiner Office, Rosenberg, TX, USA

Cognitive bias continues to be a controversial topic in the scientific, medical, and forensic communities. The use of the proper definition of cognitive bias is essential, as the general term "cognitive bias" is often used to refer to the systemic, repetitive negative effects of bias. It must be clarified that the

whole of the concept of cognitive bias consists of the heuristic structure in which huma's process and interpret all information.

Twelve types of cognitive bias will be discussed in this presentation with examples applicable to forensic pathologists. The types of cognitive bias that will be discussed include: contextual bias, confirmation bias, ascertainment bias, overconfidence (Dunning-Kreuger effect), affective bias, anchoring bias, availability bias, attribution error, groupthink, premature closure, unpacking failure, and framing.

Forensic pathology "error" is a poorly defined concept in which much care must be taken in recognizing what "errors" are potentially caused by cognitive bias versus and what "errors" are related to other factors. The ability to quantify which errors are due to cognitive bias is very limited, as any error in any part of the decision-making process may be attributable to any one of the hundreds of types of cognitive biases. Errors that result in the wrongful conviction of an innocent person or the wrongful release of a guilty individual are systemic issues, some of which may or may not involve cognitive bias. Inaccurate, unscientific, and unjustified forensic pathology opinions may play a contributing role.

There are several ways to combat the negative effects of cognitive bias in forensic pathology. The first is to understand the different types of cognitive bias and understand how these thought processes may influence decision-making both within and outside of the practice of medicine. The second is to strive for thorough objectivity in autopsy practice, autopsy reports, and expert witness testimony. The third is to utilize systemic best practices such as generous peer review and case discussion conferences. Medical examiner Offices must continue to fight for independence and free of outside pressures and political influence. The application of Dror's remedies to the problem of cognitive bias in forensic pathology are difficult, if not impossible to implement. Linear sequential unmasking may work for a forensic analyst, but is not applicable to forensic pathology specifically, and medicine in general.

7.2 Maternal Mortality and Bias in Medicine: A Tale of Two Mothers

Jan M Gorniak DO, MHSA
World Peace Forensic Consulting, LLC, Tallahassee, FL, USA

A woman's death during pregnancy, childbirth, or shortly after is a tragedy for her family and society. Pregnancy-related deaths can occur when a woman passes away during her pregnancy or within a year after the end of her pregnancy due to a pregnancy-related complication, a series of events brought on by pregnancy, or the physiological effects of pregnancy exacerbating an unrelated condition. Research published in the Journal of the American Medical Association discovered that maternal mortality in the United States had more than quadrupled over the last two decades, with Black mothers dying at the highest rate. The CDC also reports that Black women are three times more likely than White women to die as a result of pregnancy-related complications. These inequities are caused by a variety of reasons, including institutional racism, unequal access to healthcare, and unconscious bias in the medical community. The story of two (2) primigravida women will be presented to illustrate issues they faced during pregnancy and the importance of maternal mortality review in identifying factors to prevent maternal deaths.

7.3 Comparison of Forensic Pathology Board Exam Content to Forensic Pathology Practice

Amy ET Theriault DO, Daniel S Atherton MD
University of Alabama at Birmingham, Birmingham, AL, USA

The American Board of Pathology (ABP) administers the Forensic Pathology (FP) Board Exam to certify qualified FP fellows. Ideally, exam content should be comparable to practice. This presentation compares FP Board exam content to FP practice in Jefferson County, AL.

Each year, the ABP publishes a Blueprint that lists tested subject categories and their proportional representations; for this study, Blueprints of ABP FP Board exams from 2015 were obtained from ABP staff. This analysis compares content from the 2022-2024 exams to a sample of Jefferson County Coroner/Medical Examiner's Office (JCCMEO) data from 2019-2024. Each exam from 2022-2024 had 275 total exam questions (225 written and 50 microscopy). Fifty-four content categories contained questions ranging from zero questions (e.g., venom-related) to up to 23 (blunt trauma; 8.4%). The categories blunt trauma (8.4%), mechanical and physical injury (3.6%), and transportation-related deaths (4.4%) in aggregate comprised 16% of content. At the JCCMEO, blunt force injuries were implicated in 13.4% of deaths. Asphyxia questions represented 4% of exam content compared to 3.6% of cases at the JCCMEO. Deaths in-custody accounted for <1% of content; JCCMEO in-custody cases comprised 3.0% of cases. Obesity represented <1% of content, while 27.2% of examined decedents were obese, with obesity being listed in the cause of death or as a contributing factor in 4% of cases. Firearm-related questions represented 8.4% of content; guns accounted for 20.8% of JCCMEO deaths. The categories "interpretative" and "toxicology and postmortem chemistry" may pertain to drug toxicity and account for 5.5% of exam content. At JCCMEO, drug overdoses comprised 32% of cases.

The ABP provides a valuable service in publishing Blueprints; comparison to practice can help inform design of subsequent exams. In general, the proportion at which most subjects are tested appears to be comparable to what FPs see in practice; however, our study shows that subjects like drug toxicity could be considered under-represented; interestingly, drug toxicity exam content does not appear to have significantly changed from 2015 to 2024. The finding of few in-custody death questions, while being comparable to real practice, raises the issue of under-representation of content that can consume significant time in practice. Our study also raises the possibility that microscopic material (18% of content) could be over-represented on the exam. This study has several limitations including challenges associated with inferring question content from the supplied categories and acknowledgement that not all tested categories should mirror proportions in actual practice.

7.4 Oh My, How Did They Die? A Prosecutorial Conundrum

Alfredo Eugene Walker FRCPath, DMJ (Path), MBBS
Department of Pathology and Laboratory Medicine, Faculty of Medicine, University of Ottawa, Ontario, Ontario, Canada

A rare but specific clinicopathological entity exists that refers to a syndrome of sudden neurological death which has been described in "*individuals who, while acutely intoxicated with alcohol, are severely beaten about the head, usually with fists and feet, collapse at the scene and are subsequently found dead.*" The entity is ascribed to explain the death of an intoxicated individual who sustains blunt force head trauma of a severity that is either insufficient to account for the death convincingly on its own or in whom the brain structure is found to be anatomical normal. The precise mechanism of death in these cases remains unclear but details from animal experiments and clinical observations suggest acute brain stem dysfunction as being central. When the head injury results from a physical assault by another person, establishing the criminal liability of the perpetrator rests on the ability of the forensic pathologist to establish a causal link between the assault and death and may seem nebulous.

Many forensic pathologists may not ever encounter this entity in their routine practice but identification of this phenomenon is usually straightforward, once it is considered in the appropriate context, and other possible causes of death in that context have been excluded.

The mechanism of death involves the combined effects of mild to moderate concussive blunt force head injury in the setting of ethanol intoxication and will be discussed in detail.

Four cases of this entity are presented, with video documentation of the incident in one case. The judicial outcome of each case will be stated. The constellation of the typical clinicopathological features of the entity, with the usual gross anatomical, neuropathological, and toxicological findings, will be presented to heighten awareness and facilitate consideration of this rare

entity when faced with a death that occurred in the appropriate circumstance with minimal or no significant gross anatomical findings to account for the death and toxicological findings indicative of significant ethanol intoxication. It is hoped that presentation of these four cases will sensitize forensic pathologists about this rare entity and inform their diagnostic work up of such cases at autopsy.

7.5 The Case for Metabolic Acidosis as the Cause of Death in Arrest-related Deaths

Victor W. Weedn MD, JD[1], Pete Speth MD[2], Alon Steinberg MD[3]
[1]Univ of Maryland Baltimore; George Washington Univ, McLean, Virginia, USA. [2]Forensic Consultations, Wenonah, New Jersey, USA. [3]Cardiology Associates Medical Group, Ventura, California, USA

The cause of death in arrest-related deaths has been unclear and subject to controversy. We review the evidence in support of the various theories of arrest-related deaths, including restraint asphyxia, excited delirium, stress of the subdual, drugs, underlying cardiovascular disease, and metabolic acidosis. The literature suggests that autopsies will be negative in these cases. We find substantial evidence for metabolic acidosis and virtually no evidence for other postulated causes of death. Sudden cardiac arrest is itself relatively nonspecific. Tachypnea and tachycardia are to be expected. Air hunger expressed as exclamations of "I can't breathe!" favor metabolic acidosis. Other evidence of metabolic acidosis includes ECG tracings (PEA, asystole), end-tidal CO2 levels (low), and blood gas findings (elevated pCO2, pH < 7) as well as the absence of cyanosis, subendocardial hemorrhage of the left ventricular outflow tract, or myocardial contraction bands. Unfortunately, these findings have not been appreciated in the past, but can be found in most cases of arrest-related deaths when looked for. We will discuss the implications of these findings.

8.1 What the Water Gave Me: Death (and Life) at Niagara Falls

Tara J Mahar MD, Katherine F Maloney MD, Alexandra Hart MD, Stacey L Reed DO, Sara Ohanessian MD
Erie County Medical Examiner's Office, Buffalo, NY, USA

For centuries, innumerable people from across the globe have traveled to Western New York and Canada to experience the power and majesty of Niagara Falls. Many visit for sightseeing and recreation; some come for purposes related to matrimony. Others are drawn by the promise of fame, and a few make the journey out of desperation. For twenty to thirty people each year, the Falls and its river are where their story ends.

The Erie County Medical Examiner's Office in Buffalo, NY, and the surrounding jurisdictions it serves are situated near the banks of the Niagara River. Because of its location, the office is uniquely poised to investigate a variety of waterfall-related deaths, some spanning the boundary between two countries. We present an overview of the geography, geology and history of Niagara Falls intertwined with forensic pathological observations from contemporary case work. Emphasis is placed on the wide spectrum of blunt force trauma, the certification of both cause and manner of death, the considerable variation in postmortem interval, and challenges related to the death investigation and identification of foreign nationals.

A few hypotheses for various observations will be posited during the presentation, with the overarching goal of stimulating thought and discussion about rarer types of deaths involving the wonders of our natural world.

8.2 Necroidentification In A Volcano Eruption Mass Disaster

Luis Fernando Herrera
National Institute of Forensic Science -INACIF-, Guatemala, Guatemala

On June 3, 2018, Fuego volcano erupted, this being the largest eruption in the recent history of the country. This left over 12,000 people evacuated, 229 people were reported missing, and 186 homes were partially affected or destroyed in their totality. The eruption began with explosions as high as 5 km and spreading several kilometers around. The pyroclastic flows destroyed everything on their way down, where a village was located, covering houses and the people.

Our intervention in this emergency can be divided into two phases. The first phase began when the -INACIF- staff moved to the affected area on June 4, 2018, where we were deployed to handle the mortal victims. On the first day of intervention, a temporary morgue was set up for necropsy procedures of the bodies with widespread thermal damage, samples were taken for DNA analysis and fingerprints. We were able to identify a small group of people with these tools. However, in the following days, the bodies that entered the temporary morgue presented big cadaveric changes consisting of partial skeletonization, cooking and destruction of soft tissues resulting in absence of skin, fingerprints, and phenotypic traits. Also causing the DNA material collected from these bodies to stop being useful for genetic profile. The forensic anthropology team started to organize and design the collection of antemortem data with surviving family members, taking a DNA sample from them and making interviews directed to record all the individualizing features of the people who were reported missing during the eruption. The anthropologists also worked on the remains, cleaning them to recover bones, and analyzing them to get the anthropometry information from each case (the postmortem data). During the period from June to December of 2018 (first phase) 206 identifications were completed, of which 137 were carried out through the comparison of antemortem information (about 298 interviews) and postmortem data obtained from anthropological forensic analysis.

We realized the need to create a multidisciplinary group of forensic specialists to analyze all the data and get a positive identification, the Necroidentification committee. In total there were 220 identified victims from the volcano eruption.

An event this important can provoke great commotion and social impact. It is precisely this that forces us to act and look for solutions to make progress of identification techniques, also we thank multidisciplinary sciences that helped achieving our goal.

8.3 Beneath the Surface: Uncovering the Truth of Human Remains in Concrete: The Approach, Challenges, and Lessons Learned

Michelle B Aurelius MD, racy Yorkdale BS, Kimberly Janssen MD
Office of the Chief Medical Examiner, Raleigh, NC, USA

Human remains interred in concrete are unusual and present challenges to decedent transportation, extraction, examination, and safety. This case illustrates the need to pre-plan a safe approach for the removal from concrete, understand and identify in advance the appropriate tools needed, and recognize examination limitations and complications that can occur. We worked as a team, using math, tools, heavy machinery, radiographs, planning, death investigation information, and skill to safely approach suspected human remains encased in concrete within a metal barrel.

An informant was approached by a suspect requesting a saw to dispose of a body, after which he reportedly purchased 11 bags of Quickrete® brand concrete. Law enforcement was informed, and a search of the wooded area behind the home revealed a barrel filled with concrete, to which K9 cadaver dogs alerted. Chains were used to hoist the barrel onto a tow truck to transport the barrel to the autopsy facility. The weight of the barrel with concrete was less than anticipated if filled with concrete only, based on the density of Quickrete®.

Pre-established roles for the team (photographer, assist, safety officer/documenter, and sifting/staging), equipment (dollies, hoist, hoist sling, chisels, hammers, grinder, chisel), and extraction space set up were assigned and communicated. The barrel was removed with a grinder. Concrete was removed through compression/pounding, chipping, and a grinder. Concrete removal revealed that the decedent was positioned head-down with hips, knees, and upper extremities flexed. Sifting and

careful attention resulted in recovery of red and tan paper-like bag fragments within the concrete that were similar in color to Quickrete® concrete bag mix. The feet, head, and distal upper extremities were not attached to the body. A separate plastic garbage bag was recovered within the concrete, which contained a right foot still inside a sock/shoe.

Autopsy examination revealed mildly decomposed remains with evidence of gunshot wounds retained to soft tissue and postmortem dismemberment of the head and distal extremities. A projectile was recovered from the clothing. Tool mark analysis of the vertebrae was consistent with a mechanically powered reciprocating saw.

8.4 Death Caused by Wild Animals: Ex Africa Semper Aliquid Novi (Out of Africa There Is Always Something New)

Gert Saayman MMed(MedForens) FCForPath(SA)
Dept of Forensic Medicine, University of Pretoria, Pretoria, Gauteng Province, South Africa

Globally, thousands of human deaths are caused every year by (or attributed to animals, in one way or another. Yet there appears to be a paucity of scientific literature reporting on, or reviewing this phenomenon. South Africa has been rated the third most biologically diverse country in the world (after Brazil and Indonesia), but more specifically, probably has the biggest number and spectrum of deadly predators and other dangerous beasts such as elephant, rhino, buffalo and hippo.

As is the case elsewhere in Africa, we see numerous “near miss” events and many human fatalities annually in South Africa, as a direct result of the proximity between man and beast, and stemming from this economic symbiosis and indeed, competition. Every day, those who visit as tourists, those who service this industry and those who actively engage in this sector or are exposed on various other fronts (legitimate and indeed, illegitimate) are at risk. Unfortunately, we have a very poor grasp of the nature and magnitude of such fatal outcome events across the country, as there is no cohesive or systematic official reporting of cases, and media reports are erratic and of a regional nature.

This presentation seeks to provide a brief overview of the circumstances and settings under which such fatalities regularly take place in South Africa, with particular reference to incidents involving tourists, those who are involved in the broader wildlife industry, and those who may be affected or involved in more peripheral or indirect ways. A small series of case studies will be presented to reflect some of the diverse and unusual fatalities seen in relation to this growing and vital sector of the economy.

The benefit of medicolegal investigation of death in society should extend beyond the individual, case-based value-add: forensic pathologists have greatly contributed to an understanding of the broader public health issues related to illicit drug use, interpersonal violence, suicide and newer or unusual illnesses (of which COVID-19 is a good example). It is proposed that developing countries in particular, should make every effort to introduce efficient data gathering and reporting systems in respect of categories of death that may be of specific importance and relevance in those communities, including for example, industry specific fatalities in the mining, construction or agrochemical sector or indeed, wildlife tourism and related activities.

8.5 Unique Blunt Force Injury Sustained During Law Enforcement Pursuit and Subdual

Colleen Klein MD
Maricopa County Office of the Medical Examiner, Phoenix, AZ, USA

Deaths in custody are among the most complex cases in forensic medicine. Maricopa County defines deaths in custody as those occurring within 30 days of the decedent interacting with or under the control of a custodial agency. In this case, body-worn camera footage documents the pursuit and subdual of the decedent by law enforcement and supports the findings at autopsy examination. This presentation will entail review of autopsy photographs and body-worn camera footage.

A 33-year-old male was the subject of outstanding warrants and had been under surveillance by local law enforcement. Review of body-worn camera footage shows the decedent sprinting down a paved residential roadway, in close pursuit by officers. An officer uses two hands to push him forward while they are both still sprinting in stride. After contact with the officer, the decedent then stumbles forward over a curb and collides with the corner of a cement wall before falling to the ground. Once handcuffs are in place, officers attempt to pull him to his feet at which point he is noted to be unresponsive. It was reported that officers removed the handcuffs, administered naloxone, and began cardiopulmonary resuscitation (CPR). Upon arrival, paramedics find him in pulseless electrical activity and hospital records document that he remained unresponsive and without heartbeat. There was no documentation that a mechanical chest compression device (such as a LUCAS device) was utilized.

At autopsy, external examination was remarkable for an oblique linear abrasion extending from the left supraclavicular area to the middle of the chest. Internal examination was remarkable for fractures of the left clavicle, first and second ribs on the left side, and the sternum. There was rupture of the pericardial sac and the heart, with sharply demarcated near total avulsion of the left ventricle. Toxicology testing was positive for methamphetamine. These injuries are consistent with blunt force impact of the chest incurred when the decedent struck the cement wall as he was falling.

Cardiac avulsion resulting from collision with a stationary object during a fall while running has not previously been described in the literature. This case highlights the vulnerability of the myocardium to rupture in the setting of increased cardiac output (running) and stimulant use, which may represent common variables in situations of law enforcement subdual during pursuit.

8.6 Characteristics of Fatal Helicopter Crashes in New York City and Houston, Texas

Gregory Dickinson MD[1], Hannah Jarvis MBBS AICSM BSc(Hons) MRCS(Eng)[2]
[1]New York City Office of Chief Medical Examiner, New York City, NY, USA.
[2]Harris County Institute of Forensic Sciences, Houston, TX, USA

The helicopter is an aircraft without wings that obtains lift and thrust from the horizontal rotation of overhead blades, allowing a vertical take-off and landing, and maximal maneuverability. Leonardo da Vinci first created a design in the 1480’s, but it was not until 1942 that the helicopter reached full-scale production. Since then, helicopters have been used in many settings including recreation, law enforcement, medical, agricultural, and military. Despite numerous safety measures in place, the fatal helicopter accident rate (5-year average) is 0.76 per 100,000 flight hours, and has a death index 63 times greater than an airplane.

The electronic databases of the National Transportation Safety Board (NTSB), Office of Chief Medical Examiner of the City of New York and the Harris County Institute of Forensic Sciences were searched for helicopter crashes in Harris County, Texas and New York City from 2005 to present, and found 29 crashes (16 in Harris County and 13 in New York City). Nine fatal crashes with 22 fatalities were examined.

Six were civilian helicopters, two were military, and one was law enforcement. Crashes were investigated by the military or NTSB, whose findings, including a cause analysis, are available to the public. The cause of these crashes included mechanical or pilot error, including collision with another aircraft, and one was deemed survivable. Weather conditions were a factor in one crash. Decedent ages ranged from 15 to 60 years (average 38.6 years) with six females and 16 males. There was a survival interval in ten cases, ranging from three hours to 33 days. Autopsies were completed on 21 of the 22 cases; some included a Federal Aviation Administration Toxicology Box. Significant injuries were identified in the head (n=8), neck (n=7), torso (n=14), upper extremities (n=11), and lower extremities (n=12).

Notable injuries include traumatic amputation and decapitation. Other documented injuries included thermal burns and incised wounds. The cause of death included blunt force injury (n=14), drowning (n=8), or thermal injuries (n=2). Toxicological analysis revealed alcohol and diphenhydramine in one pilot, and alcohol and other medications in passengers. All cases were certified as accidents.

The coordinated investigative efforts of multiple agencies and disciplines are required to determine the circumstances of the crash. Forensic medicine and toxicology are significant parts of helicopter crash investigations, including identification of injury patterns. Feedback to regulators can improve safety guidelines, improve helicopter design, and limit further mortality and disability in these unfortunate accidents.

8.7 Sharply Upward or Downward Trajectories of Gunshot Wounds Involving the Head and Neck

Joseph A. Prahlow MD
Office of the Medical Examiner - City of St. Louis, St. Louis, MO, USA. St. Louis University School of Medicine, St. Louis, MO, USA

Introduction: Homicidal deaths occurring as a result of gunshot wounds are common within the United States. Forensic pathologists are well-versed in the evaluation of firearms injuries. Confusion at autopsy can occur regarding projectile pathways, especially when multiple gunshot wounds exist.

Objective: To present a series of gunshot-related homicide autopsies where each has a gunshot wound with a sharply upward or downward trajectory involving the head and neck.

Research Design: Retrospective observational study involving medicolegal autopsies.

Subjects: Four homicide cases are presented. Case 1 was a 54-year-old male who died from multiple gunshot wounds, one of which entered the upper right parietal skull, travelled downward through the cerebrum, cerebellum, and brainstem, before perforating the basilar skull adjacent to the foramen magnum, and then perforating the soft and bony tissues of the neck before penetrating the soft tissues of the back. Case 2 was an 18-year-old male victim of multiple gunshot wounds. One of the wounds entered the posterior right scalp, just behind the right ear and travelled sharply downward, through the posterior aspect of the neck, before perforating the posterior oropharynx and then penetrating the right anterior larynx, coming to rest next to the thyroid gland. Case 3 was a 22-year-old male who sustained multiple gunshot wounds, one of which entered the right temple region, at a markedly downward angle, before perforating the subcutaneous tissues of the right face, the deep soft tissues of the right side of the neck, the upper esophagus, the upper and lower lobes of the left lung, and the posterolateral left chest wall before penetrating the soft tissues of the lateral left chest. Case 4 was a 38-year-old male who sustained a gunshot wound of the lateral right chest. The projectile travelled sharply upwards, striking the posterior aspects of right ribs 5, 4, 3, and 2 before perforating the posterior aspect of the cervical spine, the basilar skull adjacent to the foramen magnum, the medial right cerebellum, the pons, the midbrain, the left basal ganglia, the left frontal cerebrum, and the left frontal skull, before exiting the left frontal scalp.

Discussion: In each of the cases presented, during initial external examination, with associated radiologic examination findings, ascertaining the presumed projectile trajectories was confusing, especially in those cases involving multiple gunshot wounds. Forensic pathologists should remain cognizant of the fact that projectiles can occasionally perforate or penetrate the neck, with no associated external neck injuries.

8.8 An Analysis of Gun Location Following Injury from Suicidal Gunshot Wounds

Alyssa M Lee MD, MS[1], Daniel S Atherton MD[1,2]
[1]Department of Pathology, Heersink School of Medicine, University of Alabama at Birmingham, Birmingham, AL, USA. [2]Jefferson County Coroner/Medical Examiner's Office, Birmingham, AL, USA

In the United States, suicide rates are increasing. The death of a family member by suicide is difficult for friends and family members to comprehend. Various scene findings, like where a gun is found in relation to a body, can cause confusion for family or even be misleading if not interpreted with caution by law enforcement and medical examiners. This analysis adds to existing literature by examining the distance of the gun from the body as well as the sidedness/position of the gun relative to the side of the entrance gunshot wound.

We reviewed all firearm suicides at our Office from January 2020 to March 2024. Cases were excluded if they did not include information regarding location of the gun in relation to the decedent's body. We utilized coroner reports, police reports, and scene photos to ascertain information regarding location of the gun following injury. Autopsy reports were reviewed for information on entrance and exit wounds. There were 188 (87%) males and 28 (13%) females with an age range of 19-92 years old (average age 48, median age 46). A review of ancestry showed 154 Caucasian (71%), 56 African-American (26%), 4 Hispanic (2%), and 2 Asian (1%). 181 cases involved the use of a handgun (83%), 11 involved a rifle (5%), and 24 involved a shotgun (11%).

In 120 instances (55%), the gun physically touched the decedent's body. For the remaining 96 cases, the gun was found from 0.1 to 10 feet away with an average distance of 1.6 feet from the body. In 55 cases (25%), the gun was located in the decedent's hand (left: 9 (16%), right: 45 (82%), both 1 (2%)). In 52 cases (24%), despite the wound being on the left or right, the gun was found on the same plane as the decedent's torso. In 81 cases (38%), the gun was not on the torso plane and the final sidedness of the gun aligned. In 83 cases (38%), the gun was not on the torso plane and the final sidedness of the gun did not align.

This study demonstrates significant variability of gun location (distance and final sidedness) regardless of the original side entrance wounds were located. This study provides an empirical basis that can help address family members' concerns and subsequent medicolegal conversations that occur around potentially controversial scene findings in firearm suicides.

9.1 Molecular Genetic Testing In Medicolegal Death Investigation: A Survey of Where We Stand

Jenna L. Aungst OMS-II[1,2], Kathyrn Pinneri MD[3], James R. Gill MD[4]
[1]Lincoln Memorial University-DeBusk College of Osteopathic Medicine, Knoxville, TN, USA. [2]Georgia State University, Atlanta, GA, USA. [3]Montgomery County Forensic Services, Conroe, TX, USA. [4]Connecticut Office of the Chief Medical Examiner, Farmington, CT, USA

Molecular genetic testing is a cornerstone in clinical medicine, revolutionizing the diagnosis and treatment of disease. For decades, medicolegal death investigation (MDI) has used DNA testing for decedent identification. Gradually, MDI has shifted to utilizing molecular genetic testing to determine the cause of death. To understand how MDI offices utilize molecular testing, we surveyed 154 MDI offices, including medical examiners (85%), coroners (11%), and others (4%) with a 37% response rate (n = 57).

Our findings reveal substantial utilization of molecular genetic testing in MDI. The results demonstrated that 96% of offices routinely make blood cards on all autopsies, with the remaining 4% on select autopsies. Routine collection of blood in purple top (EDTA) tubes is performed by most offices, either on all autopsies (49%) or select autopsies (41%). Molecular testing (excluding identification or infectious disease purposes) is performed by 77% of MDI offices on 5-25 cases annually (49%), with a routine cardiac panel costing $200-400 for 71% of respondents. Testing is performed at

commercial labs (94%), hospital labs where the office is housed (3%), or labs where the medical examiner/coroner office is located (3%). The testing panels included: Cardiomyopathy (100%), Arrhythmia (94%), Channelopathy (88%), Epilepsy (76%), Aortopathy (58%), Coagulopathy (67%), Metabolic/Inborn Errors of Metabolism (48%), Amyloid (39%), and Whole exome (18%). In the prior two years, the ordered molecular tests included: Cardiomyopathy (94%), Arrhythmia (82%), Channelopathy (76%), Epilepsy (59%), Aortopathy (38%), Coagulopathy (38%), Metabolic/Inborn Errors of Metabolism (47%), Amyloid (6%), Whole exome (15%), and Other (3%). The specimen type preferred by most respondents was a purple top (EDTA) tube of blood (91%), followed by a blood card (6%). Regarding sudden unexplained infant deaths (SUID), 24% routinely performed molecular testing, 29% performed testing on select cases, and 47% did not perform testing. Testing on SUID cases included: Cardiomyopathy (38%), Arrhythmia (46%), Channelopathy (46%), Epilepsy (38%), Metabolic/Inborn Errors of Metabolism (50%), Whole exome (13%), and Other (25%). Barriers to testing included cost (82%), budgetary constraints (64%), finding a lab to perform testing (55%), concerns regarding permission/consent (33%), concerns regarding what to do with the results when they are received (30%), and other (6%).

These findings underscore the important role of molecular genetic testing in enhancing the diagnostic capabilities of MDI. As evidenced by widespread adoption as standard testing for 77% of our respondents, it has emerged as a crucial tool for determining the cause of death.

9.2 From Dicom to Mesh to 3D Physical Model in a Forensic Setting

Paul P S Chui Dmj,Frcpath, Chin Wai Chan
Health Sciences Authority, Singapore, Singapore

All coronial cases handled by Forensic Medicine Division, Health Sciences Authority Singapore are routinely CT scanned. Over the last few years, the application of 3D printing technology is being explored.

In cases/objects of interest, PMCT DICOM data is converted into either .stl or .obj format to generate a 3D mesh. The mesh is then processed by software, to clean up and repair mesh errors, in order to make it fit for print. The .stl file/.obj file is then sent to the 3D printing software that drives the printer to mechanically reproduce the physical model using the Fused Deposition Modelling (FDM). Finally, post processing is required before the final object is deemed to be ready for use.

Over the course of two years, various objects were printed including bones, skulls, scaled down full bodies, weapons such as knives … etc. Whilst 3D printing is generally portrayed as easy to learn and master, reality is technically more complicated. In each step of the process, there are numerous decision points that require operator inputs to achieve a successful outcome.

The poster presentation will share:

1. the detail steps involved;
2. decision points requiring operator inputs and the implications.
3. post processing steps;

In addition, the uses and benefits of having a 3D model in a forensic setting will be discussed.

9.3 Leveraging Artificial Intelligence and Augmented Reality to Enhance Autopsy Workflows in Forensic Pathology

Maneesha Pandey MD[1,2], Mihir P Joshi[1,3]
[1]The Forensic Pathologists LLC, Holland, Ohio, USA. [2]Forensic Medical, Kansas City, Kansas, USA. [3]Dept of Biomedical Engineering, The Ohio State University, Columbus, Ohio, USA

As digital technologies emerge into medical disciplines, it is important to consider how these tools can be leveraged in forensic pathology. Recently, artificial intelligence (AI) has become increasingly ubiquitous in diagnostics, treatments, and clinical automation. Augmented reality (AR) has concurrently surfaced as a viable platform to enhance complex operating room procedures. Both AI and AR are being used to improve diagnosis, treatment procedures and develop seamless workflow for patient care and patient experience.

Currently, there is a significant amount of documentation associated with each autopsy, which can increase the time associated with signing out cases. Forensic pathologists routinely complete tasks like annotation, dictation, and formatting to ensure an autopsy report is accurately created. This repetitive and cumbersome process presents an opportunity to be automated using tools like AI and AR.

We propose a multimodal, AI-enabled system that will leverage a mixed reality headset (e.g., the Apple Vision Pro or Meta Quest 3) that will be worn by the forensic pathologist during an autopsy. There are two primary goals with the proposed system: 1) hands-free interaction with case documents and body diagrams during a procedure, and 2) automated autopsy report generation. Wearing the mixed reality headset enables the pathologist to leverage the on-device sensors (i.e., camera and microphone) to annotate diagrams with very low effort. End-to-end encryption of the captured data is implemented to ensure security.

For example, the pathologist can verbally describe the weight, texture and color of an organ. The system would interpret the natural spoken language and appropriately complete the corresponding sections on the body diagram. The benefit of wearing the headset is that the pathologist can see, in real-time, the annotations being made and easily move the document in and out of the field of view. Once the autopsy is complete, the AI algorithm will leverage its contextual understanding of the case and automatically generate a report.

The proposed system aims to make autopsies annotations more accurate, efficient and eventually improve turnaround time for signing out cases. Feasibility and limitations of this emerging technology system will be discussed as we bring forensic pathology to the forefront of augmented digital revolution.

9.4 Utilizing Image Viewer Software, Digital Asset Management Software, and File Share Services for Autopsy Photographs at the District 1 Medical Examiner's Office in Florida

Kelly Germaine Root BFA, Deanna Alicia Oleske MD
District 1 Medical Examiner's Office, Pensacola, FL, USA

Managing thousands of digital autopsy photos and creating a reliable backup strategy is paramount in today's medical examiner's office. Since our facility is not directly supported by local, county, or state digital network infrastructure, we had to design a system that addresses the needs of our office. This presentation illustrates how digital images are used, viewed, shared, and backed up in a medium sized medical examiner's office.

Digital images are utilized by medical examiner's offices in a multitude of ways. Autopsy photos are essential for medicolegal death investigation and accompany autopsy reports. They are used for training staff and for professional education purposes. Autopsy photos are also regularly made available to law enforcement agencies and the State's Attorney. Next of kin and private attorneys may also request autopsy photos, although these requests are less frequent than those from law enforcement.

The digital photo file system currently used at the District 1 Medical Examiner's Office, utilizes two data storage platforms: a network drive running digital asset management (DAM) software and a cloud-based file sharing service. Each platform has a separate use within the office.

DAM software is specifically designed for viewing and managing digital image files. It gives staff the ability to easily view many photos at once, organize photos by date and case number, and add keywords like type of injury, disease, and cause and manner of death. Simply select a customized keyword and the tagged photos appear. It's a practical tool for forensic pathology research and teaching purposes.

The cloud-based file sharing service we use functions as a shared drive for our staff. It also provides secure file sharing through custom user logins with controlled access to specific agency folders. This is how we fulfill photo requests from law enforcement and the State's Attorney. The photo files can be securely downloaded by outside agencies. This system limits the requestors that pick up photos in person from our office to next of kin and private attorneys.

Attendees will learn about various digital imaging software and how it applies to a medical examiner's office. This includes image viewer software, DAM software, and file sharing services.

9.5 Design and Implementation of a Proprietary Case Management System at the Palm Beach County Medical Examiner's Office

Catherine R Miller MD[1], Michael D Bell MD[1], Syed Gilani[2], William Zhang[2], Heron Ruiz[1], Richard Freiheit[3], Ralph Saccone[1], Benjamin Perez[2]
[1]Palm Beach County Medical Examiner's Office, West Palm Beach, FL, USA. [2]Palm Beach County Information Systems Services, West Palm Beach, FL, USA. [3]Broward County The Office of Medical Examiner and Trauma Services, Ft. Lauderdale, FL, USA

The need for a functional, easy-to-use, integrated Medical Examiner (ME) Case Management System is recognized nationwide. Many ME offices across the country use commercially available systems. While convenient, commercially available systems do not allow for complete customization, and may pose restrictions to the capabilities of the end-user. In 2015, the Palm Beach County FL Medical Examiner' Office and Information Systems Services embarked on a project to design and build an in-house, proprietary software for ME case management ("the App"). The App is web-enabled, is customized for the needs of the Palm Beach County Medical Examiner's Office, and allows extensive, in-depth metrics and records tracking. Metrics capabilities include tracking of organ donations, generation of heat maps, court time tracking, property and evidence management, records management, billing, and more. From conception to implementation, the process of App building spanned three years, and continues to be improved. Development centered around the needs of the office, reports generation for NAME and Palm Beach County standards, and end-user accessibility. The App developers also integrated toxicology results, digital imaging, and cremation permits into the App. This presentation details the design and construction of the App, including its capabilities, requirements for personnel, and cost analysis, and will provide guidance to offices who are interested in developing their own proprietary Case Management Systems.

10.1 It Is Time To Rethink How We Train Forensic Pathologists?

John C Walsh MD[1], Nicolas Kostelecky MD[2], Lorenzo Gitto MD[3], Theodore T Brown MD[4], Paul Uribe MD[5], Brandi McCleskey MD[6]
[1]USUHS, Bethesda, MD, USA. [2]Northwestern Memorial Hospital, Chicago, IL, USA. [3]Cook County Medical Examiner, Chicago, IL, USA. [4]Arkansas State Crime Laboratory, Little Rock, AR, USA. [5]Fort Bend County Medical Examiner Office, Rosenberg, TX, USA. [6]Heersink School of Medicine, University of Alabama, Birmingham, AL, USA

Forensic pathology (FP) was recognized as a subspecialty of pathology by the American Board of Pathology in 1959 on the condition that a forensic pathologist would first receive four years of basic training in general pathology prior to FP fellowship training. Matriculating through pathology residency like other pathologists has indeed helped establish credibility with medical/clinical colleagues. However, anatomic pathology (AP) has progressively diverged from forensic pathology (FP) and is arguably less relevant to the daily modern professional FP. This divergence has led to a decreased emphasis of FP curricula within the AP paradigm, to include a significant reduction in the autopsy experience from 50 to 30 cases, during a time when the FP profession continues to face a critical shortage of forensic pathologists. Over the last 24 years, multiple scientific working groups have examined medicolegal death investigation and FP training within the United States. Despite workforce and medicolegal death investigation system remediation efforts no recommendations have proposed changes to the FP training paradigm. It is estimated that there are approximately 790 actively practicing board-certified forensic pathologists within the United States and without significant changes to the FP training paradigm U.S. population and our communities will continue to be woefully underserved by forensic pathologists. It is critically important to begin a discussion on the need for alternative FP training education to recruit and sufficiently train forensic pathologists to remediate our workforce shortage to best serve our communities. We propose three alternatives to training future board-eligible forensic pathologists: 1. Physician cross-bridging program where physicians from other specialties are eligible to complete a FP fellowship program and become board-eligible in FP, 2. Combined 2-year AP + 2-year FP training program, removing less relevant AP and clinical pathology focus areas and increasing relevant FP training and 3. The creation of a dedicated forensic medicine residency program. The need to consider alternative training pathways is supported by mathematical models that demonstrate the urgent need to change the FP workforce trajectory, relevant experiences of international forensic medicine graduates and perspectives from current AP and FP program directors. These innovative strategies could provide improved education and training focused on the needs of modern FP practice (including accreditation) and increase the throughput for forensic pathologists so that communities are best served by board-eligible/board-certified forensic pathologists.

10.2 Patient Safety Beyond the Grave: Improving Accuracy in Death Certificates

Alexandra Medeiros MD, Joshua Fowler MD, Joseph White DO, Matthew Powell MD
Medical College of Georgia at Augusta University, Augusta, GA, USA

Death is an inevitable event that will occur in a hospital center. Therefore, the completion of a death certificate is an inevitable task that will be required of physicians. Despite this, we have noticed minimal formal training provided to clinicians on how to write them correctly or the implications as to why correctly filling out the forms is of the utmost importance. Death certificates become a part of a patient's permanent medical record and are used to track statistics of mortality locally and nationally. This ultimately aids public health funding to healthcare programs.

Our hospital's pathology department reviews death certificates of patient's who will be considered for an autopsy. Over the course of several months, it was revealed that extremely few death certificates that passed through our department were written correctly. Our goal was to track the inaccuracies of death certificates, educate clinicians on how to write them appropriately, and provide them with supplemental resources that can be referenced.

In 2022, 793 death certificates written at our institution were concurrently reviewed with their respective hospital courses. The certificates were evaluated based on accuracy of cause of death and the specialty of the physician who completed the death certificate. The only exclusion criteria for this study were coroner eligible patients. The accuracy of death certificates, before intervention, were 8% hospital wide, with the largest contributing specialty having an average of 7.8 % accuracy.

Our PDSA (Plan-Do-Study-Act) cycle started out with the goal of showing improvement within the largest cohort by at least 20%. Our intervention was a 30-minute instructional lecture on the following: the components of the death certificate, how to approach writing them, writing more advanced certificates in the setting of complex medical patients, and the impact of death certificates on public health. Our educational intervention showed substantial improvement in death certificate accuracy from 7.8% before intervention to 30.3% after intervention in the largest cohort.

Death certificate accuracy was a topic at our institution that was significantly overlooked. With the intervention as described above, our institution was able to increase the accuracy of these certificates by almost 300%. This

indicates that education is the first step in overcoming the inaccuracies seen in death certificate completion.

10.3 WITHDRAWN

10.4 Modernizing Medical Examiner Data Systems: The Power of FHIR

Gail L. Parker BS[1,2], Steven Clark PhD[3]
[1]DeKalb County Medical Examiner's Office, Decatur, Georgia, USA. [2]Forensic Medicine Associates, Inc., Decatur, Georgia, USA. [3]Occupational Research and Assessment, Inc., Big Rapids, MI, USA

The antiquated state of data collection practices remains one of the biggest impediments within the medical examiner and coroner (ME/C) systems nationally with regards to standardization and interoperability. Outdated workflows not only cost staff time but also divert limited budgetary funds towards maintaining legacy methodologies rather than pioneering new solutions. This presentation will showcase how strategic partnerships between ME/C offices and supporting federal agencies can catalyze the adoption of more modern data systems.

The DeKalb County Medical Examiner's Office (DCMEO) was recently awarded grant funds from the Centers for Disease Control Foundation (CDCF) to improve public health reporting efficiencies. This funding allowed the DCMEO to develop an Application Program Interface (API) utilizing the Fast Healthcare Interoperability Resources (FHIR) data standard between our case management system, MDI-Log, and two of Georgia's public health reporting systems, the Violent Death Reporting System (VDRS) and the State Unintentional Drug Overdose Reporting System (SUDORS). The DCMEO's success in developing an interoperable data exchange system highlights how ME/C offices can leverage outside funding opportunities to build integrated, automated systems that improve workflow, staff efficiency, and increase ME/C office participation in important federal programs.

For ME/C professionals, the DCMEO's journey serves as both technical and practical roadmap for navigating data modernization efforts. While the data landscape appears complex, and the establishment of “standard” terminology seems daunting, this presentation will demystify the process of procuring grant funds and partnering with vendors and organizations that share innovative values. Data standardization enables ME/C offices to harness the transformative potential of data collection and reporting. It propels our field into the future and enhances service to the public. By transitioning from outdated data systems to integrated, interoperable systems and standards, medicolegal agencies nationally may gain a more complete view of local issues to the state and national populations. These data-driven solutions will allow ME/C offices, state, and federal partners, to follow medicolegal statistics more accurately, reliability, and efficiently.

10.5 A Skeleton at Every Autopsy: The Professionalism of Forensic Anthropology

Melinda L Carter MD, PhD[1], Katharine C. Pope MA, D-ABMDI[2], Brian Spatola MA[3], Edward A. Reedy PhD, MD[4]
[1]Edward Via College of Osteopathic Medicine, Auburn, AL, USA. [2]Namus, RTI International, Salisbury, MD, USA. [3]National Museum of Health and Medicine, Silver Spring, MD, USA. [4]Alabama Department of Forensic Sciences, Montgomery, AL, USA

This presentation addresses significant variability in the handling of human skeletal remains throughout the United States mediocolegal death investigation systems. Practitioners of applied human osteology, guided by the American Association of Forensic Sciences (AAFS) and the American Board of Forensic Anthropology (ABFA), have made critical advancements in the professionalism of forensic anthropology (FA) through statistically mindful research and development of standardized best practices. These improvements, however, are slow to be adopted and implemented by Medical Examiner and Coroner Offices (ME/COs) across the country. This hampers employment for early-career forensic anthropologists and fails to utilize the unique skill set of human osteologists, who are also trained in death scene protocol and recovery methods. Over the past 20 years, progressive ME/COs, especially in large cities, moved to employ anthropologists full- or part-time as death investigators or hard tissue trauma specialists, especially beneficial to pediatric abuse cases. This presentation summarizes the nationwide modernization taking place in FA and how it will benefit forensic pathologists and medicolegal death investigators as well as enhance justice for deceased and unidentified individuals. Over the past 30 years, multidisciplinary research in anthropology, archaeology, dentistry, radiology, musculoskeletal medicine, trauma, bioengineering, geochemistry, and skeletal biology, to name a few, has clearly shown that the skeleton is a fully integrated, complex organ system central to human growth, health, pathology, and senescence, yet its value to autopsy pathology and other realms of medical practice is underappreciated. Attendees will learn about advancements in the profession of FA, such as trauma analysis, refined methods for estimating the biological profile, and stable isotopic bone chemistry, and how employing or contracting with forensic anthropologists in your state will lessen the burden of complex cases (e.g., scattered, fragmented, burned, commingled, or dismembered remains) and large caseloads and speed up identification of unknown decedents. With advancements in technology, such as genetic genealogy, the skills of forensic anthropologists will be vital to the re-examination of unidentified cases from past decades using improved, evidence-based methods of estimating age, ancestry, and sex. Our unique training will help find closure for families with missing loved ones and can potentially find answers to past deaths.

10.6 Forensic Pathology: its Public Role and the Media

Carl J Schmidt MD, MPH
University of Michigan, Ann Arbor, Michigan, USA

There are many reasons forensic pathology is “newsy,” but beneath the individual circumstances around a case, what we do is associated with loss of life, often in singularly tragic and unexpected circumstances. Largely because of this, the public perceives death investigators as different from other people. This leads to social and public expectations regarding death investigation, often amplified by the media, that are distorted and unrealistic. For example, in many states, death investigation systems are separate from law enforcement and don’t have access information the latter may gather. This also extends to social services. A person’s loss can result in a normal procedure being perceived as an error, and this is amplified by grief. Death investigators may end up in the middle of abnormal family dynamics. Some deaths are opportunities for monetization. Then there are those deaths accompanied by conspiracy theories. Many circumstances like these can be understood in terms that have more recently entered the forensic literature, such as cognitive bias. But there are deeper issues at play described in the literature of psychology, and which have direct relevance to day-to-day forensic work. For example, the availability heuristic describes a recent example, experience or information that may bias public opinion when the media reports adversely on forensic work. This can mislead thinking about an event A followed by an event B by conflicting with another event C. The anchoring effect, another form of cognitive bias, describes the common human tendency to rely too heavily on the first piece of information offered (the “anchor”) when making decisions. Cognitive bias is itself a two-way street: when a cause of death decision is said to reflective cognitive bias, the opposite may also be true: there is such a thing as public cognitive bias. This is a significant dynamic with the public that is not covered by training in forensic pathology. The impact of social media on forensic work is also not discussed in a useful way for the practitioner. How to deal with problems like these are a gap in forensic training that may affect the ability of the subspecialty to attract more candidates, probably because there is reluctance to talk about it. There is also no practical advice to manage this kind of problem when it happens. By mentioning specific examples, how these potential career-altering events may provide a path for managing them in the future.

10.7 Update on the Consortium of Forensic Science Organizations (CFSO)

James R Gill MD[1], Beth Lavach[2]
[1]OCME, Farmington, CT, USA. [2]ELS & Associates, Clifton, VA, USA

The Consortium of Forensic Science Organizations (CFSO) was established in 2001. The purpose of the CFSO is to have an organization that represents forensic science practitioners and would meet with Congressional policymakers to advocate for the Forensic Science/Medicine disciplines. The members of the CFSO include the American Academy of Forensic Sciences, the American Society of Crime Laboratory Directors, the International Association for Identification, the National Association of Medical Examiners, the International Association of Coroners-Medical Examiners, and the Society of Forensic Toxicologists and American Board of Forensic Toxicology. Beth Lavach began working for the CFSO in 2000, and continues to serve as the Director of Government Relations for the CFSO.

Representatives of the CFSO will provide an update to NAME on the status of current legislation and grant funding for various forensic programs. They also will seek input for future initiatives.

11.1 Difficult Situations with Attorneys and Their Management

Gerald T. Gowitt MD[1,2], Gail L. Parker BS[1,2], Patrick L Bailey BS[1]
[1]DeKalb County Medical Examiner's Office, Decatur, GA, USA. [2]Forensic Medicine Associates, Inc., Decatur, GA, USA

Encountering challenging and unexpected situations with attorneys is not uncommon for medical examiners. How these encounters are managed may significantly influence the outcome of testimony and the overall tone of the interaction with an attorney. In this presentation, we will share our experiences and provide strategies for effectively handling difficult attorneys. Attorneys often question the validity of testimony and may even accuse medical examiners of bias or selling their expertise. It is crucial for medical examiners to control the narrative, asserting their expertise in medicine and ensuring that attorneys do not possess superior knowledge on the subject matter. This presentation will emphasize the importance of maintaining consistency in testimony and offer insights on how to deal with potential contradictions. Additionally, we will discuss establishing a reputation of being congenial and relevant to both sides in criminal and civil cases. Pre-trial conferences with prosecutors and defense attorneys will be highlighted as a valuable opportunity to communicate the same information to both parties without revealing confidential details. Knowing the local government officials and seeking their support in challenging situations will also be explored. Throughout the presentation, we will stress the significance of professionalism, honesty, and preparedness. Expecting the worst-case scenario, having a sense of humor, and being aware of the objectives of cross-examination will also be addressed. Finally, we will emphasize the independence of medical examiners, highlighting that they represent the decedent and the pursuit of justice through scientific death investigation, rather than any particular stakeholder in the legal process. This abstract has been prepared based on our extensive experience in criminal and civil litigation as well as owning a private forensic pathology practice for nearly 40 years.

11.2 Health and Wellness: A Study Assessing Stress using Physiological and Self-reported Data Among Medicolegal Death Investigators

Kelly Keyes, Jennifer Rineer PhD
RTI International, RTP, NC, USA

Learning Overview: This presentation will provide attendees with a better understanding of the aspects of medicolegal death investigation (MDI) work that cause the most stress for the field and will reveal promising strategies for mitigating their impacts.

Medicolegal death investigators (MDIs) conduct investigations and certify the cause and manner of unnatural and unexplained deaths, providing crucial services and information to the public health and criminal legal communities. They also support communities and families during the most difficult of circumstances. As such, they experience high levels of stress. Yet, relatively little is known about which aspects of work cause the most stress, their impacts, and the kinds of resources needed to address it. RTI International partnered with the American Board of Medicolegal Death Investigators (ABMDI) to conduct a research study to address this gap.

Our study involved 55 MDIs providing daily self-report measures and biometric data on work activities, sleep, and stress indicators over a 6-week period, allowing the team to learn more about the types of activities that trigger stress. The team also tested the effectiveness of MDI Align, a mindfulness and wellness app developed through this project that is tailored to the needs of MDIs. Through the daily surveys in MDI Align, participants were asked to report issues and events experienced on each work day. Of the 661 days reported as having a work shift, participants identified stressors every day. The most frequently reported daily issue was fatigue, which was indicated on 56% of recorded surveys. This was followed by working alone (32.5%) and excessive administrative duties (32.4%). Over the study duration, participants reported that their sleep over the past 24 hours was of poor quality about one quarter of the time. Participation in the study led to a significant reduction in self-reported sleep problems and depression, and a significant increase in self-reported coping self-efficacy. Participants also demonstrated a significant decrease in physiological stress, as measured by heart rate variability, compared to the baseline measurement.

11.3 Challenges To Recruitment And Retention Of Black Forensic Pathologists

Ken Obenson MD[1], Nicole R Jackson MD, MPH[2], Herbert Mushumba MBChB, Mmed, Dr. med.[3], Roger Mitchell MD[4], Alfredo Eugene Walker MBBS[5], Joye Maureen Carter MD, PhD[6]
[1]Dalhousie University, Saint John, New Brunswick, Canada. [2]University Of Washington, Seattle, Washington, USA. [3]Institute of Legal Medicine, University Medical Centre, Hamburg-Eppendorf, Germany. [4]Howard University, Washington, District of Columbia, USA. [5]University Of Ottawa, Ottawa, Ontario, Canada. [6]J and M Forensic Consulting, Wake Forest, North Carolina, USA

Introduction: As of 2021, informal estimates place the number of practicing Black forensic pathologists (BFPs) in the US at between 35 and 45, which is less than 10% the estimated nationwide total of 600. A 2012 study recommends that 1000 forensic pathologists are required to fulfil the workforce needs of the US population. As a representative percentage of the population, 130 should be Black. However, for BFPs, the legacies of medical and institutional racism in the US have caused particular challenges to training and career development that their White peers do not have to contend with.

Methods: A survey developed on SurveyMonkey in English was distributed through social media networks and by direct email to known BFPs. Their responses to questions about the challenges they faced in training and then as qualified specialists and the factors that eased or facilitated their progress were collected and analyzed.

Results: There were 21 total responses of which 71% (n=15) were deemed complete; 9 were from individuals who identified as male. Respondents ranged from 30 to 59 years in age. Ten were board certified in forensic pathology. Over 70% practiced in urban areas. A similar percentage had been exposed to forensic pathology in medical school.

BFPs report challenges to recruitment and retention similar to those faced by Black peers in other medical specialties. While growing up in a two-parent household, having at least one parent with post graduate education, personal determination and the support of family and friends were essential ingredients to success, the biggest barriers were hostile and unsupportive work environments or hostile bosses. Other factors included financial stress and racial stereotyping in school and the workplace. Lack of mentorship was reported as a barrier and almost 45% would have

changed their mentors. Several cited mental stress derived from working in jurisdictions with an overrepresentation of Black homicide victims. Eighty percent experienced changes in behavior, mood and/or concentration in the wake of the publicized deaths of Black Americans in 2020. Of greatest concern is that only 20% would select forensic pathology as a career, given their experiences.

Discussion: Personal determination and a domestic environment conducive to pursuing a career in medicine are essential ingredients to career entry and success as a BFP. Nevertheless, there are structural barriers that must be eliminated in order to increase the total number of BFPs. The pipeline that produces BFPs must be nurtured and redesigned.

11.4 Expanding the Diversity, Equity, and Inclusion Conversation: Immigrants in Healthcare

Marisa Jacob-Leonce MD[1], Melanie Jacob MA[2]
[1]Univeristy of Rochester Medical Center, Rochester, New York, USA. [2]Melanie Jacob Consulting, Paris, France

International Medical Graduates make up roughly one-quarter of the U.S. physician work force. In fact, the field of pathology is viewed as an immigrant-friendly specialty. However, it is unclear whether forensic pathology is viewed in the same way.

Although many International Medical Graduates (IMGs) are able to successfully navigate The National Resident Matching Program (NRMP), Non-United States International Medical Graduates (Non-US IMGs) are confronted with several immigrant-specific issues (such as complex visa policies) while fulfilling training requirements and entering the work force. Many also report a lack of career advancement and support, especially as it relates to mentorship, being and feeling undervalued, microagressions, as well as racial, social and cultural discrimination in the workplace. Undoubtedly, having a greater representation of Non-US IMGs in Forensic Pathology will benefit US death investigation systems given that the US population is becoming more diverse. This means that there is a growing need for our Medical Examiners Offices and Coroners Offices to better reflect the societies they serve.

As a result, measures should be put in place to make Forensic Pathology more desirable to Non-US IMGs and foster a supportive and inclusive work environment.

11.5 The Epidemic of Dying While Crossing the Border, Undocumented Migrant Deaths in New Mexico: Historical Trends and Unusual Case Presentations

Daniel F Gallego M.D.[1], Emily D Helmrich D.O.[1], Jasmine Hernandez Ph.D. candidate[1], Maria E Zuluaga-Ruiz M.D.[2], Garon Bodor M.S.[1], Heather Edgar Ph.D.[1], Heather S Jarrell M.D.[1]
[1]Office of the Medical Investigator, Albuquerque, NM, USA. [2]Universidad del Valle, Cali, Valle del Cauca, Colombia

In 2023, estimated unauthorized crossings surpassed two million, with December reporting nearly 250,000 encounters, a record high. The southern New Mexico border extends 180 miles with Mexico, constituting 9% of the US-Mexico border.

Forensic pathology data on unauthorized border crossers is limited due to challenges in defining such deaths accurately and conducting epidemiologic surveillance. Previous data from 2002-2003 covered deaths at the Arizona, New Mexico, and Texas borders, totaling 409 deaths, with only 2.5 to 2.7 percent occurring in New Mexico.

A retrospective review of undocumented migrant deaths in New Mexico from 2009 to 2023 found 259 cases. Of these, 116 occurred in 2023, marking a 231% increase from 2021 and a 90% increase from 2022. Males accounted for 44%, females for 45%, and 9% were of unknown sex. Ages ranged from 10 to 73 years, with an average of 31. Deaths peaked in July (27%), followed by June (20%), and August (14%). The leading causes were undetermined (20%) and hyperthermia/dehydration (20%). 83% of decedents were identified. Accidents accounted for 51% of deaths, undetermined causes for 42%, and natural causes for 1%.

Cases of forensic interest:

CASE 1: A 32-year-old male found deceased near the border wall with evidence of blunt head trauma from a fall. Such cases are increasingly reported in medical literature.
CASE 2: A 28-year-old female found dead in the desert with foot fractures detected by postmortem computed tomography scan consistent with a fall from significant height.
CASE 3: A 29-year-old female collapsed while crossing the border, with microscopy and postmortem hemoglobin electrophoresis supporting sickle cell trait.
CASE 4: A 27-year-old female bitten by a snake near the US border, left by her group and found unresponsive.
CASE 5: An 18-year-old male collapsed shortly after being left at the border by his father. Autopsy revealed cardiomegaly and myocardial abnormalities due to a pathogenic *MYL2* mutation.
CASE 6: A 10-year-old crossing the border with family died from hyperthermia exacerbated by steatohepatitis, indicated by hepatomegaly, acute inflammation, and electrolyte abnormalities.

In conclusion, last year saw over a hundred deaths during unauthorized crossings of the US/New Mexico border, a route historically less traversed. The majority occurred in summer, primarily due to hyperthermia from heat exposure or undetermined causes. These deaths highlight preventable risks faced by border crossers. Enhanced documentation and understanding of demographics and circumstances surrounding these deaths could inform targeted public health initiatives for this vulnerable population.

12.1 Opioid Deaths: to Autopsy or not to Autopsy?

Linda E Iles MBBS FRCPA[1,2], Melanie S Archer MBBS FRCPA[1,2], Michael P Burke MBBS FRCPA[1,2], Chong Zhou MBBS FRPCA[1], Jennifer Schumann PhD[2]
[1]Victorian Institute of Forensic Medicine, Southbank, VIC, Australia. [2]Department of Forensic Medicine, Monash University, Melbourne, VIC, Australia

Integration of circumstantial data, external examination, PMCT and rapid toxicology testing in medicolegal death investigation decision making.

Introduction: The NAME forensic autopsy performance standards dictate that an autopsy must be performed in all suspected drug intoxication deaths. This is not the practice in our institution where the combination of scene and circumstantial data, medical history, external examination, PMCT and MRM LC/MS-MS rapid toxicological testing are used as a triage tool to determine whether autopsy is required for cause of death determination. We performed a retrospective analysis of historical cases to determine the reliability of this approach.

Methods: We undertook a blinded retrospective analysis of 100 sequential historical cases in which morphine was present in blood on rapid toxicology testing, and circumstances raised the possibility of death due to opioid intoxication. Vignettes were created for each case incorporating the police report, external examination findings and results of MRM LC/MS-MS rapid toxicology testing. Three pathologists of varying post-fellowship experience interrogated each vignette along with the corresponding full body PMCT, and then indicated whether they would be willing to proceed to attributing death primarily to opioid intoxication without autopsy. If recommending autopsy, they were asked to briefly provide reasoning. The recommendations of each pathologist were then compared with the full autopsy report.

Results**:** Out of 100 cases, 7% were determined to be non-opioid deaths. A further 20% were determined to be primarily due to opioid intoxication, with a possible contribution of underlying natural disease. Autopsy

recommendation rate was between 21- 45%. The triage process correctly identified the main COD in 97-100% of cases and identified the main COD *and* natural disease that could be considered a possible contributing factor death in 86-93% of cases.

Discussion: Pre-test probability of opioid related death in this cohort was very high. The case triage process in a reliable predictor of COD due to opioid intoxication. It is possible to avoid autopsy in some drug deaths without compromising COD accuracy.

Future: Synthetic opioids have not penetrated the illicit drug market in Australia as they have in North America. If or when this occurs, our MRM LC/MS-MS rapid toxicology testing regime can identify commonly observed illicit fentanyl derivates.

12.2 Differentiating Emergent Care Ketamine From Illicit Abuse in Postmortem Cases

George S. Behonick PhD[1], Catherine R. Miller MD[2], Natalia Belova MD[2], Laureen J. Marinetti PhD[1]
[1]Axis Forensic Toxicology, Indianapolis, IN, USA. [2]Palm Beach County Medical Examiner's Office, West Palm Beach, FL, USA

In the 1990s and 2000s resurgent interest in ketamine pharmacotherapy in emergency treatment resulted in its adoption in prehospital and emergency department (ED) settings as a sedative and analgesic agent. As a dissociative anesthetic, ketamine creates subjective disconnection between mind and body ("the K-hole"), whereas other agents promote loss of consciousness. A sinister emerging ketamine trend is the 349 percent increase in confiscations of illicit ketamine by drug enforcement throughout the US from 2017 through 2022. Co-existing possibilities to ketamine origin in postmortem toxicology complicate medicolegal death investigations.
The learning objective of this presentation is to compare postmortem toxicology findings in cases with the detection of ketamine, and its metabolite norketamine, when the drug is administered in the ED, or by paramedic/emergency medical services (EMS) personnel, versus when the drug is used illicitly or abused. Postmortem blood and antemortem blood/serum concentrations of ketamine and norketamine are reported for both emergent and illicit groups. The followup investigative protocols conducted by the District 15 Medical Examiner (ME), in Palm Beach, FL for distinguishing cases with probable illicit ketamine use versus emergent medical care use are described. In addition, other drugs detected in cases of suspected abuse of ketamine will be catalogued.

The District 15 ME conducted a retrospective review of death investigation records between June 2020 and March 2023 which entailed the detection of ketamine in decedents in which it, and other drugs, was marked as CAUSE. Likewise, Axis Forensic Toxicology identified all of submitted toxicology cases from the District 15 ME for that same period in time which included detection of ketamine. The District 15 ME characterized eight cases as being deemed the result of illicit ketamine use by a decedent; independent to these eight cases, the laboratory identified 36 detections of ketamine in postmortem blood or antemortem hospital specimens categorized as medical or emergent use. Of the eight illicit cases, a mean and median ketamine postmortem blood concentration of 304.9 nanograms per milliter (ng/mL) and 125.5 ng/mL was observed, respectively. In contrast, the mean and median postmortem blood concentration for the emergent medical use group was 1804.3 ng/mL and 770 ng/mL, respectively.

Heightened awareness by MEs with respect to possible sources of ketamine in postmortem toxicology testing is both prudent and warranted.

12.3 Expanding Overdose Death Investigations: Multidisciplinary Overdose Fatality Reviews

Margaret Moore MA
NYC Office of Chief Medical Examiner, New York, NY, USA

New York City has seen unprecedented increases in the number of overdose deaths taking place in the city over the past decade. Since 2015, overdose deaths in NYC have more than tripled from 942 to 3,026 deaths in 2022. In response, OCME has developed a multifaceted approach to combatting this epidemic and preventing future deaths. One of the key strategies involved in this approach is a multidisciplinary Overdose Fatality Review (OFR), which OCME has been hosting quarterly since June 2021. The goal of Overdose Fatality Reviews is to save lives through a root cause analysis of overdose deaths by identifying critical gaps, touch points and missed opportunities for intervention. The Office of Chief Medical Examiner is uniquely positioned to lead Overdose Fatality Reviews as we are responsible for fully investigating all drug-related deaths; have exclusive access to the most data available regarding the lives and circumstances of overdose decedents; and have independent responsibilities to both public health and public safety.

Since 2021, OCME has hosted ten overdose case review meetings and nine follow up action meetings with participation from over 50 different local, state and federal organizations across law enforcement, social service, health and other disciplines. During these review meetings, participants discuss records and insights from the OCME death investigation process, criminal justice, health system, and social service partner agencies, and from in-depth interviews conducted by OCME social workers with the next of kin of the decedent. The goal of this in-depth review is to identify missed opportunities for prevention and intervention opportunities and develop actionable program and policy recommendations that can be implemented to prevent future overdose deaths.

In this session, we will discuss the role of Medical Examiners in overdose fatality reviews and present lessons learned and recommendations for other Medical Examiners Offices interested in participating in an interdisciplinary overdose fatality review. We will also highlight the unique benefits that convening or participating in these reviews can bring to Medical Examiners Offices.

12.4 A Data Analysis of Intraoffice Variability of Death Certifications in Child Fatalities with Illicit Drugs Identified within the Georgia Bureau of Investigation Medical Examiner's Office: 2018-2022

Vanessa Schmidt BA, MS, Stephanie Marino BS, Lora Darrisaw MD, Michelle DiMarco MD
Georgia Bureau of Investigation, Decatur, Georgia, USA

A death certificate is a legal document that provides cause and manner of death. The cause and manner of death are medical opinions that reflect a conclusion based on evidence collected at the time of death, investigative information, and/ or findings at the time of a postmortem examination. For a death to be certified, cause of death, manner of death, and other significant conditions contributing to the death (if applicable) must be determined. This presentation aims to examine child fatalities, specifically within the age range of zero to five years, in which illicit drugs were identified in postmortem toxicology analysis. We aim to evaluate how circumstances and risk factors associated with the deaths contribute to finalizing death certifications. The risk factors include drug administration, such as maternal use of illicit drugs while pregnant, self-ingestion by child, and use of illicit drugs by parents or guardians in a residence or public setting. A five-year retrospective analysis from 2018-2022 examined child fatality death certifications with illicit drugs indicated as causative or contributory to death by at least 10 medical examiners employed by the Georgia Bureau of Investigation (GBI) will be performed. This study will highlight the investigative scene information; demographic information including race, gender, and age; cause of death; manner of death; and the presence of illicit substances including but not limited to methamphetamine, cocaine, heroin, and fentanyl. The study will include a comparative analysis of child deaths and illicit drug identification pre- and post- COVID-19. Trends found

within this analysis will highlight the toxicological fatalities among children due to illicit drug exposure. Additionally, these trends have the potential to assist in determining death certifications that are made by a case-by-case basis. The data cultivated is analyzed to help raise awareness for child illicit drug related fatalities and highlight the inherent difficulties of death certification in these complicated cases.

12.5 The Opioid Crisis: Evaluating the Role of Autopsy in the Certification of Suspected Overdose Deaths

Nicole D'Anna MS, Megan Brown MPH, Alex K. Williamson, Jason K. Graham, Dr. Peter T. Lin
New York City Office of Chief Medical Examiner, New York, NY, USA

The NYC OCME Drug Intelligence and Intervention Group (DIIG) developed the Suspected Potential Overdose Tracker (SPOT) to identify and track suspected overdose deaths. Criteria for initial inclusion in SPOT are purposefully broad in order to capture as many overdoses as possible. Once selected, detailed case information including scene investigative data, medical history, and mental health history are extracted from the investigation report and entered into a searchable SAS 9.4 dataset. Each case in SPOT is assigned an overdose likelihood ranking based on the presence of predictive indicators such as a history of substance use, known recent use of substance, and presence of drug paraphernalia or drug residue (cut straw, glass pipe, glassine bag, white powder, etc.). SPOT scores range from 0-3, with 0 being the most likely to be an overdose (e.g. confirmed by antemortem testing) and 3 the least likely (e.g. remote history of substance use). Final toxicology results and cause and manner of death are incorporated into the SPOT database when available. Positive predictive values are then calculated for each SPOT likelihood ranking. For 2022, SPOT likelihood scores have shown a positive predictive value of 100%, 94%, 89% and 70% for scores of 0, 1, 2, and 3 respectively.

The ongoing opioid epidemic continues to increase the case workloads of most medical examiner offices with some offices nearly overwhelmed. NAME Forensic Autopsy Performance Standards currently require that an autopsy be performed in suspected drug overdose deaths. External examination with blood draw for toxicology testing (View-Tox) has been proposed as an alternative to autopsy in suspected overdose deaths.

In this study, we leverage SPOT data to make an evidence-based assessment of the role of autopsy and the possible utility of View-Tox in suspected overdose deaths. Specifically, using positive predictive values derived from the SPOT database, in conjunction with manual case review of false positive cases, we attempt to identify subsets of suspected overdose deaths where autopsy is least likely to provide information relevant to the cause and manner of death.

12.6 Imagine a World with No More Exhumations for Toxicology Sample Collection

Laura M. Labay PhD[1,2], Devin W. Kress M.S.[2], Barry K. Logan PhD[1,2]
[1]NMS Labs, Horsham, PA, USA. [2]CFSRE, Horsham, PA, USA

Diagnosis through dried blood spot (DBS) testing was first implemented on a large-scale basis for neonatal screening of phenylketonuria in the 1960s. Today, WHO recommends DBS for HIV and hepatitis B and C infection diagnosis, and DBS collected from athletes are sent to WADA and analyzed for prohibited substances. Our hypothesis is that DBS is a valid alternative to exhuming a body for the purpose of collecting toxicology samples.

Experimental work involved spotting 250 mcL of blood from twenty postmortem cases and quality controls onto Whatman cards. After drying, the blood spots were punched out, covered with methanol, and vortexed. The methanolic extracts were transferred to test tubes, dried down and reconstituted with PBS. The DBS samples then underwent the same multi-step extraction procedure with their companion whole blood samples (WBS) prior to testing on a Sciex X500R QTOF system and evaluation with Peak View software. For an analyte to be positive, all routine acceptance criteria had to be satisfied.

Analytes that matched 100% between the paired DBS and WBS cases included 7-amino-clonazepam, BZE, cocaine, citalopram, clonidine, codeine, cyclobenzaprine, diazepam, diphenhydramine, EDDP, fentanyl, guaifenesin, hydromorphone, hydroxybupropion, lidocaine metabolite, MDMA, methadone, methocarbamol, metoclopramide, naloxone, nordiazepam, norfentanyl, norcodeine, noroxycodone, noscapine, oxycodone, noroxycodone, paroxetine, PCP, phentermine, risperidone, sertraline, sildenafil, and temazepam. Other analytes that were identified in both DBS and WBS cases but not with 100% agreement were acetaminophen (89%), alprazolam (50%), caffeine (95%), carbamazepine (66%), cocaethylene (83%), and xylazine (83%). Analytes only identified in one sample type were: DBS - carbamazepine (1) and gabapentin (2) and WBS - 4-ANPP (1), clonazepam (1), cotinine (2), dicyclomine (1), hydroxyzine (1), n-propionyl norfentanyl (1), olanzapine (1), levetiracetam (1), lidocaine (1), methamphetamine (1), norcocaine (1), and trazodone (2). One observation was that several analytes that did not match had responses around the cut-off area response of 800.

Future work involves identifying which DNA cards are amenable to holding larger volumes to increase sensitivity for low concentration analytes, determining if DBS is useful for the detection of poisons such as ethylene glycol, anticoagulants, and heavy metals, and if quantitative testing is possible.

This work supports the use of DBS as an alternative matrix that can be used for screening purposes, that DBS collection should be performed in all cases, and DBS testing deserves due consideration before exhumation to obtain toxicology samples and allows for a less complex interpretation as compared to embalmed (exhumed or stock jar) samples.

12.7 Cases Closed and Backlogs Cleared: Novel Scientific Comparisons using Advanced DNA and FGG to Resolve Unidentified Remains Casework

Andrew Singer MSc Biotechnology, MBA
Othram Inc., The Woodlands, TX, USA

Forensic Genetic Genealogy (FGG) has emerged as a powerful tool to resolve unidentified remains cases. FGG has led to the identification of hundreds of individuals and has been utilized to clear backlogs of unidentified human remains (UHR) cases, but it hasn't been until recently that SNP DNA profiles have been able to help Medical Examiners close cases through advanced forensic reporting. Novel technology now allows direct comparisons between unknown remains and a presumed relative to enable MEs to apply science to close cases.

This presentation will focus on the use of ultra-sensitive SNP profiles to advance resolve cases, demonstrated through actual case examples, including early reporting of biogeographical ancestry and biological sex. This includes the ability to pinpoint biogeographical ancestry, addressing historical investigative information, and demonstrating how properly applying advanced DNA testing enables case resolution when compared to legacy testing.

Additionally, the presentation will address the fact that in order for FGG technology to be a regular part of investigations for Medical Examiners, the industry should work together to both understand and ultimately standardize how these are resolved through forensic reporting. Novel DNA technology can allow direct, pair-wise comparison between unknown remains and presumed relatives can be evaluated as definitive forensic analysis. This comparison and forensic reporting can be issued to investigators to close the case. This talk will discuss the technology behind this reporting and demonstrate how it is applied in actual casework.

Throughout the presentation, background on the use of FGG technology will be introduced, but the primary focus will be the application of the science behind the technology to provide critical information to Medical Examiner's to resolve cases. This presentation will provide technical training on advanced DNA testing, delve into new applications of technology available to resolve cases, and demonstrate how these have

been applied to actual casework leading to identifications and closing of cases through case studies.

P1 Case Report: Accelerated Oxidation of a Copper-Coated Jacket due to the Metabolic Processes of Anaerobic Gastrointestinal Flora

Griffin C Phenegar BS[1], Jamie E Kallan MD[2]
[1]University of Wisconsin Hospitals and Clinics, Madison, WI, USA. [2]University of Wisconsin School of Medicine and Public Health, Madison, WI, USA

In order for lead projectile cores to better withstand the high pressure and temperature produced by a firearm during discharge, they are often covered by a jacket composed of a harder metal such as copper alloy. Copper can undergo oxidation, which is a chemical reaction involving the transfer of electrons in the presence of oxygen that typically occurs slowly over time. This can be seen as a color change from orange to green, blue, or black. During a forensic autopsy, recovery of a retained projectile that has undergone oxidation may indicate a remote gunshot wound and helps to differentiate it from projectiles involved in a more recent shooting. Here, we present a homicide due to multiple gunshot wounds. Interestingly, although all four of the projectiles recovered during autopsy were discharged in rapid succession from the same firearm, one of the jacketed projectiles (recovered after having passed through the colon) had undergone seemingly rapid oxidation. We propose that the mechanism of this accelerated oxidation of the copper coated jacket is due to the metabolic processes of anaerobic gastrointestinal flora from within the colon.

P2 Dye Fading in Cotton Fabrics to Determine Time Since Death in Forensic Context

Alexa Geist
Kansas City University, Kansas City, MO, USA

The determination of time since death is an important variable in forensic casework. Current methods to determine time since death rely on characteristics of the body. However, these characteristics are often highly variable due to factors such as the health, age, sex, and cause of death of the individual. The items found on remains, such as clothing, are often manufactured to known standards and therefore may be less variable. Clothing would then aid in determining time since death in these cases. This study aims to use dye fading in textiles as a measure of time independent of the body. In this study, red, white, and blue cotton t-shirts were placed outdoors for 12 weeks, and samples were taken weekly from the front and back of the shirt, where the back of the shirt was in direct contact with the soil. These samples were then analyzed for wavelength at maximum reflectance using UV-Visible Spectrometry. This wavelength signifies the true color of the fabric. From this study, we observed the front of the t-shirts fading more rapidly, allowing the creation of a ratio between front and back samples. With these results, we will determine a correlation of fading with respect to time to establish time since death when human remains are found.

P3 An Unusual Case of Bone Remodeling Resulting in Grooves on the Calvaria from Deep Brain Stimulator Wires

Davina N Dobbins MBA, MPH[1], Jennifer Vollner PhD[2,3], Jennifer Gardetto Chen MD[1,2]
[1]Department of Pathology, University of Arizona College of Medicine, Tucson, Arizona, USA. [2]Pima County Office of the Medical Examiner, Tucson, Arizona, USA. [3]School of Anthropology, University of Arizona College of Social and Behavioral Sciences, Tucson, Arizona, USA

Bone remodeling resulting in grooves created by consistent pressure on the skull has been reported in a case of Rubber Band Syndrome. Here, we report a case of bone remodeling resulting in grooves on the calvaria associated with wires of a deep brain stimulator. The decedent was a 47-year-old male found deceased at the edge of a parking lot in a climate where average high temperatures were above 100 degrees Fahrenheit. Past medical history was significant for Parkinson disease (PD) status post bilateral globus pallidus interna (GPi) deep brain stimulator (DBS) implanted two years prior to his death. External examination demonstrated findings consistent with a heat-exposure death including early to moderate decomposition, skin slippage, areas of dry and mummified skin, and dry lips. There was a linear scar at the upper left chest with an implanted device palpable deep to the scar. The head appeared normocephalic. Internal examination revealed two wires arising from the implanted stimulator in the left chest that coursed through the left neck and left temporoparietal subscalpular tissues and attached to circular devices implanted on the parietal calvaria. There was grooving of the calvaria corresponding to the pattern of the wires within the connective tissue of the scalp, forming an interweaving, curved, and circular pattern. Removal of the skull cap demonstrated bilateral probes penetrating the cerebral hemispheres through the dura. The brain weighed 1700 grams. Sectioning of the cerebral hemispheres revealed softened parenchyma along the probe tracts and otherwise unremarkable brain. A deep brain stimulator works by sending mild electrical pulses through the wires or leads to specific regions of the brain to help alleviate motor symptoms of PD. To our knowledge, this is the first reported case of grooving in the skull created by implanted medical equipment with a known exposure time of two years. The grooving into the bone is similar to that reported in Rubber Band Syndrome, but the only external pressure in our case is the scalp. It is possible the recurring electrical pulses play a role in the bone remodeling or grooving phenomenon seen here. The cause of death in this case was certified as hyperthermia due to environmental heat exposure with Parkinson disease as a significant contributing condition. This case raises awareness that while it was perhaps noncontributory to the cause of death, bone remodeling of the skull due to DBS wires could have potential implications in living patients.

P4 Reviewing the Progression of Xylazine-Related Deaths in the State of Georgia: an Interoffice Collaboration

Harry Burnett BS[1], Rachel Geller MD[2], Karen Sullivan MD, MS[3], Ashley Garrish BS[2], George Behonick PhD[4]
[1]Georgia Institute of Technology, Atlanta, Georgia, USA. [2]Georgia Bureau of Investigation, Division of Forensic Science, Decatur, Georgia, USA. [3]Fulton County Medical Examiner's Office, Atlanta, Georgia, USA. [4]Axis Forensic Technology, Indianapolis, Indiana, USA

Introduction: Xylazine is a veterinary sedative commonly adulterated with illicitly-manufactured drugs. Although not an opioid, xylazine bears a strong affinity to μ-opioid receptors, yet opioid antagonist antidotes such as naloxone are unable to displace the drug. For this reason, xylazine-adulteration risks rendering emergency intervention techniques less effective in suspected opioid overdoses. Illicit usage of xylazine has progressed exponentially in the United States since 2006, with a majority of epicenters being in the Northeastern region of the country. This review analyzes the progression of xylazine-related deaths throughout much of the state of Georgia (153 of 159 counties) in hopes of understanding the drug's migration and adulteration patterns.

Methods: Data were obtained via toxicological autopsy reports provided by the Fulton County Medical Examiner's Office and the Georgia Bureau of Investigation. A total of 3,457 cases listed as accidents due to drug overdose were reported by these agencies between January 2022 and February 2024 in the state of Georgia. Cases reporting xylazine in the cause of death were identified along with key demographic data, including age, race, sex, and date of death.

Results: There were 404 cases reporting xylazine as an associated drug in the cause of death, with xylazine being identified alongside fentanyl (402, 99.5%), amphetamines (193, 47.7%), cocaine (71, 17.6%), heroin (36, 8.9%), mitragynine (27, 6.9%), oxycodone (17, 4.2%), morphine (16, 4%), hydrocodone (8, 2%), buprenorphine (7, 1.7%), methadone (5, 1.2%), and benzodiazepines (2, 0.5%). The review identified 72 cases (18%) attributed exclusively to xylazine-adulterated fentanyl (and/or fentalogs) and identified fentanyl (and/or fentalogs) as the sole toxicological agent in 355 of the 3,457 cases (10.3%). Only two cases were identified in which xylazine was not reported alongside fentanyl: methamphetamine and protonitazene,

respectively. Xylazine was never reported as the sole toxicological agent involved in a case. The average age of decedents was 40.2 years old and the majority of decedents were White males (215, 53%).

Discussion: Xylazine is primarily used as an adulterant in illicitly manufactured fentanyl due to its low cost and its potent effects that heightens the user's euphoric experience. Current available reports detailing nationwide data indicates xylazine most frequently contaminates fentanyl, which this review's data supports. Familiarization of xylazine-adulteration trends is a crucial step in understanding the migration patterns of the drug and improving preventative methods and treatment.

P5 Toxemia of Pregnancy Masking as an Assault

Kaylee D Fox OMS-IV[1], Dr. Lauren Havrilla D.O.[2]
[1]Lincoln Memorial University Debusk College of Osteopathic Medicine, Harrogate, TN, USA. [2]Knox County Forensic Center, Knoxville, TN, USA

After attending this presentation, attendees will have a greater insight into the importance of comprehensive medicolegal death investigation and autopsy examination of pregnant women. Topics and information exhibited in this presentation will impact the forensic community by demonstrating the importance of merging scene findings from death investigators and law enforcement with autopsy findings, toxicology findings, and medical history review performed by the forensic pathologist, specifically in cases involving pregnant women. This integration is key to determining an accurate cause and manner of death, most importantly when foul play is suspected. Furthermore, this report serves as an example of the continued education needed in the urgent care setting regarding hypertensive disorders of pregnancy.

Hypertensive disorders of pregnancy exist as a spectrum from pre-existing chronic hypertension to gestational hypertension to pre-eclampsia (toxemia of pregnancy) to eclampsia. Excluding chronic hypertension, these disorders typically occur after 20 weeks of gestation. This spectrum of disorders represents the leading cause of maternal morbidity and mortality within the United States. These disorders have the potential to lead to other complications including preterm labor, placental abruption, and HELLP syndrome (hemolysis, elevated liver enzymes, and low platelets), among others. While patients with these disorders are typically monitored closely by an obstetrical clinician, and a death occurring in the hospital may not meet medical examiner jurisdiction, cases may arise needing further investigation by the medical examiner/coroner.

Herein we describe a case of a 39-year-old pregnant woman, with essentially no prenatal care, who died suddenly and unexpectedly after complaints of generalized pain and a headache the day prior to death. Given the history obtained by investigators and the external appearance of the decedent, including abdominal bruising in different stages of healing, law enforcement had a high suspicion of foul play. A thorough postmortem examination and toxicology testing were crucial in determining the most accurate cause and manner of death in this case.

P6 Fatal Hyperosmolar Dehydration in a 7-Month-Old with a History of Hairdryer-Related Thermal Burns

Larissa M. Ybanez BA, BS[1], John W. Powell MD[2], Melissa M. Blessing DO[3,4], Darshan R. Phatak MD[2], Marianne E. Beynon MD[2]
[1]University of the Incarnate Word School of Osteopathic Medicine, San Antonio, TX, USA. [2]Harris County Institute of Forensic Sciences, Houston, TX, USA. [3]Texas Children's Hospital, Anatomic Pathology, Houston, TX, USA. [4]Baylor College of Medicine, Pathology and Immunology, Houston, TX, USA

Pediatric thermal injuries create the need for medical professionals to distinguish accidental from non-accidental injury. Few cases of hair-dryer related burns are represented in the literature. Furthermore, cases of death following feedings with concentrated formula are also ill-represented. We present a case of fatal hyperosmolar dehydration in an infant with a history of extensive hairdryer-induced thermal burns, which resulted in placement of a feeding tube.

The decedent was a 7-month-old male, born via caesarean delivery at 34 weeks gestation. At two months of age, the infant was left in the care of his teenage sibling, who used a hairdryer to blow hot air to warm the infant, which resulted in 35% TBSA partial thickness burns. The infant underwent skin grafting, left leg fasciotomies, left ankle disarticulation, and left below-the-knee amputation, and subsequently had a percutaneous endogastric tube placed due to difficulty feeding.

The morning of the infant's death, the mother reportedly attempted oral feeding without success. She consulted the local children's hospital, who instructed her to push concentrated formula through the feeding tube. After pushing the formula, the mother reported black material exuding from the tube prior to the infant becoming unresponsive. The infant was transported to the hospital, and death was pronounced shortly thereafter.

At autopsy, external examination revealed a small-for-age infant with extensive cutaneous scarring and evidence of skin grafting on the anterior, posterior, and left torso, left arm, and bilateral legs. The left below-the-knee amputation site had a well-healed skin flap. The percutaneous endogastric tube showed evidence of focal hemorrhage. Internal and microscopic examinations revealed five milliliters of black viscous and mucoid granular material in the stomach, congestion of the lungs and kidneys, and acute stress response of the thymus.

Laboratory findings revealed vitreous humor with hypernatremia (171.0 ± 10.3 mEq/L), hyperchloremia (151.0 ± 6.1 mEq/L), hyperglycemia (>500 mg/dL), and uremia (>100 mg/dL). The manner of death was ruled as an accident due to resulting investigations concluding that the mother did not fully understand the formula mixing instructions and there was no evidence of intentional overconcentration of formula.

This case highlights the dangers of misuse of common appliances as well as improper mixing of infant formula. Corroboration of narrative with medical records proved helpful in determining the mechanism of injury. To our knowledge, this case is the first of its kind with this constellation of history and presentation.

P7 A Case of Myometritis Arising in an Adenomyotic Uterus Resulting in Fatal Sepsis-Associated Disseminated Intravascular Coagulation

Victoria Prager OMS-IV[1], Hiren Patel OMS-IV[1], Dr. Zuhha Ashraf M.D.[2]
[1]Nova Southeastern University College of Osteopathic Medicine, Clearwater, FL, USA. [2]Cobb County Medical Examiner Office, Marietta, GA, USA

Introduction: Myometritis, inflammation of the uterine muscle layer, is a complication usually associated with postpartum women or as a result of sexually-transmitted infections. Nonobstetric myometritis is described in literature; however, the etiology is unclear in about one-third of these cases. Untreated myometritis can lead to peritonitis or sepsis, and about 20% of these cases progress to disseminated intravascular coagulation (DIC), further increasing the risk for life-threatening coagulopathy and organ dysfunction. Patient mortality in cases of sepsis-induced coagulopathy is estimated to exceed 30% compared to overt DIC. Nonobstetric myometritis complicated by DIC is an uncommon but life-threatening condition and requires accurate diagnosis.

Case Presentation: A 44-year-old African American female with a past medical history of poorly controlled diabetes, obesity, and abnormal uterine bleeding due to suspected fibroids presented to the emergency department with fatigue, vaginal bleeding, and hematemesis. Limited diagnostic workup showed leukocytosis, severe thrombocytopenia, prolonged partial prothrombin time, severe hyperglycemia, and lactic acidosis. She received an emergent transfusion, but minutes later went into cardiac arrest and was not able to be revived despite aggressive resuscitative measures. Notable findings on autopsy included oozing of blood from needle puncture sites and multifocal petechiae and purpura on the epicardial surface of the heart

and the serosal surfaces of the small and large intestines, consistent with DIC. Purulent fluid was present in the peritoneum. Dissection of the uterus showed uniform myometrial thickening grossly consistent with adenomyosis. The myometrium showed multifocal purulent exudates throughout. On histological examination, interspersed endometrial stroma and glands in association with abscess formation were identified in the myometrium, confirming a diagnosis of adenomyosis with myometritis. The cause of death was sepsis due to myometritis in an adenomyotic uterus. Diabetes mellitus was a significant contributing condition.

Discussion: This case illustrates the need for accurate diagnosis of adenomyosis, as many cases of abnormal uterine bleeding are misdiagnosed as leiomyoma, endometrial polyp/hyperplasia, or endometrial cancer. Rare case reports describe abscess formation arising in adenomyotic uteri with or without progression to peritonitis and sepsis, in which hysterectomy resulted in positive outcomes. A case of DIC arising in an adenomyosis patient is described in the literature, and was successfully managed with blood transfusions. One study found a correlation between morbid obesity and increased adenomyosis risk. To reduce mortality, increased surveillance and reporting of nonobstetric myometritis is needed, and clinicians should be aware of the increased risk of myometritis in patients with morbid obesity and adenomyosis.

P8 Hypertrophic Cardiomyopathy Mimicking a Primary Cardiac Tumor: Case Report and Review of Molecular Genetic Findings

Heather L. Williams CM2[1], Tara J. Mahar MD[2]
[1]Jacobs School of Medicine and Biomedical Sciences, Buffalo, NY, USA. [2]Erie County Medical Examiner's Office, Buffalo, NY, USA

An 18-year-old man was found unresponsive in his bed following a nighttime sleep period. He had celebrated his birthday with a small gathering of family and friends the evening prior. Examination of the scene showed evidence of cannabis use only.

His past medical history included anxiety and depression. He had no history of cardiac issues or complaints, including no history of chest pain, syncope, or palpitations. Family history was negative for significant cardiovascular disease or prior instances of sudden unexpected death.

The decedent was a well-developed and well-nourished young man with no significant injuries or dysmorphic features. Cardiac examination demonstrated hypertrophy (weight: 445 gm) and a bulge from the midline posterior aspect of the heart with slight associated subepicardial fibrosis. Transverse sectioning from apex to base revealed an 8.8 x 6.0 x 4.5 cm firm and focal mass-like lesion spanning nearly the entire length of the posterior interventricular septum. The interventricular septum ranged in thickness from 1.4 cm to 4.5 cm. Grossly, the affected tissue appeared expanded by haphazardly arranged bands of myocardium alternating with tough fibroelastic tissue. The left ventricular outflow tract was free of plaques.

Microscopic examination showed findings classic for hypertrophic cardiomyopathy (HCM); namely, diffusely enlarged and occasionally bizarre cardiomyocytes with marked disarray and associated marked interstitial and perivascular fibrosis. Toxicological testing was non-contributory.

Molecular genetic testing (for single nucleotide variants and small insertions and deletions only) found a variant of unknown significance (VUS) in the alpha kinase 3 (*ALPK3*) gene. The VUS consisted of a missense mutation resulting in the substitution of a neutral amino acid with a basic polar amino acid (Gly>Arg) in codon 1094 of the *ALPK3* gene. Large deletion and duplication analysis could not be completed on the postmortem sample sent for testing.

Seventy to eighty percent of individuals with HCM carry mutations in the *MYH7* or *MYBPC3* genes. *ALPK3* has emerged as an important cardiomyopathy gene only in recent years and the role of *ALPK3* mutations in hypertrophic and other cardiomyopathies remains poorly understood. Current literature on *ALPK3* highlights protein truncations more than missense mutations as a cause of HCM. Further research into protein function and the effects of specific mutation variants is needed, with the overarching goal of developing screening and intervention strategies to prevent sudden cardiac death in susceptible asymptomatic HCM patients.

P9 Sudden Death from Undiagnosed Polyarteritis Nodosa in a Nonverbal Autistic Individual

Cooper Shenyu Lyu PhDc[1,2], Juniper Emile Fedor MS[1], Vishal Patel MD[3], Bruce H Wainer MD/PhD[1]
[1]Dekalb County Medical Examiner's Office, Decatur, GA, USA. [2]Georgia Institute of Technology, Atlanta, GA, USA. [3]Emory University Hospital, Decatur, GA, USA

Polyarteritis nodosa (PAN) is a rare systemic vasculitis affecting medium and small-sized arteries, manifesting with a wide range of symptoms that can often be overlooked, particularly in individuals with communication challenges. This case report highlights the sudden death of a 20-year-old African-American male with a complex medical history including seizure disorder, attention deficit hyperactivity disorder (ADHD), and autism spectrum disorder, characterized by nonverbal communication. The decedent's sudden demise following a prolonged seizure episode unveiled an undiagnosed case of PAN associated with chronic Hepatitis B infection, complicating the clinical picture.

This case emphasizes the challenges in diagnosing PAN, especially in the absence of overt symptoms, and highlights the necessity for increased awareness among clinicians about the potential neurologic presentations of systemic vasculitis. Despite a well-documented association between PAN and hepatitis B infection, the neurological manifestations, including seizure disorders and potential for sudden death, are not widely recognized.

The absence of verbal communication abilities in the decedent underscores a significant challenge in the diagnosis of complex conditions. Nonverbal individuals may not effectively convey symptoms of distress or pain, leading to underrecognition of serious underlying conditions. In this case, despite the individual's history of seizures, the lethal event was not anticipated to be linked to a systemic disease like PAN. Autopsy findings revealed extensive cerebral vasculitis and other systemic involvements, suggesting that PAN contributed to the seizure's severity and the subsequent fatal outcome. The presence of Hepatitis B surface antigen confirmed the association with HBV-PAN, indicating the potential for immune complex-mediated vascular damage.

This case accentuates the critical importance of comprehensive medical evaluations and a high index of suspicion for systemic diseases in non-verbal or mentally disabled individuals. It also highlights the need for caregivers and healthcare providers to be vigilant for indirect signs of underlying conditions that may not be readily apparent due to communication barriers. Understanding the unique challenges faced by non-verbal individuals in conveying their health status is essential for preventing overlooked diagnoses and improving health outcomes. Through this tragic instance of undiagnosed PAN leading to sudden death, we advocate for enhanced diagnostic strategies and tailored healthcare approaches for individuals with communication difficulties, aiming to prevent similar outcomes in this vulnerable population.

P10 A Not- So- Subtle Stabbing Pain...

Kajsa L. Anderson BS, Jacob C. Teigen BA, Selly R. Strauch MD, Susan J. Roe MD
University of North Dakota School of Medicine and Health Sciences, Grand Forks, ND, USA

Lethal impalement deaths are not common. We present a case of a 46-year-old male with a history of bipolar disorder who set up an apparatus upon which to impale himself. Law enforcement responded to a request for a welfare check and found his apartment door barricaded from the inside. Law enforcement had responded to the residence the day before because

of a report of a suicidal person. Officers spoke with the man, and he indicated that he was going to cut himself with a knife. He refused help and the officers left. After returning and gaining entry, law enforcement saw that he was deceased in a prone position on a high table with dried blood underneath the table. There was a smaller table below the higher one with a soup can trapped between the two tables by wood pieces held by a jumper cable. A large kitchen knife had been placed with the handle in the soup can and the blade extending upward through a center seam of the large table. The blade penetrated the chest of the decedent.

Autopsy findings included a single stab wound of the chest with perforations of the sternum and pericardial sac, and incisions of the ascending aorta, right pulmonary artery, and superior vena cava at the junction with the right atrium. There were a 1500 cc right hemothorax and a 130 cc hemopericardium. The bronchus to the lower lobe of the right lung was transected and there was aspirated blood in the right primary bronchus. There were also superficial sharp force injuries, "hesitation marks" on the left arm and left side of the neck.

Postmortem toxicological analysis revealed recent methamphetamine use with a blood methamphetamine concentration of 38 mcg/L. Blood volatiles were not detected and blood drug screen results included a metabolite of marijuana.
To achieve the stab wound path and injuries, the decedent would have to have fallen upon the secured blade. This presentation will highlight an unusual case of a self-impalement using an elaborate apparatus. Discussion will center on the investigation and autopsy findings.

P11 Sorting Out Self-Immolation: Fire and Death in a Cornfield
Lindsey M. Martens BA[1], Allison B. Anderson BS[1], Selly R. Strauch MD[2], Susan J. Roe MD[2]
[1]University of North Dakota School of Medicine and Health Sciences, Grand Forks, ND, USA. [2]University of North Dakota School od Medicine and Health Sciences, Grand Forks, ND, USA

Setting oneself on fire, termed self-immolation, has high mortality, morbidity, and healthcare burden. Often, self-immolation patients have comorbid substance abuse and underlying psychiatric illnesses including suicidal intent. Self-immolation has also been used as a form of political protest for decades.

A 60-year-old female with history of depression, anxiety, and prior alcohol overuse was found by a drone search deceased with thermal injuries in a cornfield in a county a distance from her home. No witnesses were reported to be at the scene of the fire. Her abandoned vehicle was found unlocked, out of fuel, and with a dead battery approximately one-quarter mile away.
The decedent was found lying on her left side with substantial burns to her torso and head. Her shirt had been completely consumed by the fire. The surrounding corn stalks exhibited minimal burn marks. A lighter was found eight feet from the decedent, and a string of rosary beads was hanging off a nearby corn stalk. Clothing, cigarettes, pliers, and a glass bottle with a cross on it (thought to contain holy water) were found under a tree at the edge of the cornfield.

Autopsy findings were notable for charring of the face, torso, and portions of the extremities, soot deposition into the peripheral airways, erythema of the epiglottis, bilateral lateral tongue hemorrhages, and pulmonary congestion and edema.

Toxicology report revealed a blood carbon monoxide saturation of 23.8%. A blood volatile screen was negative. A blood drug screen was positive for a metabolite of marijuana and a metabolite of loperamide was confirmed present in the blood.

Cause of death was determined to be due to thermal injuries and smoke inhalation.

After extensive investigation, the State Fire Marshal concluded that the decedent was alone at the time of the fire and death. No fuel or ignitable fluid was found on her clothes, hair, or surrounding area. Her phone and purse were left at her home. A search of her car revealed numerous non-contributory items and papers. Her glasses were missing and never located. The origin of the fire and the manner of death were listed as undetermined. Whether this case represents a deliberate act or a possible accident remains in question. This presentation will detail the investigation and autopsy of a perplexing case of possible self-immolation.

P12 Not Just Another Flesh Wound: The Hairy Story of a Fulminant Soft Tissue Infection
Annie M. Ferguson BS, BA[1], Conner B. Sheridan BS[1], Selly R. Strauch MD[2], Susan J. Roe MD[2]
[1]University of North Dakota School of Medicine and Health Sciences, Grand Forks, ND, USA. [2]University of North Dakota School od Medicine and Health Sciences, Grand Forks, ND, USA

Necrotizing fasciitis or necrotizing soft tissue infections (NSTI) is a toxin producing bacterial infection of the underlying tissues that can rapidly progress to cellulitis and myositis, leading to significant morbidity and mortality. These cases may present to the forensic pathologist due to associated trauma or because of the suddenness of presentation and death. Although NSTIs are more frequently caused by *Staphylococcus aureus* and streptococci, they can rarely present from clostridial species such as *Clostridium septicum*. *Clostridium septicum* accounts for 1% of overall cases of NSTIs. It is less frequently associated with traumatic introduction of bacteria and has a higher incidence in patients with occult colonic or hematologic malignancies.

This report details the case of a 36-year-old male with pancytopenia and cellulitis of the left thigh who presented to the emergency department. Prior to presentation, the patient was experiencing fevers, fatigue, night sweats, and unintentional weight loss. The clinical course was complicated by cecal necrotizing colitis and septic shock. Surgical intervention was pursued, including a right hemicolectomy and debridement of the thigh. Further surgical treatment was deemed futile, and the patient was placed on comfort cares. Peripheral blood smears and flow cytometry revealed findings consistent with hairy cell leukemia.

On autopsy, deep left thigh cultures were positive for *Clostridium septicum* and for one colony of *Staphylococcus hominis*. Splenomegaly and lymphadenopathy were noted with neoplastic involvement of the spleen, bone marrow, lymph nodes, liver, and vasculature of the lungs.

Autopsy findings confirmed the cause of death was due to fulminant *Clostridium septicum* NSTI of the left thigh complicated by a previously undiagnosed underlying hairy cell leukemia. The manner of death was natural. The underlying malignancy likely contributed to the rapid progression of the fulminant infection. Patients with hairy cell leukemia have a high frequency of infection due to profound defects in the monocyte-macrophage lineage, and a decrease in myeloid and lymphoid dendritic counts. These defects are unique to hairy cell leukemia and cause patients to have much greater morbidity and mortality related to NSTIs. This case report and discussion will aid the forensic pathologist in evaluating cases presenting with possible trauma or rapid death and the presence of necrotizing soft tissue infections.

P13 A Devastating Separation: A Case of Prosthetic Valve Embolization
Alexus E. Meduna BS[1], Morgan R Mastrud BS, BA[1], Selly R. Strauch MD[2], Susan J. Roe MD[2]
[1]University of North Dakota School of Medicine and Health Sciences, Grand Forks, ND, USA. [2]University of North Dakota School od Medicine and Health Sciences, Grand Forks, ND, USA

Endocarditis is a rare complication following surgical placement of prosthetic valves, especially within the first three months following the procedure. The causative bacterial agents of endocarditis are commonly staphylococci, streptococci, or enterococci. Risk factors that increase

susceptibility to endocarditis include poor dentition, valvular heart disease, male sex, over 60 years-of-age, and intravenous drug usage. Endocarditis increases the incidence of valve replacement failures and occurrences of prosthetic valve dehiscence. The nature of dehiscence can be either partial or complete, with complete dehiscence less commonly outlined within the literature. These patients may experience sudden death and present as a medicolegal death investigation case.

We present a case of a 69-year-old man who died suddenly during treatment for endocarditis approximately two months following aortic valve replacement. The patient had a history of aortic stenosis, severe atherosclerosis of the native coronary arteries, abdominal aortic aneurysm, dyslipidemia, hypertension, biclonal gammopathy, and chronic renal failure. The patient had an initial aortic valve replacement and required a second surgery for the placement of a revisional valve nearly four years later. Two months following the second valve procedure, the patient was treated for prosthetic valve endocarditis. He died suddenly in the hospital.

Antemortem blood cultures grew *Staphylococcus epidermidis*. Autopsy findings confirmed bacterial infection of the bovine aortic valve prosthesis, valve annulus, and myocardium. Complete dehiscence of the prosthetic valve was found with embolization of the valve to the abdominal aorta. The mitral valve had multiple vegetations with necrotic material, fibrin and an intense polymorphonuclear leukocyte infiltrate. The tricuspid and pulmonic valves had no vegetations or calcification. Pericardial fibrous adhesions were present. There was an abdominal aortic aneurysm with a stent from an endovascular repair. The tissue between the stent and the aortic wall was filled with organizing thrombus and fibrous connective tissue scar. The embolized aortic valve occluded the proximal end of the stent.

This case illustrates the presentation and autopsy findings of a case of sudden death due to embolization of a prosthetic aortic valve. Understanding the pathology and comorbidities associated with bacterial endocarditis is important in the evaluation of such cases.

P14 A Public Health Scourge: The Recent Surge of an Ancient Disease

Abigail E. Pleiss BS[1], Mikale R Kuntz BS[1], Selly R. Strauch MD[2], Susan J. Roe MD[2]
[1]University of North Dakota Medical School and Health Sciences, Grand Forks, ND, USA. [2]University of North Dakota School od Medicine and Health Sciences, Grand Forks, ND, USA

There has been an alarming increase in the incidence of syphilis infection among middle- and high-income countries, including the United States. Recent Centers for Disease Control CDC) data report an 80% increase in syphilis cases compared to just six years ago. Congenital syphilis has had a subsequent tenfold increase in incidence in the last twelve years, with a 30% increase in just the last three years.

Neonatal syphilis, caused by the spirochete *Treponema pallidum*, occurs almost exclusively in the setting of maternal infection and is acquired via transplacental transmission. Maternal-fetal transmission may transpire during any stage of maternal disease and during any trimester of the pregnancy. Congenital syphilis can have devastating impacts on neonatal morbidity and mortality. Perinatal outcomes of maternal syphilis infection include preterm birth, spontaneous abortion, and stillbirth. Neonatal outcomes include intrauterine growth restriction, small for gestational age, nonimmune hydrops fetalis, and anemia. Neonatal infection can be prevented with adequate prenatal care or otherwise treated in infancy.

We report a case of a stillborn male infant born to a 30-year-old mother at 33 weeks gestation. The pregnancy was complicated by limited prenatal care, a diagnosis of late latent syphilis made eight days prior to delivery, and polysubstance abuse. Intrauterine fetal demise was diagnosed at 32 weeks five days via ultrasound. Biometry was consistent with 27-week fetus with significant hydrops. Autopsy findings revealed maceration with skin slippage and discoloration, hydrops fetalis, placentomegaly, edematous umbilical cord with focal necrotizing funisitis, acute arteritis in chorionic plate vessels, and placental features of maternal vascular malperfusion. There were radiographic trophic lucent bands of the long bones. The autopsy findings showed characteristics consistent with congenital syphilis. This was confirmed by testing by CDC. Spirochete organisms were detected in the lungs and placenta by immunohistochemical tests.

This presentation will address the clinical impact of congenital syphilis, highlight the importance of adequate prenatal screening and treatment, and demonstrate the value of postmortem testing in cases of suspected neonatal syphilis. The rise of congenital syphilis in the United States is a major public health concern and will become a crisis if widespread transmission continues within the adult population.

Overlapping maternal drug use, delivery outside of a hospital setting, and possible issues of trauma or neglect increase the likelihood of congenital syphilis presenting with forensic implications.

P15 "When the Sky Falls": A Case Series of Six Crop Duster Crashes in Rural North Dakota and Minnesota

Zachary E. Even BA[1], Charles R Garrity BA[1], Selly R. Strauch MD[2], Susan J. Roe MD[2]
[1]University of North Dakota Medical School and Health Sciences, Grand Forks, ND, USA. [2]University of North Dakota School od Medicine and Health Sciences, Grand Forks, ND, USA

Agricultural aircraft (crop dusters) use is widespread in modern agriculture to maximize farmers' production. Crop dusters are especially critical in rural states such as North Dakota and Minnesota, with 96 and 150 licensed aerial applicator pilots respectively, covering greater than 4.2 million acres, an area about the size of Connecticut. We report six cases, four in North Dakota and two in Minnesota, from 2014-2023, in which crop duster crashes resulted in fatality. All the deceased were the sole operators of their aircraft. In addition to the contamination of fuel, fire products, and sharp objects seen in other aircraft crashes, potentially harmful agricultural chemicals are used and require identification and potential decontamination prior to autopsy to mitigate potential hazardous material exposure.
Autopsies confirmed extensive blunt force trauma in all cases, but a uniquely characteristic fatal injury was not shared between cases. Injuries commonly involved extremities, thorax, and head. Hands and feet must be carefully assessed at autopsy as they are involved in navigational control, which is important.

Samples from multiple locations were collected at autopsy and sent to the Federal Aviation Administration (FAA) for toxicological analysis. The findings were not contributory in all cases.

The results of these cases are compared in this study. With the high speeds and short collision distance, disorientation, over-correction, or other minor pilot distraction and navigational errors may have devastating consequences.

Of cases with notable history provided, it was determined that in one case, the deceased likely crashed due to massive mechanical failure of their self-built plane. In another case, witnesses at the scene of the accident indicated that at the time of impact it was very foggy, possibly contributing to the crash.

Crop duster pilots face inherent risks in their occupation, such as flying near the ground at high speeds while carrying large amounts of dangerous chemicals. Entanglement with power lines, structures, and other hazards that normally are not implicated in other aircraft investigations should be assessed. In addition, mental health is a public health issue with all aviation incidents; the seasonal and informal nature of crop dusting may reduce screening rigor. This presentation will further elucidate the autopsy and investigative findings seen in crop duster crashes.

P16 A Twisted Tale: An Elderly Woman with Abdominal Complaints

Henry E. Elsenpeter BA[1], Paxten R Wahlund BS[1], Doctor Selly R. Strauch MD[2], Doctor Susan J. Roe MD[2]
[1]University of North Dakota School of Medicine and Health Sciences, Grand Forks, ND, USA. [2]University of North Dakota School od Medicine and Health Sciences, Grand Forks, ND, USA

Medicolegal death investigation (MDI) includes sudden and unexpected deaths; within most MDI systems, about 35% of these reveal natural disease at autopsy. Discovery of these natural deaths assists in general public health efforts and affords the family the opportunity to evaluate and address general and familial health issues. Dominating sudden natural deaths are cardiovascular deaths, followed by cerebral, pulmonary and cancer causes. Gastrointestinal (GI) diseases however can be a dramatic cause of sudden death. Most GI conditions are symptomatic, resulting in access to the health care system rather than MDI. Occasionally, pain is masked, absent, or occurs in tandem with other conditions so as to mislead investigators. Of the many intestinal conditions that may cause death, intestinal volvulus occurs in all ages, and is part of the larger intestinal obstruction disease states that may rapidly produce a terminal course.

The individual in our report was an active, articulate 85-year-old female in excellent health; her medical history was positive only for hypothyroidism, treated for over 30 years with Synthroid. No hypertension, coronary artery disease, diabetes, or lipid disorders were noted. She expired following vague abdominal complaints and nausea following a meal at a church social. The autopsy was done due to family request, lack of medical history, and potential for food exposure. At autopsy, a volvulus of the ilium and adjacent mesentery was present. The ileum was necrotic and 700 cc of bloody, dark peritoneal fluid were present. Adhesions were present at cecum and splenic flexure regions. No masses were identified. Toxicology was not contributory. Major arteries, including celiac, superior and inferior mesenteric arteries were patent.

A volvulus occurs when the bowel or portion thereof twists upon its' associated mesentery causing obstruction within the intestine, vascular compromise from the supporting vessels in mesentery and ultimate distal ischemia of the affected bowel. The classic clinical presentation of volvulus is nonspecific; most patients have an acute abdomen with symptoms of nausea, vomiting, and obstipation. In infants, it often is associated with intestinal malrotation and peritonitis and abdominal pain may be difficult to assess. Correct assessment in this case provided answers for the family, avoided an investigation into a potential food outbreak, and allowed correct death classification rather than a reflexively applied cardiovascular death.

P17 When Therapy Becomes Threatening: A Case of Suicide by Exogenous Insulin Administration

Chloe J. Kaelberer BS[1], Cole E. Rokke BS[1], Selly R. Strauch MD[2], Susan J. Roe MD[2]
[1]University of North Dakota Medical School and Health Sciences Center, Grand Forks, ND, USA. [2]University of North Dakota School of Medicine and Health Sciences, Grand Forks, ND, USA

Suicide among individuals with diabetes presents an intricate challenge, highlighting the complexity of managing a chronic disease with comorbid mental health conditions. The use of exogenous insulin, a life-sustaining therapy for people with type 1 diabetes, paradoxically introduces potential method for self-harm. We report a case of death due to insulin overdose with evidence of intent.

A 31-year-old male was found lifeless in his barricaded home. He had a reported history of type 1 diabetes mellitus, major depressive disorder, recent suicidal ideation, three prior suicide attempts by insulin overdose over the past twelve years, and methamphetamine use.

Autopsy findings were notable for pulmonary congestion and edema, a small pancreas with fibrosis and hemorrhagic autolysis, and lymphocytic thyroiditis. Dexcom urgent low alerts were noted on the 24 hours prior to death at 3:33AM, 8:03PM, 8:28PM, and 10:23PM.

Toxicology report showed significantly elevated insulin concentrations at 118 uIU/ml (708 pmol/L) (315 ng/ml) and low C-Peptide (< 0.1 ng/ml). Vitreous humor panel-1 chemistry studies demonstrated a glucose of <20 mg/dl. The report was also positive for amphetamine (43 mcg/L).

Hypoglycemic deaths can be extremely challenging to suspect, investigate, and resolve. As in this case, autopsy findings in insulin or oral hypoglycemic drug overdose may be nonspecific. Vitreous glucose naturally decreases postmortem so a low value is meaningless; furthermore, a rapid onset of hypoglycemia, as in massive exogenous insulin administration, may not be reflected in the vitreous:serum equilibration. Obtaining postmortem serum is inherently difficult due to the rapid biochemical changes that occur after death and presents a significant challenge for pathologists. Insulin concentrations and C-Peptide are of use but must be obtained promptly and handled expeditiously by the consulting laboratory. Unlike many other cases with a similar presentation, the ability to obtain and analyze the decedent's serum concentrations allowed for confirmation of the cause of death. With the increasing use of automated glucose measurements and apps, the scene investigation may be increasingly useful in identifying these deaths.

This case report will provide valuable insight into the complex intersection of mental health, pharmacology, and suicide prevention and highlight the inherent risk of fatal overdoses in necessary insulin therapy for individuals with diabetes and comorbid depression. It provides guidance for scene investigations, autopsy practices, and laboratory evaluation.

P18 Making Haste When Confronting Hantavirus

Nicole R. Virgin BS[1], Carissa A. Amundson BS[1], Selly R. Strauch MD[2], Susan J. Roe MD[2]
[1]University of North Dakota Medical School and Health Sciences, Grand Forks, ND, USA. [2]University of North Dakota School od Medicine and Health Sciences, Grand Forks, ND, USA

Hantavirus is a member of the *Bunyaviridae* family and known to acutely lead to severe infection, namely hantavirus cardiopulmonary syndrome (HCPS). HCPS is characterized by pulmonary edema, acute respiratory distress syndrome (ARDS), and end-organ damage. The rapid progression and high mortality of HCPS without appropriate management make prompt diagnosis essential for survival. Because of the fulminant nature of the infection, the young age and general good health of those afflicted, and the high potential for public health involvement, these cases often present to the medicolegal death investigation systems.

A 29-year-old male presented to the hospital with complaints of fatigue, weakness, and fevers. He was admitted for dehydration and two days later transferred to the intensive care unit (ICU) for pulmonary edema confirmed by radiographic imaging progressing to severe acute respiratory syndrome (SARS). Despite medical intervention, the patient expired in the ICU shortly after transfer. Review of hospital records revealed hepatosplenomegaly and morbid obesity. Laboratory studies were remarkable for leukocytosis, thrombocytopenia, and elevated creatinine. There was no growth on blood cultures after five days, and viral pathogen panels were negative. Forensic autopsy reports confirmed edema of the lungs, with abundant yellow fluid found in each pleural cavity. Other autopsy findings included hepatic and splenic congestion, renal tubular necrosis, and cerebral edema. Postmortem blood testing via ELISA and RT-PCR and positive immunohistochemical staining of the lung and kidney performed by the Center of Disease Control (CDC) revealed acute hantavirus infection.

The patient had no known rodent exposure before hospital admission. Additional investigation revealed the decedent had been playing paintball on his grandparents' farm a few days before he became symptomatic. According to CDC case reporting, hantavirus has an increased prevalence in rural states, including North Dakota, Utah, Wyoming, Montana, and Idaho. Physicians in these areas should increase their clinical suspicion of hantavirus in patients with a history of spending time outside, particularly in a rural area or on a ranch or farm. This case highlights the role of clinician awareness of hantavirus presentation; due to the 35% mortality rate in this

infection and minimal treatment options that are limited to supportive care. Early diagnosis has a significant impact on patient prognosis.

P19 Asthma: Angst and Awareness

David R. Lee BS[1], Trenton A. Bohan BS[1], Selly R. Strauch MD[2], Susan J. Roe MD[2]
[1]University of North Dakota Medical School and Health Sciences, Grand Forks, ND, USA. [2]University of North Dakota School of Medicine and Health Sciences, Grand Forks, ND, USA

Asthma is a chronic obstructive airway disease characterized by reactive bronchoconstriction and inflammation, affecting an estimated 25 million people in the United States. Many risk factors have been associated with asthma. Although significant medical progress has occurred in this disease, disparities in asthma morbidity and mortality persist due to demographic factors, income level, and geographic location. Asthmatic attacks may occur precipitously; symptoms may overlap, be unobserved, or be unrecognized, particularly if the individual engages in risk-taking activities or is away from people familiar with the asthmatic history. The deaths often present to forensic services for evaluation.

Case 1: A 13-year-old African American female with a known asthmatic condition experienced an acute asthma exacerbation unresponsive to nebulizer treatment. While en route to a clinical facility, she suffered a respiratory arrest. Although she was initially resuscitated, she could not be stabilized and expired shortly after arrival at a tertiary medical facility.

Case 2: A 17-year-old Hispanic male was fishing with his father along a dam. He appeared to slip underwater; his father went through the rapids, retrieving his son within a few minutes. The father and first responders attempted CPR but were unsuccessful.

Autopsy findings in both cases were similar and included hyperinflated lungs and mucous-filled airways consistent with an acute asthmatic event. There was no additional evidence of natural disease, traumatic injury, or infectious disease. Due to the combination of clinical presentation, autopsy findings, and past medical history, the deaths were deemed to be natural as the result of asthma.
Despite improvements in asthma treatment, acute asthmatic deaths occur with regularity. Geographical isolation in a rural area contributes to the outcome. Although asthma exacerbations are not entirely preventable, asthmatic patients who reside a significant distance, >50 miles from a large hospital, require more resources, including frequent follow-up visits with a physician, more robust medications for exacerbation, prophylaxis, and education. Forensic pathologists can contribute to public education, public health efforts, and identifying disparities within health service delivery systems. Since many of these deaths overlap with drug overdoses, traffic, or other accidental deaths, it is critical to recognize the anatomic signs of an acute asthmatic event and to certify the condition correctly.

P20 Brokenhearted; Postpartum Cardiomyopathy

Elizabeth R. Holzwarth BS, BS[1], Johnathan A. Beaudrie BS[1], Selly R. Strauch MD[2], Susan J. Roe MD[2]
[1]University of North Dakota Medical School and Health Sciences, Grand Forks, ND, USA. [2]University of North Dakota School od Medicine and Health Sciences, Grand Forks, ND, USA

Postpartum cardiomyopathy (PPCM) is idiopathic heart failure with reduced ejection fraction that develops during the final month of pregnancy or up to five months postpartum. It is a significant contributor to the increasing rate of maternal morbidity and mortality within the United States, an increase primarily seen in women of color, particularly those in rural areas and within lower socioeconomic levels. PPCM may present with sudden decompensation or death, often activating a medicolegal investigative response and resulting in a forensic autopsy. Medical Examiners and Coroners should be aware of this entity and investigate appropriately. Most states have Center for Disease Control-supported Maternal Mortality Review Committees that review and recommend changes to reduce maternal mortality; reporting the death to this committee assists public health in surveillance and recommendations for prevention.

A 24-year-old, Gravida 1, Para 1, Native American female presented to the emergency room 7 days postpartum via primary Caesarean section, complaining of sudden onset of shortness of breath, dry cough, and exhaustion with physical activity. Past medical history included a systolic heart murmur identified in the second trimester and gestational hypertension. Her emergency department course included antibiotic treatment for suspected bilateral atypical pneumonia; she was discharged the same day. The next day, she arrived at the ED by ambulance with CPR in progress, and despite resuscitative efforts, she died.

Autopsy examination revealed severe cardiomegaly with globoid four chamber dilation and flaccid ventricular myocardium. The lungs were notable for pulmonary congestion and edema. Toxicology was negative, and postmortem vitreous electrolytes were within normal limits. The cause of death was determined to be postpartum dilated cardiomyopathy. The manner of death was determined to be natural.

Patient risk factors include gestational hypertension, systolic heart murmur, and rural location, which may have been a barrier to timely identification and treatment. Pregnancy and postpartum hormones add a significant amount of stress on the hemodynamic stability of the body, which may have predisposed the decedent to develop cardiac complications.

This presentation will explore the possible etiologies of PPCM, review the condition, and discuss the risk factors that increase the risk of mortality in these patients. There is an increasing incidence of PPCM in the United States as awareness and identification techniques have increased. However, the treatment of PPCM remains supportive mainly, with varying outcomes, including full recovery, chronic heart failure, or death.

P21 Dissecting Dissections: A Series of Case Reports Looking at Aortic Dissections, their Associated Conditions, and Autopsy Protocol

Cole E. Rokke BS[1], Chloe J. Kaelberer BS[1], Selly R. Strauch MD[2], Susan J. Roe MD[2]
[1]University of North Dakota School of Medicine and Health Sciences, Grand Forks, ND, USA. [2]University of North Dakota School od Medicine and Health Sciences, Grand Forks, ND, USA

Aortic dissection may initially present with sudden death. Since these often are in middle-aged individuals without known risk factors, many of these deaths end up in the medicolegal death investigation system.

We introduce a case series of aortic dissections (AD) in decedents, evaluating their risk factors, associated conditions, and genetic factors that may have contributed to their AD. Each case provides unique insights into the clinical presentation, autopsy findings, and outcomes, shedding light on the underlying pathological processes. By interpreting the interplay between genetic predisposition and structural abnormalities of the aortic valve, our case series contributes to a deeper understanding of AD pathogenesis.

Two of these cases investigate decedents with a bicuspid aortic valve (BAV), the most common congenital heart valve anomaly, affecting approximately 1-2% of the population. Its prevalence is significantly higher in patients with aortic pathology, particularly aortic dissection (AD) and ascending aorta aneurysm. The relationship between BAV and aortic pathology is crucial for effective clinical management. Furthermore, genetic factors, particularly Marfan syndrome and related connective tissue disorders, play a pivotal role in predisposing individuals to AD, exacerbating the risk associated with BAV.

Moreover, we outline a systematic autopsy protocol explicitly tailored for AD evaluation. This protocol involves a series of methodical steps, including measuring hemopericardium volume to assess the extent of hemorrhage, en-bloc removal of the heart and aorta to facilitate comprehensive

examination, and formalin fixation for detailed histological analysis. Documentation of the extent of dissection, evaluation for associated anomalies such as BAV and aortic coarctation, and examination of unaffected aortic tissue for evidence of connective tissue disorders is essential for complete analysis in these cases.

Our case series aims to enhance diagnostic accuracy and refine management strategies for AD by applying a structured approach and evaluation at autopsy. Through a combination of clinical, genetic, and pathological insights, we strive to improve patient outcomes and ultimately contribute to advancing knowledge in cardiovascular medicine.

P22 Cold Can Kill: Hypothermia in North Dakota

Megan E. Kelly BS[1], Grace J. Lavandowska BS, BA[1], Selly R. Strauch MD[2], Susan J. Roe MD[2]
[1]University of North Dakota Medical School and Health Sciences, Grand Forks, ND, USA. [2]University of North Dakota School od Medicine and Health Sciences, Grand Forks, ND, USA

Hypothermia, death occurring with a body temperature below 95°F, is a major concern in North Dakota with an average of fifty days below 0 °F. The cold season extends five months, from November to March, and is coldest in January with an average low of 5° F. The record low in ND is -60° F; winds gusting to over 50 mph produce record windchill, rapid frostbite, and numerous cold deaths with most frozen solid upon discovery. Nationally, about 1300 deaths per year are associated with exposure to cold. However, only a tiny minority of these involve a body that has frozen solid.

We share our protocol for thawing, toxicology, and autopsy performance in hypothermia. After initial photographs, the body is thawed. The decedent is laid out in an open room-temperature area, away from light. Bodies are assessed every few hours. The clothing is removed as soon as feasible. After 8-10 hours, the decedent is returned to the cooler, and the process is repeated for 3-10 days. This decelerates surface decomposition, which can occur when using lights or heaters for thawing. Core body thawing is a longer process. Toxicology is drawn externally as soon as initial thawing occurs. Serial photographs are taken. Once the body is felt to have thawed sufficiently for internal examination, the autopsy can proceed.
Pathologic findings described in hypothermia death include lack of blood clotting in the heart, bladder distention, Wischnewski spots, and pancreatic hemorrhage. Of the seven hypothermic cases reviewed, five decedents were found outside, one inside a home heated by a wood-burning stove, and one in a car. Bodies were found in December, January, and February. All had cutaneous frostbite with erythema. Six had pulmonary congestion and lack of heart blood clotting, four had a distended bladder, three had Wischnewski lesions, and one had pancreatic hemorrhage. Toxicological analysis was variable. The constellation of the autopsy findings and the scene descriptions aid in the diagnosis of hypothermia. The autopsy findings on their own, such as Wischnewski spots, are not pathognomonic for hypothermia and can be seen in other diseases. Hypothermia is preventable with appropriate outdoor clothing, avoiding skin exposure, staying dry, and moving to a warm environment when signs of body cooling develop. With North Dakota's extreme climate, it is of utmost importance that the public be aware of the dangers of the cold.

P23 Hydrogen Sulfide: A Scientific Exploration of its Role in Suicides and Accidental Deaths

Matthew Nguyen[1,2], Tasha L. Zemrus MD[1], Tera Jones MD[1]
[1]Tarrant County Medical Examiner's Office, Fort Worth, TX, USA. [2]University of North Texas Health Science Center, Fort Worth, TX, USA

This case series examines hydrogen sulfide (H2S) deaths at the Tarrant County Medical Examiner's Office, noting scene and autopsy findings, and reviewing literature.

H2S is a colorless, flammable, and water-soluble gas with the characteristic smell of rotten eggs found in sewage, effluent waste, and farm slurry. It is a mucosal irritant, rapidly absorbed in lungs but minimally through skin. Fatalities can occur to rescuers entering the hot zone. Inhaling enough gas inhibits mitochondrial cytochrome oxidase, halts aerobic metabolism, reduces oxygen use, and produces metabolic acidosis, with varied symptoms leading to rapid unconsciousness, and death. There is no proven antidote; treatment is supportive, but nitrite therapy in cyanide antidote kits can be used. Scene response should include positive-pressure, self-contained breathing apparatus, removing contaminated clothing, and flushing exposed skin and hair with water. There is no significant risk after decontamination, except if contacting or breathing vapors from heavily H2S soaked clothing.

H2S is a volatile compound and concentrations cannot be used to identify or monitor toxicity. Thiosulfate is the major oxidation product and is stable, making it a more reliable indicator. Classic findings include pulmonary edema/hemorrhage and greenish-gray discoloration of organs/tissues.

Detergent suicide is a method popularized in Japan in 2008, rising since in the US, and shared on web sites and online message boards. Lime sulfur (CaS) fungicide mixes with hydrochloric acid (HCl), present in toilet bowl cleaners, to produce H2S gas in a confined area like a motor vehicle.

From 2011 to present, four cases of intentional H2S deaths in vehicles were identified with combinations of CaS, HCl and/or toilet bowl cleaner mixed in a bucket. Warning notes to first responders were present, three on the vehicle and one in the decedent's residence. All had pulmonary congestion/edema, most had cerebral edema, and one had greenish-gray tissue discoloration. Three accidental H2S deaths were found at oilfields, all with pulmonary congestion/edema, two with cerebral edema, and none with greenish-gray tissue discoloration. Blood thiosulfate concentrations above the reported fatal concentration of 2.5 mcg/mL (range 13 – 26.8 mcg/mL) were present in all but one hospitalized case.

Understanding the circumstances and mechanisms of H2S toxicity allows first responders and medical personnel to be prepared to recognize, diagnose, and treat H2S toxicity and ensure safety at the scene. Understanding scene and autopsy findings allows medical examiners and other personnel to recognize these deaths, inform testing and ensure safety.

P24 A Bizarre Bezoar: Fatal Small Bowel Obstruction Secondary to Phytobezoar Formation

Rachel T. Guest M.D.[1], Marianne E. Beynon M.D.[2]
[1]Baylor College of Medicine, Houston, Texas, USA. [2]Harris County Institute of Forensic Sciences, Houston, Texas, USA

The word "bezoar" is derived from the Arabic word for antidote and in ancient times, these aggregates of undigested material in the gastrointestinal tract were thought to have medicinal properties that could cure many ailments and diseases. With the advancement of modern medicine, it is now known that bezoars not only have no healing properties but can cause serious medical problems that can lead to life-threatening emergencies. Bezoars are the cause of up to 4% of cases of gastrointestinal obstruction and can be composed of vegetable matter (phytobezoars), hair (trichobezoars), milk proteins (lactobezoars), and undigested medication (pharmacobezoars). Without timely diagnosis and treatment, these obstructions can lead to perforation, infection, and even death. We present a fatal case of phytobezoar-induced small bowel obstruction in a 59-year-old Asian man with schizophrenia and diabetes mellitus with neuropathy who was found unresponsive in his home.

Per his family, the decedent lived alone and had been complaining of constipation and vomiting in the days leading up to his death. He was found dead beside his recliner with possible vomitus exuding from his mouth. No obvious signs of trauma were noted. Autopsy revealed an 18 x 6.5 cm phytobezoar obstructing the proximal jejunum. The portions of gastrointestinal tract proximal to the obstruction showed dilation with large amounts of partially digested vegetables remaining in the stomach. Microscopy of the gastrointestinal tract showed evidence of chronic

alterations in the gastrointestinal wall in the form of diffuse inflammation, mucosal ulcerations, and bacterial and fungal overgrowth.

Several risk factors for phytobezoar development were identified in the decedent. Diabetes mellitus alters gastric physiology by decreasing gastric emptying and disrupting gastric motility. This phenomenon is more likely to occur in patients with diabetic neuropathy. Additionally, the decedent took antipsychotic and anticholinergic medications to manage his schizophrenia. These medications are known to decrease gastrointestinal motility by inhibiting the parasympathetic nervous system via muscarinic-type acetylcholine receptors. Furthermore, the consumption of large amounts of vegetables increases the amount of nondigestible fibers in the gastrointestinal tract which promotes phytobezoar development. Gut dysmotility is also a known cause of bacterial and fungal overgrowth and proliferation of these organisms can lead to nutrient malabsorption. The effect of nutrient malabsorption on phytobezoar formation has not been fully described in previously published case reports.

In conclusion, this case repor contributes to the limited literature on phytobezoar pathogenesis, gross and microscopic features, and potential fatal complications.

P25 Sudden Death from IgG4-Related Subglottic Stenosis: A Rare Case Report and Review of Literature

Jason D. Steiger B.S.[1], Carolyn H. Revercomb MD[2], Christopher M. Curtiss MD[3]
[1]University at Buffalo, Buffalo, NY, USA. [2]Onondaga County Medical Examiner's Office, Syracuse, NY, USA. [3]SUNY Upstate Medical University Department of Pathology, Syracuse, NY, USA

IgG4-related disease (IgG4-RD) is a fibroinflammatory condition characterized by chronic inflammation and tissue fibrosis. While it commonly presents with organ-specific manifestations such as autoimmune pancreatitis, retroperitoneal fibrosis, and salivary gland involvement, its impact on the respiratory tract, including subglottic stenosis, is a rare but potentially life-threatening complication. This case emphasizes the importance of considering IgG4-RD as a possible cause of death in individuals with sudden death attributed to upper airway stenosis, particularly when clinical awareness may be limited due to multiple comorbidities.

Herein, we present a case of a male in his twenties who was found deceased in his secure residence. Postmortem examination revealed focal subglottic obstruction due to thick mucus plugs and significant airway narrowing, with microscopic expansion of the airway wall by storiform fibrosis with plasma cell infiltrate. Immunohistological analysis demonstrated the presence of a significant percentage of IgG4-positive plasma cells. Medical record review showed that the decedent had a history of prolonged intubation following surgery approximately three months before his death.

The etiology of IgG4-RD remains poorly understood, and its documentation has only emerged in the last 20 years. There is growing evidence that genetic factors play a role in the pathogenesis of IgG4-RD. Of particular interest to medical examiners is that IgG4 has been reported as an etiology of arteritis affecting the coronary arteries and aorta. This case report underscores the significance of maintaining vigilance while determining cause of death and the signs for recognizing IgG4-RD.

P26 Undiagnosed High-Grade Glioma Leading to Sudden Death in a 38t-Year-Old Female with a Four-Week History of Blurred Vision and Headache

Matthew E Stenerson MS, Robert F Corliss MD
Department of Pathology and Laboratory Medicine, University of Wisconsin School of Medicine and Public Health, Madison, WI, USA

Diffuse gliomas collectively represent the most common primary intracranial malignancies in adults, and prognosis varies considerably between WHO grades, 2–4, which are differentiated by histology and molecular profiling, most notably of isocitrate dehydrogenase (*IDH1/2*) mutations and chromosome 1p/19q codeletion, amongst others. The three main categories of diffuse glioma include IDH-mutant astrocytoma (grades 2–4, further distinguished by histology and *CDKN2A/B* deletion); IDH-mutant, 1p/19q codeleted oligodendroglioma (grades 2–3); and IDH-wildtype glioblastoma (GB, grade 4). In midline structures such as diencephalon, diffuse midline glioma, H3 K27-altered, grade 4 must also be considered. Of all these, GB is the most common, particularly in older adults, with an incidence of 3.7 per 100,000 person-years, a median age at diagnosis of 64 years, and a median survival of approximately 15 months. In high-grade (WHO grade 3–4) gliomas, symptoms tend to begin with smaller tumor volumes compared to lower-grade gliomas, due in part to their rapidly proliferative nature, and commonly include cognitive/behavioral changes (36%), seizures (35%), headache (31%), dizziness (24%), motor deficits (22%), and aphasia (20%). Because presenting symptoms are often nonspecific or more likely explained by less pernicious causes (e.g., migraine, infections, depression), neuroimaging may be delayed. We present a case of a 38-year-old female with no serious past medical history who presented to her primary care provider with a one-week history of blurred vision and pressure-like headache in her frontal and maxillary sinuses which was worse when leaning forward. She was diagnosed with acute sinusitis, prescribed amoxicillin-clavulanate, and referred to an otolaryngologist who performed nasal endoscopy, corroborated the diagnosis, and prescribed azithromycin and prednisone with a plan to undergo CT of the sinuses if symptoms did not improve. Unfortunately, the patient was found unresponsive at home the following week and resuscitation efforts were unsuccessful. Autopsy revealed a 4.5 cm necrotic mass arising around the third ventricle, growing into the ventricular system and obstructing the cerebral aqueduct, causing bihemispheric mass effect with total sulcal obliteration. The mass was histologically consistent with a high-grade glioma most suggestive of GB, showing anaplasia, necrosis, and extensive neovascularization; however, autolytic loss of tumor immunogenicity obscured molecular profiling and features of tumor differentiation, highlighting the time-sensitive nature of tissue fixation. This patient's age and symptom duration made high-grade glioma an unexpected cause of death, demonstrating the elusive course these diseases may take. When CNS malignancies obstruct the ventricular system, life-threatening hydrocephalus may develop rapidly.

P27 Pre- and Postmortem Diagnostic Discrepancies at a Large, Academic, Urban Hospital

Tamyra Clark-Hoogstrate BS, BA[1], Kathryn Scherpelz MD, PhD[2], Nicole Jackson MD[2]
[1]University of Washington School of Medicine, Spokane, WA, USA. [2]University of Washington Medical Center, Seattle, WA, USA

Introduction: Autopsy utilization in U.S. hospitals has dramatically decreased over the past 80 years despite the value of the autopsy examination in detecting diagnostic errors. The decline in autopsy usage throughout the United States has been attributed to various factors including elimination of autopsy requirements by the Joint Commission on the Accreditation of Hospitals, reduced emphasis on autopsies as a teaching device in medical education, fear of malpractice suits, and lack of any direct reimbursement for performing autopsies. Due to the current low autopsy rate, the true rate of inaccurate or missed diagnoses in patients who die in the hospital remains unknown in the United States.

Methods: The University of Washington (UW) autopsy service provides postmortem examinations for UW Medicine-associated hospitals, helping

to determine and/or confirm the cause of death for approximately 150-250 patients each year. This retrospective study will review autopsy reports and electronic medical records of adult patients who died between January 1, 2015 and December 31, 2023, to identify major discrepancies between pre- and postmortem diagnoses. The primary outcome variables are based on the Goldman criteria for autopsy discrepancies: major discrepancies will be classified as either Class I (missed major diagnosis with potential adverse impact on survival and that would have changed management) or Class II (missed major diagnosis with no potential impact on survival and that would not have changed therapy). Additional variables of consideration are age, sex, race, admitting service, length of hospital stay, clinical cause of death (COD), and autopsy COD.

Outcome: The results of this analysis will identify discrepancies between autopsy findings and clinical diagnoses in a recent cohort at a tertiary care center. Consideration of age, race, duration of stay, and cause of death may identify subgroups who are more likely to have missed clinical diagnoses. We expect that improvement still needs to be made in closing the gap between pre-and postmortem diagnostic discrepancies based on non-clinical variables.

P28 Deadly Hemorrhage after Minor Trauma in Former Bariatric Patients: A Two-Case Series of Deaths in the Setting of Remote Bariatric Surgery

Jude Danagher BSc Hons[1], Elizabeth Mooney DO, MS[2], Thomas Gilson MD[2]
[1]University of Limerick Medical School, Limerick, County Limerick, Ireland. [2]Cuyahoga County Medical Examiner's Office, Cleveland, Ohio, USA

Obesity is commonly defined as abnormal or excessive body fat with a body mass index (BMI) or greater than 30.0 kg/m^2, though alternate obesity classifications have been proposed. Obesity is a complex, multifactorial, and multisystemic disease associated with a high adverse effect. With a rise in obesity prevalence, the 'obesity epidemic' has established itself as one of the leading causes of death worldwide. As a disease, obesity is preventable. Normal methods of obesity management involve weight loss through lifestyle intervention, such as dieting or exercise, with bariatric surgery as a final option indicated for those who meet criteria. Bariatric surgery offers patients the chance to improve their overall wellbeing by assisting in significant and maintainable weight loss. Like any surgery, it poses risks and complications.

Roux-en-Y gastric bypass surgery accounts for the most bariatric operative procedures. Its perioperative mortality is small and long-term, all-cause mortality is reduced; however, for patients with major coexisting conditions, there is a greater risk of morbidity and mortality. Its early and late complications are described in medical literature; however, there is no documentation of deaths related to adhesions and intra- and retroperitoneal hemorrhage following such surgery.

The case series follows two women of middle age with histories of drug dependency disorders diagnosed with prominent intra-abdominal adhesions and intra- and retroperitoneal hemorrhage in the setting of remote gastric bypass following minor blunt force injury. In both cases, there was a marked presence of adhesions scattered throughout the abdomen, specifically in the locality of their surgical sites. Adhesions are dense, fibrous tissue ordinarily resulting from healing following inflammation. When following an abdominal procedure, these adhesions which may surround important arterial vessels of the stomach and small intestine become vulnerable to tears even in the setting of minor trauma.

P29 Without Restraint: Preventable Natural Deaths of Inmates

Mira Basuino BS[1,2], Catherine Benge MD[2], Keith Norton MD[2], Deirdre Amaro MD[2]
[1]Kansas City University, Kansas City, MO, USA. [2]University of Missouri, Columbia, MO, USA

Four prisoners died while incarcerated in Missouri due to sudden medical complications related to slowly developing medical conditions that could have been avoided with adequate medical care. Complete forensic autopsies were performed, including neuropathologic consultation for two of the four cases. Three of four causes of death were found to have been caused by complications of tumors, including hepatocellular carcinoma with metastasis to the adrenal gland, a benign abdominal fibromatosis, and a meningioma, respectively. The fourth cause of death was due to diabetic ketoacidosis with hyponatremia. In all cases, the deceased themselves or their cell mates noticed irregularities in their behavior and requested help from custody personnel and medical staff. Their pleas were largely ignored. Deaths in custody such as those represented by this case series reiterate the need for healthcare reform in the United States prison/jail system and emphasizes the critical role of the medical examiner's office in helping to protect these vulnerable populations. Though the United States comprises less than 5% of the global population, they incarcerate nearly 2 million people, which accounts for 20% of prisoners internationally. Lack of comprehensive care is detrimental to people who are incarcerated, whether awaiting trial or already found guilty, and has long-lasting effects after they are released, should they survive until then. Problems that could have been evaluated and treated are deferred until it may be too late and those who could have had fulfilling lives are denied the opportunity.

P30 A Novel Approach to Evidence Preservation in a Crossbow Homicide: A Case Report

Fiona Lane, Alexander Jonson
Western University of Health Sciences COMP-NW, Lebanon, Oregon, USA

Crossbow fatalities are exceedingly rare; in 2020 there had only been 20 case reports of crossbow homicides ever published. Due to their rarity, there is not an established protocol for evidence preservation. In this case report, an adult White woman was found supine in her home in the early stages of decomposition with a defect to the left temporal skull superior to the helix. The defect had a retained aluminum crossbow bolt with part of the shaft protruding from the skull. At autopsy, the entrance wound was round, symmetric, and lacked beveling. The bolt passed through the cranium and central brain, before embedding in the lesser wing of the right sphenoid at the articulation with the frontal bone. According to available evidence, manner of death was ruled a homicide. A novel approach was employed to preserve possible DNA and fingerprints. An evidence tube was placed over the protruding portion of the bolt before reflecting the scalp, opening the skull, and removing the brain. The field point portion of the arrow was left on the bolt. Pressure with a gloved hand was applied to the shaft in the cavity so that the bolt was moved into the evidence tube and possible fingerprints and DNA were preserved. This case illustrates the need for increased publication and discussion of cross bow related deaths to increase the information available to forensic pathologists working up future cases.

P31 A Death from Necrotizing Wound Infection after Caesarean Section: Resurgence of Group A Streptococcal Puerperal Sepsis

Timothy Ogburn BS[1], Laura Knight MD[2,1]
[1]University of Nevada Reno School of Medicine, Reno, NV, USA. [2]Washoe County Regional Medical Examiner's Office, Reno, NV, USA

Necrotizing wound infections are serious, potentially lethal complications of surgeries, including Caesarean section deliveries.

A 32-year-old obese female with a history of hidradenitis suppurativa presented to the hospital at 39 weeks' gestation for ruptured membranes. She underwent an uncomplicated caesarean section due to failure of progression of labor. Four days later, the patient developed abdominal pain

and an abdominal CT scan showed ascites; she was treated with empiric antibiotics. She progressed to septic shock, decompensated into cardiopulmonary arrest with subsequent resuscitation, and expired the following day from a subsequent arrest. Hospital blood cultures grew no microorganisms.

Autopsy findings included soft tissue purulence around the incision site and copious purulent ascites. There was no evidence of tubo-ovarian abscess or retained products of conception. There was also no evidence of pulmonary thromboembolism or amniotic fluid embolism on gross and histologic examination, including cytokeratin staining. Microscopic examination of the peri-incisional soft tissues demonstrated inflammatory debris with abundant neutrophils and gram-positive cocciform bacteria. Grocott's methanamine silver stain revealed no fungal elements. Postmortem bacterial cultures had no growth, not unexpected following antemortem antibiotic therapy. Paraffin blocks submitted to the Centers for Disease Control Infectious Disease Pathology Branch and revealed *Streptococcus pyogenes* by immunohistochemical staining.

Historically, group A streptococcus was a major cause of peripartum mortality, and the prevalence of puerperal sepsis-associated deaths was greatly reduced by the advent of antibiotics. Although the rates of pregnancy-related mortality secondary to infectious causes have remained relatively stable in the United States for decades, Group A Strep (GAS) has made a resurgence over recent decades. This case report reminds forensic pathologists of the relevance of rare, but severe causes of peripartum deaths.

Additionally, there is some evidence in the medical literature of cutaneous bacterial biofilms associated with hidradenitis suppurativa (HS). The deceased had many actively draining lesions at the time of delivery, including in areas near the operative site. At least theoretically, this could have increased the risk of perioperative infection due to colonization or secondary infection of HS lesions.

P32 Shedding Light on Unseen Challenges: Investigating the Underreported Issue of Undescended Testes

Yaqub Ahmedfiqi[1], Mahmoud Ajine[1], Rami Madani[1], Grainne Caughey[1], Patrick Hansma MD[2]
[1]Western Michigan University Homer Stryker School of Medicine M.D., Kalamazoo, MI, USA. [2]Department of Pathology - Western Michigan University Homer Stryker M.D. School of Medicine, Kalamazoo, MI, USA

Introduction: Cryptorchidism is defined as the lack of one or both testes in the scrotum. It affects about 3% of full-term and 30% of premature male infants. True incidence is approximately 1% after the first year of life. Early intervention plays a significant role in minimizing long-term morbidities associated with cryptorchidism, including increased risk of testicular germ tumors, inguinal hernias, torsion, and psychological impairments; therefore, It is crucial for physicians to detect cryptorchidism early. Treatment is typically orchiopexy and continuous monitoring. Given the serious ramifications of undiagnosed cryptorchidism, this retrospective study examines and calls to attention the incidence of cryptorchidism in pediatric autopsies, focusing on discrepancies between reported and actual testicular descent in medical histories.

Methods: We systematically examined a forensic pathologist's pediatric (<18 years old) autopsy reports performed between 2010 and 2022. We identified 186 pediatric cases and among these, we identified a total of 113 males. Of these 113 male pediatric cases, we further identified five cases of undescended testes. He primary objective was to determine the incidence of unreported cryptorchidism in pediatric autopsies with histories of normal testicular descent (NTD).

Results: The incidence of cryptorchidism was 4.4% (5/113). In all cases, medical records documented NTD. The average age at autopsy of these 5 decedents was 3.0 years.

Discussion: Due to the previously discussed risk of UDT (undescended testes), the rate of clinically undiagnosed cryptorchidism in the studied population is concerning. Protocol detailed by the American Urological Association, currently recommends palpation of testes for position at each recommended well-child visit and referral to a surgical specialist for timely evaluation if UDT persists beyond six months of age. Currently, methods of diagnosis include physical exam, ultrasound, and surgical exploration. Literature on improved diagnostics is scarce; studies suggest the use of diffusion-weighted imaging (DWI) with conventional MRI to increase the accuracy of identifying UDT.

This study reinforces the importance of performing routine screening for UDT. Further research should investigate high-sensitivity methods to evaluate UDT. Additionally, larger retrospective studies could investigate potential correlations between cryptorchidism and factors such as SES and race.

P33 A Case Report: Fatal Hemorrhage from a Dislocated Prosthetic Knee Joint

Geunyoung Jung MD[1,2], Zachary O'Neill DO[1,2], Christopher K. Poulos MD[1,2]
[1]Indiana University School of Medicine, Indianapolis, IN, USA. [2]Marion County Coroner's Office, Indianapolis, IN, USA

Total knee arthroplasty (TKA) is a relatively common procedure for patients with knee pain and dysfunction from underlying diseases, such as osteoarthritis. Although the procedure is beneficial, there are potential complications.

Here we report a rare, fatal, complication of TKA. The decedent was a 77-year-old woman with a medical history of hypertension, hypercholesterolemia, coronary artery disease (with stenting), morbid obesity, prediabetes, breast cancer, arthritis, gout, insomnia, obstructive sleep apnea, and supraventricular tachycardia. She also had a history of bilateral TKAs in 2015 (right) and 2017 (left) with initial radiographs confirming the correct placement of the left knee prosthesis. Despite the bilateral TKAs, she had recently complained of knee pain. In 2023, the decedent was supposed to attend a meeting; however, when she did not arrive a well-being check was requested. A police officer arrived, unlocked her secure residence, and found her deceased on the floor. A defect, initially resembling an incised wound, was observed on her left lower extremity and a significant amount of clotted blood and blood spatter was in the area surrounding the decedent. Money and valuables present within the residence were undisturbed, no sharp objects found near the decedent, and neighbors reported no unusual activity at the residence.

Autopsy examination revealed a morbidly obese woman with a 7-inch full thickness laceration of the left popliteal fossa. Radiology of the extremity reveled dislocation and displacement of the prosthetic joint. Examination of the laceration revealed transection of the left popliteal artery, exposure of the dislocated prosthetic knee, and a patellar fracture. Further examination demonstrated a few contusions of the torso; however, no additional significant injuries were observed. Internal examination revealed cardiomegaly with mild coronary artery stenosis. Toxicology was negative for tested substances. We believe that sudden prosthetic joint failure and dislocation resulted in the laceration and the transection of the artery, with resultant exsanguination. The cause of death was reported as 'exsanguination due to laceration of the left popliteal artery, due to mechanical failure of left prosthetic knee joint'. The manner of death was categorized as "accident."

A review of literature regarding TKA indicates that generally favorable long-term functionality, but with relatively high complication rates up to approximately 50% at six months; however, both mortality (0.2%) and dislocation (0.1%) are rare events. An additional study documented statistically significant higher mortality from TKA in patients with underlying comorbidities, such as cardiovascular disease, as seen in this case.

P34 Meckel Diverticulum as a Lead Point for Fatal Volvulus in an 84-Year-Old Man

Hiro Ross MD, MCR
UCLA, Los Angeles, CA, USA

Introduction: Meckel diverticulum is a common congenital abnormality and is a remnant of the embryonic omphalomesenteric duct. It is most commonly asymptomatic and found incidentally, however, incomplete obliteration of the duct can result in omphalomesenteric cysts, fistulae, and gastrointestinal bleeding distal to the diverticulum. In some cases, fibrous derivatives of the vitelline arteries may form a mesodiverticular band that connects the mesentery to the tip of the diverticulum, leading to bowel obstruction.

Case description: We present a case of an 84-year-old man with a history of aortic stenosis with a prosthetic valve, chronic obstructive pulmonary disease, and unspecified gastrointestinal bleeding, who presented to the emergency room with shortness of breath and abdominal pain. He was treated for a COPD exacerbation and admitted to observation, and was shortly thereafter found without a pulse and with vomit on his gown. Resuscitation attempts were unsuccessful. Autopsy demonstrated twisted, hemorrhagic and necrotic loops of small bowel extending from the mid-jejunum to the ileocecal valve, incarcerated by a fibrous band and what appeared to be a diverticulum. Further examination revealed a true diverticulum in the proximal ileum lined with necrotic small bowel epithelium.

Discussion: Despite the high clinical suspicion for sudden death in the context of a COPD exacerbation, the cause of death was likely gangrenous small bowel necrosis in the setting of intestinal volvulus with a Meckel diverticulum as a lead point. In this case, the mesodiverticular band resulted in incarceration and volvulus of the adjacent bowel. The ensuing hemorrhage and gangrenous necrosis carried a high risk for metabolic derangements, dehydration, sepsis, multi-organ failure, and sudden death. Only rare cases of sudden death due to this complication of mesodiverticular bands have been reported, predominantly in children, and exceptionally rarely in adults. It is important for pathologist to be familiar with this entity as a potential cause for sudden death, as well as to be mindful when performing the internal examination to avoid disrupting the mesodiverticular band.

P35 Diabetic Ketoacidosis in the Setting of Autoimmune Polyendocrinopathy

Jane E Persons MD, PhD, Dennis Firchau MD
University of Iowa Hospitals and Clinics, Iowa City, Iowa, USA

Type 1 diabetes mellitus is an autoimmune disease characterized by destruction of beta cells, the insulin-producing cells of the pancreas. Individuals with type 1 diabetes mellitus are at increased risk of developing ketoacidosis, which may even be the initial presentation of the disease. Diabetic ketoacidosis develops when there is insufficient insulin available for normal glucose metabolism, resulting in hyperglycemia. Compensatory fatty acid metabolism leads to increased production of ketone bodies, producing an anion gap metabolic acidosis. Diabetic ketoacidosis can be rapidly fatal without appropriate intervention.

Although type 1 diabetes mellitus is usually a polygenic, non-syndromic autoimmune disorder, genetic diabetes syndromes have also been described. In this report, we present a case of fatal diabetic ketoacidosis in a patient with type 1 diabetes mellitus in the setting of a previously undiagnosed autoimmune polyendocrinopathy.

The patient was a 26-year-old woman with type 1 diabetes mellitus that was first diagnosed at five months of age. She had generally poor blood glucose control and had multiple prior hospital admissions for diabetic ketoacidosis. Several days following her most recent hospital admission, she was found lying in bed at home, deceased. An autopsy was performed. Postmortem toxicology testing showed elevated blood acetone concentration (31 mg/dL). Postmortem vitreous chemistry testing was significant for elevated glucose concentration (483 mg/dL; reference range <200 mg/dL). In addition, microscopic examination of the internal organs showed glycogenic hepatopathy and nodular glomerulosclerosis with hyaline arteriolosclerosis, conditions associated with longstanding uncontrolled diabetes.

Autopsy examination also showed chronic lymphocytic (Hashimoto) thyroiditis and lymphocytic adrenalitis (Addison disease). The pituitary was evaluated and showed no evidence of inflammation. These findings raised suspicion for the presence of an autoimmune polyendocrine syndrome. Specifically, co-occurrence of type 1 diabetes mellitus, lymphocytic adrenalitis, and chronic lymphocytic thyroiditis is characteristic of autoimmune polyendocrine syndrome type II (Schmidt syndrome). However, in the absence of genetic testing, this co-occurrence of multiple autoimmune conditions was broadly categorized as 'autoimmune polyendocrinopathy'. Cause of death was attributed to diabetic ketoacidosis due to type 1 diabetes mellitus in the setting of autoimmune polyendocrinopathy. Manner of death was natural.

P36 Right Atrial Perforation in the Setting of Methamphetamine-Associated Cardiomyopathy

Christie-Anne Estrada MD[1], William R Oliver MD[2]
[1]University of Tennessee Graduate School of Medicine, Knoxville, TN, USA. [2]Knox County Regional Forensic Center, Knoxville, TN, USA

Right atrial perforation is a rare sequela of a few clinical situations such as acute myocardial infarction, invasive cardiac procedures, or cardiac malignancies. This case is a novel example of a right atrial perforation due to methamphetamine-associated cardiomyopathy. The decedent was a 44-year-old male with a history of methamphetamine use who suffered a witnessed collapse and was pronounced on scene. His autopsy showed findings consistent with acute and chronic sympathomimetic drug use such as cardiomegaly with dilated cardiomyopathy, necrosis, perforation of the right atrium, and hepatitis. Toxicologic evaluation revealed methamphetamine and benzoylecgonine. 800 ml of bloody fluid was removed from the pericardial space. On histologic examination, the right atrium demonstrated acute hemorrhage, mild to moderate patchy fibrosis with myocyte necrosis, and mixed acute and chronic inflammation. The cause of death was classified as cardiac tamponade secondary to a right atrial perforation. Searches of PubMed and Google Scholar failed to provide a report of this complication. This case provides an example of a rare and possibly novel cardiac pathology that occurred as a complication of methamphetamine-associated cardiomyopathy (MAC).

P37 Hemorrhagic Enteritis as a Rare Complication of Rotavirus A Infection in a Young Child

Phillip Bennett DO[1], Jessicia Schmitt MD[1], Lily Marsden MD[2]
[1]University of Utah Department of Pathology, Salt Lake City, UT, USA. [2]Utah Office of the Medical Examiner, Taylorsville, UT, USA

Rotavirus is a common pathogen implicated in severe gastroenteritis in children worldwide and the most common cause in children under the age of 24 months. Rotavirus infection may lead to mortality in developing countries due to lack of access to vaccination, poor hygiene and malnutrition. Typically, rotavirus presents with symptoms of watery diarrhea, vomiting, fever, dehydration, and rarely, neurological symptoms such as convulsions or encephalitis. Hemorrhagic enteritis is a rare complication that is not often associated with rotavirus. This autopsy case report is that of a well-nourished and appropriately developing 12-month-old female child who was found unresponsive shortly after falling asleep in her parent's bed. She was transported to the hospital but could not be revived. Hospital labs resulted a critically low hemoglobin of 2.9 g/dL, but no obvious source of bleeding or identifiable cause of death. Her medical history was remarkable for numerous visits for presumed infections (upper respiratory tract infections, otitis media, and gastroenteritis) in addition to routine pediatrician visits where she received all recommended vaccinations, including rotavirus. Autopsy revealed diffusely erythematous small bowel mucosa and patchy large bowel mucosal erythema with a large amount of liquid bloody stool filling the bowel. Microscopically, the bowel

showed lamina propria and submucosal hemorrhage with increased, predominantly mononuclear inflammatory infiltrate extending into the overlying mucosa. Infectious disease stool testing detected rotavirus A. Given the extreme rarity of hemorrhagic enteritis as a complication of rotavirus infection and her numerous medical visits for various types of infections, a primary immunodeficiency is suspected to have played a role in this child's death, though this was not able to be confirmed.

P38 Rising Detection of Xylazine in Toxicology Reports: Implications for Public Health and Polydrug Use Patterns

Casem Ballouk MD, Teresa Nguyen MD, Omar Rayes MD
Wayne County Medical Examiner, Detroit, MI, USA

Xylazine, traditionally a veterinary sedative not approved for human use, has seen a concerning increase in detections in human toxicology reports. This trend, as revealed by the analysis of data from the Wayne County Medical Examiner's Office between 2019 and 2022, has shown a considerable rise, stabilizing in the more recent years of the study. The data indicates a notably higher incidence of xylazine detections in males, highlighting a potential gender-specific impact that warrants further attention within public health discussions

Our study also shows a significant association between xylazine and opioid co-detections, with every case testing positive for xylazine and fentanyl for the first two years. In the latter two years, the association remained high at over 98%. Additionally, cocaine has emerged as another frequently co-detected substance, pointing to complex patterns of polydrug use.

The ramifications for public health are profound, given the depressant effects of xylazine and the enhanced risks when used in combination with other substances. Although our insights pertain to Wayne County, the observed trends are indicative of a broader issue, underscoring the urgent need for comprehensive public health strategies. These strategies must address the realities of polydrug use and its effects on community health and safety.

P39 Homemade Fentanyl Suicide Machine Used in Experiment to Prove Existence of the Multiverse: A Case Report

John-Luke Rivera MD[1], Claire Sorensen MD[2], Lorenzo Gitto MD[2]
[1]Department of Pathology and Laboratory Medicine, Loyola University Medical Center, Maywood, IL, USA. [2]Cook County Medical Examiner's Office, Chicago, IL, USA

Deaths by homemade suicide machines naturally capture public attention given the sensationalism of the subject matter and the complexity of the mechanisms involved. In the medical literature, the vast majority of these suicides are due to makeshift firearms, followed by devices that emit toxic gas, electrocute, explode, or cause lethal sharp force injury. Even rarer are automated devices designed to inject a lethal dose of drugs.

In this case, a self-made apparatus designed to administer a fatal dose of fentanyl leading to an intentional acute toxicity was used. As detailed in a 19-page scientific article-style draft he sent to his family posthumously, the decedent engineered this device with the express purpose of testing the Many-Worlds Interpretation of quantum mechanics. This interpretation posits that for every time one outcome is observed, there are "parallel universes" in which a different outcome becomes reality; these "parallel universes" are collectively called the "multiverse". By programming his homemade device to kill the versions of him in the "parallel universes" where he did not achieve a desired outcome (e.g., having the winning numbers of a Powerball lottery drawing) the decedent sought to experience a reality where he did win the lottery, which would somehow, through his convoluted logic, thereby prove the existence of the "multiverse."

Initially, the bizarre details of the scene led investigators to consider possibilities like intentional electrocution or even homicide executed by remote means. Thorough death scene and background investigation was critical to determine that it was an elaborate act of suicide.

P40 A Hidden Culprit: A Report of Two Unusual Deaths Secondary to Gastrointestinal Bleeding

Andrea Leal Lopez MD[1], Todd M. Luckasevic DO[2]
[1]University of Pittsburgh Medical Center, Pittsburgh, Pennsylvania, USA. [2]Allegheny County Medical Examiner's Office, Pittsburgh, Pennsylvania, USA

According to the World Health Organization (WHO), gastrointestinal diseases caused 20.41 deaths per 100,000 population in the United States in 2019. These most commonly include gastrointestinal hemorrhage (e.g., peptic ulcer disease, esophageal varices, mucosal tears), peritonitis from perforation, intestinal obstruction, pancreatitis, or complications from cirrhosis. We present two cases of exsanguination secondary to gastrointestinal bleeding in unusual settings.

Case 1: The decedent was a 74-year-old female with a history of remote Roux-en-Y gastric bypass, diabetes, and two prior myocardial infarctions with stenting. In the six months prior to her death, she had three episodes of hematemesis and hematochezia. The bleeding source was not identified despite endoscopies and CT scans. Ultimately, she had hematemesis with sudden death. Autopsy revealed an intact Roux-en-Y gastric bypass with an ulcer in the excluded duodenum, eroding into a vessel. The excluded stomach contained 1.5 liters of liquid and clotted blood. The intestines held liquid blood and dark tarry stools. The kidneys and brain displayed pallor.
Case 2: The decedent was a 52-year-old male with a history of alcohol misuse. He complained of malaise, weakness, and pallor. He was found unresponsive in a residence surrounded by minimal bloody material. Autopsy revealed two Mallory-Weiss tears in the gastro-esophageal junction (GEJ) with ruptured esophageal varices and 1 liter of liquid and clotted blood in the stomach. Additional findings included liquid blood throughout the intestines and a steatotic and cirrhotic liver.

Although a rare complication, ulceration in the gastric or duodenal remnant in gastric bypass patients can occur months to years after the procedure. This represents a diagnostic challenge, as conventional endoscopy fails to visualize these areas, requiring alternative methods such as double-balloon enteroscopy or transgastric endoscopy. To our knowledge, this is the first report of fatal gastrointestinal bleeding in a gastric bypass patient caused by peptic ulcer disease in an excluded section of the stomach or duodenum. Mallory-Weiss tears are longitudinal lacerations of the esophageal mucosa, a rare complication that results from a sudden increase in intraesophageal pressure after repeated forceful vomiting or retching. They are most frequently seen in men with a history of alcohol misuse and located in the distal esophagus, GEJ, or lesser curve of the stomach. They can cause profuse bleeding with acute exsanguination. Rare fatalities have been published in the literature.

Given the mortality burden of gastrointestinal diseases, these cases highlight the importance of a careful evaluation of the digestive tract during autopsy.

P41 WITHDRAWN

P42 Possible Pulmonary-Renal Syndrome as a Cause of Death: An Uncommon Finding at Autopsy

Khanh Duy Doan MD[1], Amy D Stringer MS[2], Yin Jiejing MD[1], Nahum Duker MD[1], Jared Hassler MD[1]
[1]Temple University Hopsital, Philadelphia, PA, USA. [2]Lewis Katz School of Medicine - Temple University, Philadelphia, PA, USA

Introduction: Pulmonary-renal syndrome is a rare condition in which glomerulonephritis is accompanied by pulmonary hemorrhage.

Case description: The patient was a previously healthy 53-year-old male with a past medical history of hypertension and diabetes. He was admitted due to fatigue, increasing dyspnea, decreased urine output, and edema of the lower extremities for several days. He denied fever, joint pains, rashes, hematuria, or hemoptysis. The admission labs were remarkable for a

creatinine concentration of 19.9 mg/dL (elevated from a baseline of 1.1mg/dL one year ago), potassium concentration of 8.2 mEq/L, severe metabolic acidosis along with abundant blood and leukocytes in the urine. Chest radiographs showed diffuse bilateral lung infiltrates. The patient experienced rapidly progressive hypoxic respiratory failure. Despite maximum medical care, the patient went into cardiac arrest and expired. At autopsy, microscopic examination of the kidney was remarkable for diffuse, same-staged, active crescentic glomerulonephritis, with nearly 90% of glomeruli involved. His lungs were heavily congested on gross examination. Pulmonary edema was present suggestive of acute left-sided heart failure secondary to volume overload due to kidney failure. This correlates with the clinical picture observed before expiration. Microscopic examination of the lung also revealed focal alveolar hemorrhages with the presence of hemosiderin-laden macrophages confirmed by iron stain, suggestive of underlying chronic heart failure or a prior alveolar hemorrhage. The heart showed some extent of concentric hypertrophy, but all coronary arteries were unremarkable.

Discussion: The differential diagnosis for crescentic glomerulonephritis includes ANCA-vasculitis (pauci-immune), anti-glomerular basement membrane disease (anti-GBM antibodies), and immune complex-mediated glomerulonephritis such as in systemic lupus erythematosus. The number of glomeruli involving crescents would be much less prominent (usually <30%) in immune complex-glomerulonephritis than that we found in this patient (90%). In ANCA vasculitis, we should see crescents at different stages (cellular and fibrous), unlike in this case, most crescents were cellular (active). A combination of a highly aggressive clinical course and a very high percentage of glomeruli involved by cellular crescents (90%) made anti-GBM disease the most likely underlying etiology in this case. In addition, the presence of abundant hemosiderin-laden macrophages in the lung of a patient with no known history of chronic heart failure raised the possibility of pulmonary renal syndrome (Goodpasture syndrome or ANCA vasculitis). However, the definite diagnosis could not be confirmed due to lacking premortem serology for anti-GBM and ANCA antibodies and unavailable immunofluorescence on previously formalin-fixed tissues.

P43 BASE Jumping Deaths in Utah: A 12-year Retrospective Study

Jessicia Schmitt MD[1,2], Neil Haycocks MD, PhD[3,4]
[1]University of Utah, Salt Lake City, Utah, USA. [2]ARUP Laboratories, Salt Lake City, Utah, USA. [3]Utah Office of the Medical Examiner, Salt Lake City, Utah, USA. [4]University of Utah School of Medicine, Salt Lake City, Utah, USA

BASE jumping is a recreational activity where one jumps from a fixed object and uses a parachute to descend to the ground below. The term BASE is an acronym derived from the most common jumping points: buildings, antennae, spans (i.e., bridges), and earth. There are several variations of BASE jumping. One uses a so-called wingsuit, which provides lift and allows the user to glide head-first rather than freefall. An individual in a wingsuit will terminate the jump by deploying a parachute. BASE jumping is a fairly hazardous undertaking. Compared to skydiving, the jumps have lower altitudes, less aerodynamic control, and close proximity to obstacles (e.g., cliffs), making accidental deaths more likely.

Utah is a geographically large western state that attracts many outdoor enthusiasts year-round. Its geography includes mountains in the northern and central parts of the state and mesas, buttes, pillars, spires, and arches in the southern and eastern regions. These formations lend themselves to a broad array of activities, including BASE jumping.

A search of the Utah Office of the Medical Examiner electronic database identified 13 deaths from BASE jumping during the period from 2011 to 2022. During this same timeframe, there were two deaths from skydiving accidents. Of the 13 decedents, 11 (85%) were male and two (15%) were female. The mean age was 33 years (range 22-55). Wingsuits were used in four (31%) of cases, and the remaining 9 (69%) used only parachutes. Examination of the autopsy reports from these cases showed a broad array of blunt force injuries without overt differences between wingsuit and parachute-only cases.

Interestingly, the locations of the deaths showed an evolution. From 2011 to 2016, there were eight deaths that occurred in five counties around the state. These included two deaths in Zion National Park (Washington County), where BASE jumping is illegal, and two deaths at Notch Peak (Millard County), which has the second tallest vertical cliff face in North America. From 2016 to 2022, all five deaths occurred at different sites in a single county (Grand) near the town of Moab. The root cause of each fatal accident was not always clear, in part because the falls were not always witnessed, but parachute failures were the most commonly recognized factor. While BASE jumping will always be an inherently dangerous activity, these findings underscore that careful planning and proper use of equipment can mitigate the associated risks.

P44 Beyond the Grave: Examining the Role of Exhumation in Forensic Investigations

Muhammad Ahmad Faraz MBBS, Faisal Naeem Bandesha, Pervaiz Zarif
Post Graduate Medical Institute, Lahore, Lahore, Punjab, Pakistan

Introduction: Exhumation is the disinterment or retrieval of a corpse, or its remains, either coffined or unconfined, after burial. Authorized personnel carry out the disinterment with permission from the law of the land. Our study set out to analyse the prevalence of exhumation and to evaluate the usefulness of exhumation in identifying the causes of death and other associated factors.

Methods: This record-based retrospective study, spanning five years from January 1, 2018, to December 31, 2022, was conducted at the Department of Forensic Medicine & Toxicology of Lahore General Hospital, Lahore, Pakistan, after approval from the institutional ethical review committee. It focused on all the exhumations carried out during that time. Data were sourced from exhumation registers, police reports, and Punjab Forensic Science Authority reports and entered into a Microsoft Excel worksheet. Data analysis was performed using SPSS version 25.

Results: Between 2018 and 2022, eight exhumations were carried out. The minimum age of the exhumed body was 20 years, and the maximum was 79 years, with a mean age of 53.3 ± 24.7 years. Of total exhumations, seven (87.5%) were males and 01 (12.5%) were female bodies. In 2018 and 2021, three, while in 2019 and 2020, one exhumation was carried out. All eight bodies were buried in a graveyard, and autopsies of all the exhumed bodies were done there. None of the bodies was preserved either by embalming or refrigeration before the burial, and the time elapsed between burial and exhumation in four (50.0%) cases was more than six months and was less than six months in the remaining four (50%) cases. None of the exhumed bodies were recognizable by facial features. Seven (87.5%) of the exhumed bodies were at the stage of advanced putrefaction, and one (12.5%) was near skeletonization. Toxins were found in four (50.0%) cases, of which morphine was present in two (50.0%) cases. In the one (12.5%) case, bone fractures were present. In five (62.5%) cases, the cause of death could be ascertained after the autopsy of the exhumed body, of which two (40.0%) cases each were determined to be poisoning and due to disease process, while in one (20.0%) case, cause was ascertained to be due to blunt trauma.

Discussion: Although it's not done very often, exhumation is nevertheless a valuable procedure. It can answer several questions and help the justice system. Hence, whenever the need arises, exhumation should be done.

P45 Autopsy Unveils Pituitary Macroadenoma and Its Complex Complications in a Severely Obese Male

Omid Golestanian MD[1], Fahad Fuad Bafakih MD[2]
[1]West Virginia University, Morgantown, WV, USA. [2]Charleston Area Medical Center, Charleston, WV, USA

These are the autopsy findings of a 36-year-old male with abnormal peripheral vision, and obesity. Multiple fractures in the left lower extremity caused by a traumatic accident likely due to abnormal peripheral vision combined with a unique medical history and anthropometric characteristics

created a challenging clinical scenario. The patient developed pulmonary embolism and was treated successfully. The patient underwent a left below-the-knee amputation due to infection which was complicated later by renal failure, electrolyte disturbances, and respiratory distress. He was stabilized and was ready to be discharged, however; he suddenly deteriorated and died. The first clinical impression was between a pulmonary embolism or a cardiac event. A full autopsy showed a pituitary macroadenoma with hemorrhage and infarction.

This is a 36-year-old male with history of a car accident resulting in a comminuted fracture and open wound on his legs. Despite extensive medical intervention provided to the patient during hospitalization, including limb amputation, his condition quickly deteriorated, ultimately resulting in his death 19 days after the accident. Two significant findings were found at autopsy: a pituitary macroadenoma with hemorrhage and necrosis measuring 5.0 x 5.0 cm and an acute subarachnoid hemorrhage in the quadrigeminal plate and sella turcica region.

The patient's condition presented multiple challenges due to severe obesity, traumatic injury, surgical intervention, and pre-existing medical conditions. Additionally, the patient had an undiagnosed pituitary macroadenoma that hemorrhaged most likely leading to acute subarachnoid hemorrhage, resulting in significant neurological impairment. Macroadenoma can compress nearby brain structures such as the optic chiasm, hypothalamus, and cranial nerves, leading to several neurological symptoms such as visual disturbances and neurological deficits. The tumor can also cause abnormal pituitary function resulting in hormonal imbalance. These hormonal imbalances lead to systemic effects, such as metabolic, cardiovascular, renal failure, and electrolyte disturbances, which can complicate the clinical course further.

This case demonstrates the significant complexity involved in treating patients with multiple health conditions, especially when dealing with rare anatomical findings such as pituitary macroadenoma and acute subarachnoid hemorrhage. The pituitary macroadenoma with hemorrhage and necrosis/infarction likely resulted in the patient's death through various factors such as mass effects, hormonal imbalances, neurological compromise, and secondary complications. The patient was 210 cm and 500 lbs; this could be due to pituitary hormonal imbalance. This anatomical finding highlights how complex such cases can be and emphasizes the importance of timely diagnosis and management of pituitary tumors to improve patient outcomes.

P46 Disseminated Kaposi Sarcoma and Inflammatory Cytokine Syndrome: An Unexpected Cause of Death in a Young HIV-Positive Male on Antiretroviral Therapy

Hunter Koster MD, John-Luke Rivera MD, Christopher Bell DO, Andreas Kontosis MD, Phillip McMullen MD, PhD
Loyola University Medical Center, Maywood, Illinois, USA

We present this case of a 22-year-old male with HIV diagnosed four months before his admission who was started on antiretroviral therapy (ART) and was taking the medication as prescribed. He initially presented to the emergency department with bilateral lower extremity weakness and a witnessed seizure. A few days prior, he was experiencing chills, dizziness, lethargy, epistaxis, and swelling of his neck, groin, and armpits. His examination was remarkable for diffuse palpable lymphadenopathy. His labs showed profound anemia (hemoglobin of 3.3 g/dL), thrombocytopenia (platelet count of 19 k/uL), leukocytosis (20 k/uL), and a normal CD4 count (589 cell/mm3). Chest x-ray showed diffuse patchy opacities on the right lung field with pleural effusion. The patient's condition continued to worsen despite broad spectrum antibiotics and pressors, and he was deemed too unstable to perform a lymph node biopsy. The patient ultimately passed away from progressive shock and respiratory failure, and the family requested an autopsy. The external exam was significant for anasarca, palpable axillary and inguinal lymphadenopathy, and an absence of rashes or skin lesions. All lymph node cut surfaces exhibited dark pink-purple fleshy centers and the spleen also showed focal nodular areas. The bilateral lungs were heavy and hemorrhagic with marked pink-purple lymphadenopathy. Essentially all abnormal organs contained metastatic deposits of Kaposi Sarcoma, including the bilateral lungs, trachea, all examined lymph nodes, right kidney, spleen, and liver. The diagnosis of Kaposi Sarcoma was confirmed by HHV-8 immunostaining. In the context of treated HIV-infection with an appropriate clinical and laboratory response, the findings were most suggestive of Immune Reconstitution Inflammatory Syndrome-Associated Kaposi Sarcoma (IRIS-KS) complicated by Kaposi Sarcoma Inflammatory Cytokine Syndrome (KICS). Both of these entities are exceedingly rare. IRIS-KS can occur days to months after initiative of antiretroviral therapy, and it is a result of the restoration of dysregulated immune response after ART initiation that results in florid proliferation of KS. KICS mimics severe sepsis and is usually associated with acute respiratory distress syndrome due to excess IL-10 and IL-6 cytokine release as a result of disseminated KS. We present this case as a teaching point for a differential diagnosis of future patients to consider KS-IRIS and/or KICS in any decompensating HIV+ patient who has recently started on ART.

P47 A Report of Two Cases of Iatrogenic Vascular Cannulation Injury Discovered at Autopsy: A Literature Review and Brief Discussion on Manner of Death

Allison Lindsey MD, MS[1], Staci Keene MD[1], Lauren C Scott MD[2], Janet Baranello MD[2]
[1]University of North Carolina, Chapel Hill, NC, USA. [2]North Carolina Office of the Chief Medical Examiner, Raleigh, NC, USA

Iatrogenic vascular cannulation injuries represent uncommon yet critical complications of medical procedures. Often, they are discovered in a clinical setting, but in the following two cases injuries were first documented at postmortem examination.

Decedent 1 was a 42-year-old female admitted to the hospital for chest pain after she was assaulted the day prior. She received a cardiac stent via the left femoral artery after being diagnosed with a myocardial infraction. It was noted she had small femoral and iliac arteries. Following the procedure, she experienced left-sided weakness, coded, and could not be resuscitated. Autopsy documented 400 mL of hemoperitoneum with extensive soft tissue hemorrhage, a defect in the left external iliac artery without notable atherosclerosis, and a defect of the bladder wall. No contributory blunt force injuries were seen. The cause of death was determined to be hemoperitoneum due to perforation of the left external iliac artery and bladder wall during left femoral line placement and manner of death was accident.

Decedent 2 was a 51-year-old female admitted to the hospital for shortness of breath after a recent ankle fracture with a complicated hospital course, including septic shock with multiorgan failure and acute respiratory failure with non-survivable progressive pulmonary fibrosis. No complications of the ankle fracture were noted. She required veno-venous extracorporeal membrane oxygenation (ECMO) and was cannulated in the right internal jugular and left femoral veins, but cannulation was switched to the right femoral vein due to insufficient flow. After 16 days on ECMO, she was transitioned to comfort care and died. At autopsy, there was 500 mL of hemoperitoneum and a massive left retroperitoneal hematoma extending into the left thigh along the left femoral vasculature, measuring at least 2500 mL; no vascular defect was identified. The cause of death was attributed to diffuse alveolar damage in the setting of infection and preexisting pulmonary disease; the hematoma cannot be excluded as contributory. The manner of death was classified as natural.

Iatrogenic vascular injury is a known risk factor for cannulation procedures and is associated with high morbidity and mortality rates. Given the nature of these types of injuries, cases can have vastly different clinical presentations which can explain the lack of clinical detection in some instances. These cases highlight the importance of autopsy examination in detecting subclinical iatrogenic vascular injury as well as broach the discussion of manner of death determination in such cases.

P48 Fatal Unrecognized Confined Perforated Duodenal Ulcer Discovered by Autopsy Examination
Danielle Lee Mack MD, Dennis Firchau MD
University of Iowa Hospitals and Clinics, Iowa City, IA, USA

Peptic ulcer disease, characterized by mucosal ulceration of the stomach or proximal small intestine, has declined in incidence partially due to the widespread use of proton pump inhibitors and the treatment of *H. pylori* infection. Despite this trend, the complications of these ulcers continue to pose a significant risk to individuals. Left untreated, peptic ulcers can perforate and quickly become a surgical emergency associated with high mortality rates. In rare cases, perforations are confined by adjacent organs or tissues, presenting a diagnostic challenge for clinicians who may not encounter the usual warning signs of perforation, thus potentially delaying critical interventions. Here, we present a case of perforated duodenal ulcer confined by the liver discovered during autopsy in an individual with a complex clinical picture and no clinical suspicion of perforation.

The decedent was a 57-year-old female with a complex medical history who was found minimally responsive at home by her husband. She was transferred to a local hospital where she was found to have bilateral acute to subacute cerebral infarcts and severely low hemoglobin concentrations. Her condition deteriorated rapidly, culminating in cardiac arrest necessitating resuscitation. She was transferred to allow for a higher level of care for shock with multisystem organ failure. She was found to have necrotic wounds on the back and lower extremities, was clinically suspected to have pneumonia, and had a urinary tract infection with Klebsiella pneumonia bacteremia. She was also noted to have melanotic stools during the admission. As her condition deteriorated further, the decision was made to transition her to comfort care, and she was pronounced dead a few days later.

In addition to the anticipated findings related to her chronic illness and recent resuscitation, autopsy examination revealed a 1.5 x 1 cm perforated peptic ulcer of the proximal duodenum with tamponade by the adjacent liver. There was 900 mL of blood throughout the small intestine and colon, related to the duodenal ulcer.

This case raises awareness among clinicians and forensic pathologists that the typical signs and symptoms of peptic ulcer perforation may be absent in cases of confined perforation. A heightened index of suspicion for this entity is necessary in the context of severe hemorrhage and shock in individuals of advanced age with multiple comorbidities.

P49 High-Dose Loperamide Intoxication with Cardiotoxicity Resulting in Sudden Death: A Case Report
Katherine N. Christel MD, Dennis Firchau MD
University of Iowa Hospitals and Clinics, Iowa City, IA, USA

Loperamide is an over-the-counter opioid commonly used as an antidiarrheal. In supratherapeutic doses loperamide can have similar effects to methadone in alleviating opioid withdrawal symptoms and, less commonly, in achieving a euphoric effect.

Over the past decade, these alternative uses, along with accessibility and low-cost, have caused it to gain popularity among opioid users, resulting in increased misuse and abuse. Cases have been described in the emergency medicine literature of patients presenting with syncope and cardiac arrest where testing revealed extremely elevated concentrations of loperamide in their postmortem plasma.

High doses of loperamide have been shown to be cardiotoxic and result in ECG abnormalities including marked QT-interval prolongation, widening of the QRS-interval, and ventricular dysrhythmias such as monomorphic or polymorphic ventricular tachycardia (Torsades de Pointes). Death resulting from such cardiac arrhythmias could have an otherwise negative autopsy, and loperamide is not included on all routine toxicology panels.

We report a fatal case of loperamide intoxication in a 24-year-old male with a history of depression, opioid dependence, and cannabis use. He was reported to have abstained from using heroin for approximately a year and known to intermittently use loperamide for relief of withdrawal. An empty bottle of loperamide was found in his vehicle. He was found unresponsive in his home after last being seen well an hour prior. Resuscitative efforts resulted in the return of spontaneous circulation. He was brought to a hospital with concerns for loperamide intoxication and viral myocarditis. MRI of the brain revealed anoxic brain injury and an ECG showed a widened QRS complex and new left bundle branch block. He subsequently went into ventricular tachycardia without pulse that required epinephrine and amiodarone and was pronounced brain dead the next day.

No anatomic cause of death and no life-threatening injuries were identified at autopsy. Toxicologic examination of antemortem blood was positive for loperamide at a concentration of 130 ng/ mL, which is well above concentrations related to therapeutic usage (<10 ng/mL) and concentrations reported in loperamide fatalities (as low as 77 ng/mL). Toxicologic examination was also positive for desmethylloperamide (830 ng/mL), an inactive metabolite of loperamide, at a concentration well above usual therapeutic usage (<20 ng/mL) and in one previously reported fatality (380 ng/mL).

This report presents a case of accidental loperamide intoxication. We discuss the current literature in hopes of raising awareness of increasing incidence of intoxication and mechanisms in which loperamide can contribute to death.

P50 The Utility of Postmortem Vitreous Procalcitonin in Sepsis-Related Deaths at the Medical University of South Carolina: A Comparative Analysis (2023-2024)
Brittany Wilson DO, Thomas Beaver MD
MUSC, Charleston, SC, USA

The postmortem diagnosis of sepsis is difficult as gross findings and microscopic features are nonspecific, including hemorrhage, ischemic changes, and mixed inflammatory infiltrates. Blood cultures may grow postmortem contaminants rather than the responsible infectious agent, or in cases of antemortem antibiotic treatment be entirely negative. Additionally, medical records are often delayed, incomplete, or unavailable at the time of autopsy. This can make a focused examination difficult, if not impossible. A potential tool to aid in the postmortem diagnosis of sepsis may be procalcitonin.

The utility of serum procalcitonin measurement in clinical diagnosis and management of infection and septicemia is well established. However, the use of procalcitonin concentrations in the postmortem interval is less established. A review of the literature regarding postmortem procalcitonin reveals variations in concentrations in plasma, nonspecific tissues, and various fluids including vitreous and pericardial fluid. To assess the utility of procalcitonin in the postmortem setting, a retrospective analysis was performed comparing vitreous and serum collected during autopsies at the Medical University of South Carolina from 2023-2024. An experimental group comprised of medical and select forensic autopsies with documented antemortem infection, sepsis, or those that met systemic inflammatory response syndrome criteria was compared to a control group with antemortem records with no documented evidence of an infection or pathologic inflammatory response.

P51 Disseminated Mycobacterium Tuberculosis from Infected Bone Graft Source: Case Studies In Iatrogenic Infections and Our Approach
Thomas Herb MD, Jeffrey Jentzen MD, PhD, Carl Schmidt MD
University of Michigan, Ann Arbor, Mi, USA

We are reporting the case of a 57-year-old female with a medical history of chronic renal failure for which she was treated with three kidney transplants and concurrent immunosuppression. She developed spinal stenosis treated

with an L3-L5 laminectomy and a cadaveric bone graft. The immediate postoperative course was unremarkable until three months later when she was hospitalized with diffuse lymphadenopathy and purulent ulceration of the surgical wound site. Culture of the surgical wound demonstrated acid-fast bacilli shown to be *Mycobacterium tuberculosis* in culture. Sputum and blood cultures were also positive for mycobacterium tuberculosis. Despite initiation of therapy with rifampin, isoniazid, pyrazinamide and ethambutol, the patient developed profound hypotension and died four weeks after admission. The main autopsy findings were purulent discharge from the ulcerated midline lumbar surgical site, small abscesses in the medulla of one of the transplanted kidneys, diffuse pinpoint areas of softening in the liver, and congestion and edema of the lungs. Microscopic examination of the areas of liver softening showed foci of macrophages and monocytes with reactive background hepatocytes. Ziehl-Neelsen staining showed acid-fast organisms within these loosely clustered granulomas. The abscesses in the transplanted kidney consisted of loose connective tissue, macrophages, and lymphocytes with added fungal elements (hyphae and yeast forms of Candida species). The spleen showed loss of follicular architecture, a finding common in chronic infections. Additional investigation of the bone graft source found that another recipient of the same bone graft donor was also positive for mycobacterium tuberculosis. The cause of death was sepsis in the setting of mycobacterial infection of the patient's transplanted bone graft. These infections are not rare. We have prior experience with fungal meningitis instilled intraspinally, also found in other states. Adequate sampling of tissue is best done through a complete autopsy to adequately visualize infectious lesions. For example, with an abscess, the best sample for histology and culture is often the margin of the abscess. Dissection of anatomic areas not normally accessed may be necessary to get the sample you need. Documentation may need to include lot numbers of contaminated medication and implanted devices. Some of these deaths may happen outside of a medical center without microbiological capabilities. In that case, being aware of resources to document the causative organism through a health department, regional or state microbiological facilities is important. The workup of these cases can help identify those outside laboratory resources needed in other infectious disease outbreaks.

P52 Fatal Disseminated Neonatal Herpes Simplex Virus Type 1 Infection

Vasudevan D. Mahalingam DO, MS[1,2], Andrea Jaworski PA(ASCP)[1,2], Omar Rayes MD[1,2]
[1]Wayne County Medical Examiner's Office, Detroit, MI, USA. [2]Wayne State University, Detroit, MI, USA

Neonatal herpes simplex virus (HSV) infections are rare with incidence ranging from 1 in 3,200 to 10,000 births. Without treatment, infections can lead to life-threatening disease. HSV can be acquired perinatally and postnatally with disease manifestations ranging from localized skin, eye, and mouth (SEM) vesicular lesions to central nervous system, and disseminated forms. Historically, infections were more commonly seen with HSV type 2 and patients presented with more severe and systemic disease compared to HSV type 1. The incidence of HSV-1 genital infections, however, is increasing and accordingly there are more cases of HSV-1 neonatal infections seen with localized SEM disease. Here, we report a case of a 10-day-old male with a fatal HSV-1 infection who presented with disseminated disease. The patient was born at full term via C-section due to non-reassuring fetal heart tones. The mother was treated for Group B strep and did not exhibit any genital lesions. The pregnancy was unremarkable and delivery was without complications. The neonate was healthy until day 9 when he became unresponsive and was brought to the hospital by EMS. Initial workup showed lactic acidosis with poor respiration prompting intubation, along with intermittent drops in heart rate requiring CPR, and myoclonic movements concerning for seizure. He was started on empiric antibiotics with anti-seizure medication and was transferred to a higher acuity hospital. In the pediatric ICU, he had multisystem organ (including liver) failure, DIC, and multipressor shock. Despite aggressive resuscitation efforts, he had worsening neurological and cardiac function, and ultimately succumbed to the disease. At autopsy, external examination showed a truncal pink maculopapular rash without vesicle formation. Gross findings were consistent with consumptive vasculopathy including significant petechial hemorrhages in the thymus, heart, kidney, and diaphragm. There was hemorrhage in the perinephric soft tissue and bilateral adrenal glands. The liver had white, punctate, necrotic lesions and the brain was edematous with kernicterus, signifying acute hepatic injury. Immunohistochemical staining for HSV performed on hepatic tissue was positive and HSV-1 PCR was detected in peripheral blood. This case shows a rare instance of a fatal neonatal HSV-1 infection causing severe disseminated disease without SEM lesions. Clinical manifestations, particularly in cases of disseminated disease, are generally nonspecific and therefore require a high level of suspicion for diagnosis and treatment. With the incidence of HSV-1 genital infections rising, there may be public health implications in recognition of HSV-1 having the potential to cause disseminated neonatal herpes disease.

P53 Fetal Blunt Force Injury Patterns in Cases of Pregnant Women Involved in Motor Vehicle Collisions

Katelyn E. Moss DO[1], Ana E Lopez MD[2], Pramod Gumpeni MD[2], Marianne E. Beynon MD[2]
[1]Baylor College of Medicine, Houston, Texas, USA. [2]Harris County Institute of Forensic Sciences, Houston, Texas, USA

Motor vehicle collisions (MVCs) are the leading traumatic cause of death in the United States and are a risk factor for pregnancy complications including preterm labor, placental abruption, and uterine rupture. Trauma complicates approximately 10 percent of all pregnancies with MVCs being the most common cause of non-obstetric trauma in pregnancy. There is limited data on fetal blunt force injury patterns as a result of MVCs involving pregnant women. The risk of fetal death due to MVCs increases with gestational age. While not common, fetal loss usually results from placental abruption rather than direct blunt force injury. The most common fetal injury patterns described in the literature are blunt force injuries of the cranium and extremities; however, pelvic fractures as well as chest and abdominal injuries have been reported as well. We present a series of three cases of pregnant women killed in MVCs and highlight the blunt force injuries sustained by their fetuses.

Case 1: A 27-year-old female pedestrian was struck by a speeding car while crossing a roadway. Autopsy revealed uterine rupture with a term male fetus and placenta in her upper peritoneal cavity. Fetal blunt force injuries included multiple skull fractures with intracranial hemorrhage, complete fracture of T3 with laceration of the spinal cord, and pulpification of the spleen with hemoperitoneum.

Case 2: A 21-year-old female was the unrestrained driver of an SUV that was struck from behind by a pickup truck. Autopsy also revealed uterine rupture with an early second trimester female fetus and placenta in her upper peritoneal cavity. Fetal blunt force injuries included liver lacerations with herniation of the liver into the right pleural cavity.

Case 3: A 35-year-old female was the unrestrained rear passenger of a van who was ejected during a collision with a car. Autopsy revealed an intact uterus within which were a pulpified placenta and a late second trimester fetus. Fetal blunt force injuries included intracranial hemorrhage and liver lacerations with hemoperitoneum.

The cause of death of the mother in all three cases was blunt force injuries, and the manner of death was accident. Similar to the literature, the most common fetal injuries noted in these cases involved the head and abdomen; however, injuries involving the extremities were not seen. This case series serves to add to the fund of knowledge related to fetal blunt force trauma due to MVCs.

P54 Hereditary Hemorrhagic Telangiectasia and Methamphetamine: A Catastrophic Combination Visualized in an Unconventional Way
Erika Wheeler MD, Rhonda Mittenzwei MD, Brian Mazrim MD
King County Medical Examiner's Office, Seattle, WA, USA

Hereditary hemorrhagic telangiectasia (HHT), also known as Osler-Weber-Rendu disease, is a rare disorder of vascular malformations that confers an overall greater risk of hemorrhagic complications than the general public. Likewise, methamphetamine use has been shown to cause fatal hemorrhage due to multiple mechanisms including hypertension, vasospasm, and direct vascular toxicity. Although there are reports of pulmonary arterial hypertension and portal hypertension in subjects with methamphetamine use in the setting of HHT, to our knowledge there are no reported cases of fatal hemorrhage with this combination of factors. It stands to reason that stimulant drug use may exacerbate vascular vulnerabilities in this patient population, potentially resulting in catastrophic bleeding events. We present a case in which the decedent had a known diagnosis of HHT with past medical interventions including intracranial vascular malformation resection and elective termination of pregnancy due to the autosomal dominant inheritance pattern in this syndrome. She was last seen alive in a casino bathroom with significant bleeding from her mouth. Upon EMS arrival, she was unresponsive and was pronounced dead at the scene, which was notable for copious amounts of blood surrounding one of the toilets, on the floor around the decedent, and scattered on the surrounding walls. Further scene investigation yielded apparent illicit drug paraphernalia in the decedent's purse, including scorched foil, a lighter, and a partially burned portion of a plastic straw. In-house portable mass spectrometry (MX908; 908 Devices™) showed the presence of methamphetamine and fentanyl on the foil and straw. Two in-house screening tests, One Step Detect urine drug screen and Randox Evidence MultiSTAT™ peripheral blood testing, and final gold-standard toxicology testing via liquid chromatography-tandem mass spectrometry were positive for fentanyl and methamphetamine. Gross examination at the time of autopsy revealed vascular malformations in the lungs, brain, and nasopharynx. A Teslong Articulating Borescope (TD500) was used to visualize and photograph the nasopharynx, revealing clotted blood products and engorged vessels in dark red-purple mucosa. It is likely that, after smoking a mixed drug concoction containing methamphetamine, this vascular lesion ruptured and hemorrhaged. The cause of death was massive epistaxis secondary to HHT with combined drug intoxication including fentanyl and methamphetamine as a contributing factor; manner was accidental. This case displays an infrequently utilized technique in the forensic setting to examine an area traditionally difficult to visualize, which was essential in confirming the cause of death.

P55 *Helianthus Annuus:* A Forensic Neuropathologic Description of Histologic Findings in a Case of 'Sunflower Syndrome'
Brandon M. Maveal MD[1], Karen F. Ross MD[2], Paul V. Benson MD[1], Neda Wick MD[1], Richard E. Powers MD[1], Edward A. Reedy PhD, MD[2], Rati Chkheidze MD[1]
[1]University of Alabama, Birmingham, AL, USA. [2]Alabama Department of Forensic Sciences, Montgomery, AL, USA

We report on the histopathologic findings of the neuropathological autopsy in a case of the rare "Sunflower Syndrome." The history involves a 22-year-old female with a known clinical history of epilepsy who tragically died because of accidental drowning. Clinically, her seizure activity was associated with exposure to bright light. On neuropathological examination, the brain of the decedent showed edema (brain weight 1,600-grams) but otherwise no gross anatomic architectural pathology. On histologic examination, the primary visual cortex showed evidence of neuronal delamination with foci of large dysmorphic neurons in cortical layers 3 and 4, consistent with a focal cortical dysplasia (FCD) type IIA pattern in both occipital lobes. This morphologic finding was further supported by neu, confirming, and further highlighting dyslamination; and Neurofilament (NF) staining showing abnormal cytoplasmic accumulation of NF in a subset of neurons and dysmorphic neurons. FCD is a known cause of seizure, though traditionally found in other regions of the CNS. As the epilepsy of Sunflower Syndrome are triggered by sunlight and the finding of FCD is associated with seizure, we conclude its presence in the visual cortex adequately explains this case of seizure syndrome. There is essentially no neuropathologic description characterizing Sunflower Syndrome in the literature. More studies are required to support FCD as a pathognomonic finding for Sunflower Syndrome or if there is a range of cytoarchitectonic and physiologic disturbances to explain this rare form of epilepsy.

P56 Eosinophilic Myocarditis: A Rare and Potentially Fatal Diagnosis
Mariana Voudouri MD[1], A. Aziz Ould Ismail MD[2,3]
[1]Miami-Dade County Medical Examiner Department, Miami, FL, USA. [2]Geisel School of Medicine at Dartmouth, Hanover, NH, USA. [3]Dartmouth-Hitchcock Medical Center, Lebanon, NH, USA

Eosinophilic myocarditis represents a rare form of cardiomyopathy characterized by nonspecific systemic and cardiac symptoms. It poses a significant challenge in diagnosis and management due to its intricate nature and delayed recognition. Myocardial injury resulting from eosinophil infiltration stands as the hallmark of this condition, with endomyocardial biopsy regarded as the gold standard for diagnosis. Histologically, the condition progresses through distinct stages, from early myocardial necrosis to the emergence of eosinophilic granulomas and extensive endomyocardial fibrosis. Prognosis is contingent upon various factors, including underlying conditions, timing of diagnosis, and treatment efficacy, with the early necrotic stage signifying a critical period often associated with increased mortality. Treatment strategies, encompassing nonspecific immunosuppressive therapies, and, in severe instances, heart transplantation, aim to halt disease progression. However, diagnosis may evade detection until postmortem examination, as exemplified by the case of an 83-year-old woman presented herein, emphasizing the profound consequences of this condition. The decedent had a challenging hospital course, complicated by multiple comorbidities including several autoimmune diseases, eosinophilia, coagulopathy, and renal insufficiency. It was only upon autopsy and microscopic examination, including thorough cardiac review, that the cause of death was discovered and attributed to eosinophilic myocarditis based on histologic findings. This highlights the importance of considering eosinophilic myocarditis in the differential diagnosis of acute decompensation cases, particularly when eosinophil levels exceed reference thresholds. Moreover, it underscores the pivotal role of autopsy in unveiling such cases, given their tendency to evade detection before death.

P57 Fatal Gastric Hemorrhage in a Rare Case of Simpson-Golabi-Behmel Syndrome with Gastric Arterial Malformations
CPT Elizabeth McLeod MD, MS[1], LT Jessica Cole DO[1], CPT Ian Lagerstrom MD[2], Laura Malone MD[1]
[1]Walter Reed National Military Medical Center, Bethesda, MD, USA. [2]Walter Reed National Military Medical Center, Maryland, MD, USA

Simpson-Golabi-Behmel syndrome (SGBS) is a rare X-linked overgrowth syndrome with unknown prevalence characterized by fetal macrosomia, characteristic facial features, and mild to severe intellectual disability. Additional variable findings include supernumerary nipples, diastasis recti / umbilical hernia, congenital heart defects, diaphragmatic hernia, genitourinary defects, gastrointestinal issues, skeletal anomalies, and increased risk of embryonal tumors. SGBS has two recognized subtypes: Type I is more common and less severe, resulting from a Glypican-3 mutation. Many individuals with SGBS Type I live to adulthood. Type II is often fatal in infancy.

We present the hospital autopsy case of an adolescent male with SGBS Type I. In addition to the characteristic findings of SGBS, the decedent's medical history was significant for longstanding colonic dysmotility status post diverting ileostomy. The decedent presented to the hospital with symptoms of small bowel obstruction with minimal blood-tinged ileostomy output. Over the course of several hours, the decedent's condition deteriorated, leading to his death. At autopsy, the patient was found to have 2100 milliliters of frank blood in the small intestine and 1060 milliliters of sanguineous fluid and clots in the stomach. The location of the upper

gastrointestinal bleeding was not identified grossly. However, histologic examination of random sections from the stomach demonstrated atypical caliber arteries within the gastric mucosa, consistent with an arterial malformation. In addition to these findings, other SGBS features were identified to include hypertelorism, macroglossia, macrostomia, high arched palate, prognathism, supernumerary nipples, and non-patent ventricular septal defect.

Arterial venous malformations and telangiectasias of the gastric mucosa have a known association with massive gastrointestinal bleeding and death from exsanguination. Vascular abnormalities that are associated with SGBS include carotid artery dissection, hepatic vascular malformations, and neonatal hemangiomatosis. Gastric arterial malformations have not been previously described. Unfortunately, additional sections of stomach were not available for histologic examination to determine the extent of the vascular abnormality. This unique case of upper gastrointestinal bleed secondary to gastric arterial malformation highlights the value of retaining ample specimen for additional studies and represents a previously unreported finding in a patient with SGBS.

P58 Alcohol-Related Deaths in Washtenaw County: A Ten-Year Retrospective (2013-2023) and Reflection on Chronic Alcohol Use in Younger Adults

Jenelle H Lee MD, Alexis Snyder PA(ASCP), Catherine Morris MD
University of Michigan, Ann Arbor, Michigan, USA

Alcohol use disorder remains one of the most prevalent medical conditions affecting Americans. Recent studies by the Centers for Disease Control and Prevention have found an increase in deaths related to excessive alcohol use in the past two decades. With this in mind, it is essential that a deeper understanding of this trend is sought so that appropriate public health measures can be put in place. The Washtenaw County Medical Examiner's office serves a population of approximately 370,000 people in southwest Michigan. We conducted a retrospective review of all cases over a ten-year period (2013-2023) and selected deaths due to chronic alcohol use. We identified 341 cases that were categorized into five groups based on sociologically defined generations: the Silent Generation (birth years 1928-1945), Baby Boomers (birth years 1946-1964), Generation X (birth years 1965-1980), Millennials (birth years 1981-1996), and Gen Z (birth years 1997+). Upon further analysis, 167 (49%) cases occurred between the years 2020 and 2023, with 2021 alone accounting for 51 (15%) of all cases. When examining the proportion of deaths by generation, 13 (4%) were from the Silent Generation, 172 (50%) from Baby Boomers, 93 (27%) from Generation X, 61 (18%) from Millennials, and 2 (1%) from Gen Z. These proportions shifted over the years, showing an increased proportion of chronic alcohol use-related deaths in Generation X and Millennials, averaging an increase of 0.9 cases per year in Millennials and 1.1 cases per year in Generation X compared to an average increase of 0.5 cases per year in Baby Boomers. While the number of cases was limited, the study indicated generational variation with respect to alcohol use. The pandemic may have contributed to the overall increase in alcohol-related deaths after 2020, and the relative increase seen within Millennials and Generation X may suggest additional cultural influences. We plan to conduct further analyses to see if the trend can be explained by aging or the relative prevalence of certain groups. By identifying influencing factors unique to specific cultural groups, we can better understand these trends and develop more targeted and effective public health interventions.

P59 A Case of Disseminated Histoplasmosis in the Peach State

Patrick Nicholas Simpson-Mahan MD[1], Rachel Geller MD[2], Keith Lehman MD[2]
[1]Emory University Hospital, Atlanta, Georgia, USA. [2]Georgia Bureau of Investigation, Atlanta, Georgia, USA

Surveillance data of infectious diseases have described histoplasmosis (caused by the infectious organism, *Histoplasma capsulatum*) as a mycotic infection widely endemic to Central America and the Midwest of the United States, usually causing disease in immunocompromised people. However, relatively few cases of histoplasmosis have been reported in immunocompetent people except for those living in crowded facilities. Here, we report a case of disseminated histoplasmosis in a 24-year-old Hispanic male from Guatemala with no known medical history. In the days preceding his death, he was reported to have recent complaints of an upper respiratory infection. Autopsy showed large aggregates of grey-green lymph nodes in the peripancreatic region of the spleen, liver base, hilar lung regions and para-aortic regions, in which representative sections were submitted for histology. Microscopic examination of tissue sections demonstrated lymphoid tissue with plasma cell infiltrates and abundant macrophages laden with organisms, consistent with histoplasmosis morphology. GMS and PAS fungal stains were used o support the diagnosis, which both stained positive for the suspicious organisms.

P60 Posttraumatic Meningitis in an Infant with Blunt Head Trauma and Severe Malnourishment: A Case Report

Monica Miyakawa-Liu MD[1], Nika Aljinovic MD[2], Michelle A. Jorden MD[2]
[1]Stanford Health Care, Palo Alto, CA, USA. [2]County of Santa Clara, Medical Examiner-Coroner Office, San Jose, CA, USA

We report our second post-traumatic meningitis, a rarely reported phenomenon in the forensic literature, which describes meningeal inflammation secondary to head traum typically in the setting of craniocerebral trauma. This diagnosis is reserved after exclusion of other causes of meningitis. Such a diagnosis may be important to recognize, as this form of meningitis is not immediately fatal and may provide additional information regarding the potential head injury and time frame to death.

We report a 2-month-old decedent who was found unresponsive by his mother. At autopsy, he was noted to weigh only 6.1 pounds, below the 2nd percentile for age, along with being malnourished and dehydrated. Examination of the head revealed subgaleal and skull discolorations of the right parietal and left frontal skull bones which were retained for further examination. An expert neuropathologic examination revealed acute parietal and frontal skull fractures, confirmed with histology. The parietal skull bone also revealed organizing epidural and subdural membranes with hemosiderin-laden macrophages. The skull fractures were initially not detected on postmortem imaging and were only identified upon careful stripping of the galea. The leptomeninges were clear when examined at autopsy and neuropathology. Histology of the right frontal lobe, adjacent to the injury, revealed post-traumatic meningitis demonstrated by a robust chronic inflammatory infiltrate, characterized predominantly by lymphocytes. Also notable in other areas were subarachnoid hemorrhages and organizing subdual membranes. Bacterial cultures for lung and heart blood were notable for microorganisms consistent with postmortem growth, and CSF bacterial culture was negative, excluding an infectious etiology for meningitis. Viral studies were performed on the nasopharynx, trachea, and small intestine, which were negative. Other studies including toxicology, hemogram, and hemoglobin electrophoresis were also negative. Histologic examination of the thymus showed atrophy of the cortex, which supported the external findings of malnourishment and further indicated that this infant was chronically stressed.

This case, along with our previously reported case, underscores the value of performing routine neuropathology in cases of head trauma as posttraumatic meningitis is not immediately apparent, particularly since the leptomeninges may not exhibit the classic purulent feature. This diagnosis, an uncommon complication of untreated head injury, relies on multiple samplings of the brain and thorough histologic examination. We concluded that the cause of death in this infant was combined effects of blunt head trauma, severe malnourishment, and dehydration.

P61 Intrauterine Fetal Demise Resulting from Maternal Vascular Malperfusion Secondary to Maternal Opioid Abuse, Endocarditis, & Sepsis

Ethan Powell DO, Lydia Du MD, Nicholas Jaeger MD
Allegheny Health Network, Pittsburgh, PA, USA

Intravenous (IV) drug use-related infective endocarditis occurring in pregnancy with subsequent autopsy findings is limited in the literature. We describe the pathologic findings at autopsy of a 31-year-old pregnant female (G6P4014) with a history of polysubstance abuse and no documented prenatal care. The decedent was found unresponsive at home, and first responders initiated cardiopulmonary resuscitation. She was subsequently transported to the emergency department where return of spontaneous circulation was achieved. She was intubated and admitted to the medical intensive care unit. Upon admission, a urine drug screen detected fentanyl, and blood cultures revealed methicillin-susceptible *Staphylococcus aureus* (MSSA). Imaging revealed severe hypoxic ischemic brain injury with mild cerebellar tonsillar herniation and a pelvic abscess. A fetal heart rate was confirmed. The decedent's condition continued to deteriorate in the following days and a neurology consultation confirmed brain death. An obstetric ultrasound revealed fetal demise at an estimated 23 weeks and 5 days gestation. The decedent experienced spontaneous rupture of membranes, followed by vaginal delivery of a stillborn female fetus.

Autopsy revealed needle-tract marks, congruent with the decedent's history of intravenous drug use. This was accompanied by the presence of acute infective endocarditis characterized by aortic valve vegetations, septic thromboemboli resulting in multiple organ infarctions, pulmonary interstitial inflammation including foreign-body giant cells, and sepsis. Cultures of the pelvic abscess detected *Candida* and *Staphylococcus aureus*. The fetus, classified as small for gestational age, exhibited grade II maceration. The placenta displayed hemorrhage on the fetal surface and a clot adherent to the maternal surface. Microscopic evaluation of the placenta was significant for immature chorionic villi with accelerated maturation, perivillous fibrin deposition, and maternal surface infarction. These findings, coupled with the mother's autopsy and clinical history, are consistent with intrauterine fetal demise resulting from maternal vascular malperfusion secondary to maternal opioid abuse, endocarditis, and sepsis.

P62 Getting Crunchy with COVID-19: A Unique Case of Catastrophic Multiorgan Calciphylaxis

Andrew D Johnson MD, Kathryn Manocchia PA(ASCP), Marissa Jacob-Leonce MD
University of Rochester Medical Center, Rochester, NY, USA

Calciphylaxis, also referred to as calcific uremic arteriolopathy (CUA), is a rare condition with a reported morbidity of up to 80%. It is characterized by calcium deposition within the medial layer of arteries and arterioles with associated intimal thickening. This arterial calcification ultimately results in end organ hypoperfusion and ischemic necrosis of surrounding tissues. While most reported cases of calciphylaxis reference skin lesions, the involvement of extracutaneous organs, called systemic calciphylaxis, has also been recorded.

Currently, the pathophysiology surrounding calciphylaxis is not entirely understood and the mechanism is thought to be multifactorial. Calciphylaxis is usually associated with diseases that cause abnormalities in calcium metabolism, such as end-stage renal disease and hyperparathyroidism. However, more recent cases of calciphylaxis report its development after having a recent infectious disease or following corticosteroid and warfarin use.

Additionally, it has been reported in persons diagnosed with diabetes mellitus, autoimmune diseases, and protein C or S deficiency without significant renal disease or other disorders that cause abnormalities of calcium metabolism.

We present a case of a 48-year-old female with a history of human immunodeficiency virus (HIV) infection, and two recent hospitalizations in the previous month for acute pancreatitis and COVID-19 with inpatient prednisone use who now returned to the hospital for worsening abdominal pain, progressive weakness of proximal upper and lower extremities, shortness of breath on exertion and new onset skin lesions.

Subsequently, the patient developed acute vision loss, severe hypertension, and acute kidney injury with significantly worsening skin lesions. Laboratory studies showed a transient hypercalcemia and elevated troponins and creatinine kinase, while imaging was concerning for posterior reversible encephalopathy syndrome (PRES). Given the concern for PRES, the patient was treated with intravenous immunoglobulin, steroids, and hemodialysis. A skin biopsy was performed and showed findings that were consistent with calciphylaxis. Ultimately, the patient continued to rapidly deteriorate and eventually died.

At autopsy, there were extensive coalescing brown-black skin plaques and ulcers, affecting over 50% of body surface area, confirmed as cutaneous calciphylaxis. Additionally, there was widespread organ involvement by visceral calciphylaxis with the most striking and catastrophic findings seen in the heart and lungs.

This autopsy case highlights the importance of considering systemic calciphylaxis in patients with acute disorders in calcium metabolism and COVID-19 being a trigger for developing systemic calciphylaxis.

P63 Different Strokes for Different [Young, Nonhypertensive] Folks: A Case Report of Cerebral Venous Sinus Thrombosis and Review of the Literature

Lauren R Crowson-Hindman DO[1,2], Paul Yell MD[1]
[1]NC Office of the Chief Medical Examiner, Raleigh, NC, USA. [2]UNC SOM Dept of Pathology and Lab Medicine, Chapel Hill, NC, USA

Cerebral venous sinus thrombosis (CVST) is a rare type of stroke, affecting less than five people in one million each year. It more commonly presents in patients who are younger than those with arterial types of strokes, including children and infants, and more commonly presents in females (3:1). Risk factors for adults include infection, pregnancy, head injury, hematologic conditions such as prothrombotic states or severe anemia, and malignancy; however, approximately 13% of adult cases have no known risk factors or underlying etiology. Symptoms can include headache, focal neurological deficits, seizures, mental status change, stupor, and coma.

The most common site of cerebral vein thrombosis is the superior sagittal sinus and two mechanisms have been proposed for the pathogenesis of CVST: 1) venous obstruction causing arterial backflow and engorgement, leading to arterial rupture and intraparenchymal hemorrhage, and 2) thrombi within the dural sinuses cause occlusion and obstruction of cerebrospinal fluid absorption, leading to increased intracranial pressure, increased cerebral edema, and possibly venous hemorrhage.

We present a case of a 28-year-old Black male with no known medical history and new onset headaches within the month prior to his death, whom was found unresponsive in bed. Autopsy revealed numerous thrombi in the dural sinuses and extensive intraparenchymal hemorrhage, consistent with cerebral venous sinus thrombosis (CVST). A literature review is performed to correlate case findings with that of CVST, as well as discuss epidemiology, etiology, pathogenesis, and differential diagnosis of this disorder.

P64 From a Big Belly to Sudden Death

Rosalind I Chen BS, Kimberly M Johnson MD
Georgia Bureau of Investigation, Decatur, GA, USA

When considering a distended, protruding abdomen in a middle-aged female at autopsy, a differential diagnosis should be considered. While pregnancy may be the first thing to come to mind in a female decedent,

other diagnoses such as ascites, malignancy, and hemorrhage must be included when contemplating potential causes of death. Often accompanied by discomfort and the feeling of being bloated, a distended abdomen may be an acute or chronic symptom, but nonetheless, may be an indication of a significant underlying medical condition. In this case, an autopsy was performed on a 50-year-old Black female who died suddenly and unexpectedly. The decedent's medical history consisted of hypertension, hyperlipidemia, anemia, lower back pain, and irritable bowel syndrome. At the time of autopsy, the decedent was notable for her uncharacteristically distended abdomen in the absence of a known pregnancy. Postmortem radiography revealed a large volume of radiopaque fluid in the abdomen. According to investigative reports, her abdominal and lower back pain had been increasing, and the decedent had reportedly sought medical attention on multiple occasions over the preceding months. In the days leading up to her death, her abdomen reportedly increased in size. Internal examination of the decedent revealed a large, complex cystic mass containing more than seven liters of hemorrhagic fluid and large tumor excrescences. The cystic mass had direct extension into the wall of the uterus and appeared to originate from the right adnexa. There were no traumatic injuries present and no evidence of drug use. Histology showed a malignant tumor consistent with a high-grade serous carcinoma with direct extension into the uterus with erosion of the right uterine artery. Ultimately, the mechanism of death was acute hemorrhage due to the high-grade serous carcinoma eroding into an artery. Despite reports of attempted medical visits, the tumor growing in the decedent's abdomen went undiagnosed. This highlights the need for increased medical literacy, access to care and patient advocacy while also reminding forensic pathologists that malignancy, while rare in the forensic setting, is an important part of the differential diagnosis.

P65 An Investigation into the Demographics Related to Decedents Found in the Bathroom and Their Causes and Manners of Deaths
Sydney Beaird BS, Romana Mayer MD
Georgia Bureau of Investigation, Decatur, GA, USA

We assessed demographics of decedents examined at the Georgia Bureau of Investigation (GBI)-Headquarters who died in the bathroom in 2023. That year, we had 4,400 cases reported to our headquarters location which serves 81 out of 159 counties in Georgia. In Georgia, most counties have an elected coroner who reports cases to the state medical examiner when indicated under the Georgia Death Investigation Act.

After reviewing locations of all reported cases, 270 (6.1%) were found deceased in the bathroom. 167 cases met our inclusion criteria to examine manner of death with the following breakdown: accident 53%, natural 33%, suicide 12%, homicide 1%, and undetermined 1%. In comparison to overall GBI numbers for manner of death, accident 44%, natural 21%, suicide 11%, homicide 13%, and undetermined 3%. The common categories of causes of death included drug related deaths 51%, various natural diseases 36%, gunshot wounds 8%, hanging 2%, inhalation of smoke and soot 2%, and drowning 1% (pediatric).

Looking at demographic information of decedents found in the bathroom, we found 70% male and 30% were female. Comparing to the overall GBI data, 69% male and 31% female. The racial demographics showed that 80% White, 19% Black, and 1% Asian, comparing to the overall GBI data 67% White, 31% Black, and 1% Asian. Per US census data, the racial breakdown of Georgia's population is: 59% White, 33% Black, and 5% Asian. Regarding age, we had a range from 11 months to 91 years. We found juveniles (0-17) made up 3% of the total cases and the following breakdown by age 18-29 11%, 30-49 46%, 50-69 31% and 70 and older 9%. The comparison of overall GBI numbers which were juveniles (0-17) made up 9% and the following breakdowns by age 18-29 16%, 30-49 40%, 50-69 33%, and 70 and older 1%.

In conclusion, we found the most common manner of death of decedents found in the bathroom was accidental with natural being the second, most decedents were male, White, and the most common ages were 30-49 years old. We understand there are limitations to our analysis as we only examined cases reported to our office. Our numbers may not reflect the demographics of all deaths in Georgia that occur in the bathroom as some cases are not reported to us or brought in for autopsy when the case is known to be related to natural disease.

P66 Aim True: A Review of Multiple Gunshot Wound Suicides
Sanisha Bailey
Virginia Office of the Chief Medical Examiner- Central, Richmond, VA, USA

Most firearm related deaths in Virginia are suicides involving one weapon and a single fatal injury. Some deaths are suspected to be a suicide but involve more than one wound and/or weapon. A thorough investigation from law enforcement and the death investigation system (ME/C) is required to exclude homicide as the manner of death. This presentation will focus on firearm related suicide cases reported to the Virginia Office of the Chief Medical Examiner from 2013 to 2023, where the decedent sustained two or more injuries. Number of weapons used, location of injury and number of injuries determined to be fatal will be reviewed. Literature indicated that multiple gunshot wound suicides represent 1%-8% of all firearm suicides, but the exact prevalence is likely under reported. Understanding the severity of the gunshot and the whether the decedent would have the ability to inflict subsequent wound(s) upon themselves must be understood for the ME/C to accurately determine the manner of death.

P67 When Pets Kill: Death due to Rat Bite Fever from Pet Hamster
Karenna E. Grieco BS[1], Justin Vo[1], Y. Van Vo MD[1], Dana Troxclair MD[2]
[1]East Baton Rouge PArish Coroner's Office, Baton Rouge, LA, USA. [2]Jefferson Parish Coroner's Office, Harvey, LA, USA

Rat bite fever is a rare, potentially fatal infection, caused by the bacteria *Streptobacillus moniliformis* in North America. This is a case of a 24-year-old White female who presented to an urgent care center with a two-day history of diarrhea and dehydration. The decedent appeared septic with mottled skin, discolored toes, decreased respirations, and hypotension. She was immediately transported to the emergency department where she continued to deteriorate, developing pulmonary hemorrhage and renal failure, and expired two hours after arrival. The coroner's office was notified and the decedent was transferred to the forensic facility for a postmortem examination. Discussion of the case with hospital staff prior to postmortem examination revealed that the decedent owned many animals including geckos, salamanders, snakes, rats, Halloween crabs, hamsters, and rabbits. The treating physicians suspected Leptospirosis due to the decedent's frequent interaction with exotic pets. Gross autopsy findings included mottled skin, congested lungs, and cerebral edema. Microscopic examination showed pulmonary hemorrhage, and numerous slender bacilli on peripheral blood smear. Leptospira microagglutinaton testing was negative. Follow-up interview with decedent's father revealed that he witnessed the decedent perform CPR on her pet hamster three days prior to her death. The hamster also subsequently expired. With this new information, decedent's tissue and blood samples were consequently sent to The New York State Department of Health, which identified *Streptobacillus moniliformis* DNA by real-time PCR. The final cause of death is bacteremia caused by *Strepobacillus moniliformis* secondary to rodent exposure. This case represents a unique presentation of death due to rat bite fever following CPR administered to a pet hamster, and highlights the importance of thorough death investigation, and collaboration across multiple agencies.

P68 Is Mid-Michigan's Fatal Drug Overdose Age Increasing? A Retrospective Study
Amanda Wallace BCJ; ABMDI-D
University of Michigan Health-Sparrow, Lansing, MI, USA

The University of Michigan Health-Sparrow Forensic Pathology serves as the Medical Examiner for five counties in mid-Michigan. Over the years, our office has felt the average age of those dying from unintentional (accidental) drug overdoses has increased.

In order to prove or disprove this theory, we reviewed data from 2012 to 2023. During this time, the total number of unintentional drug overdoses went from 65 to 167. During this time period, the average age for all individuals went from 40 years to 44 years. When divided by sex, the average age rose from 38 years to 46 years in males but remained steady at 42 years for females.

According to the Centers for Disease Control and Prevention's WONDER Database, the total number of unintentional drug deaths in 2012 was 32,952 with most deaths occurring in the 45-54 years of age demographic. In 2021, the total number of unintentional drug deaths was 97,995 with most deaths occurring in the 34-44 years of age demographic. This data shows that while the total number of unintentional drug deaths has increased, the age of death appears to have decreased.

After comparing the average age of unintentional drug death, a percentage differential was also completed by the designated age groups. Mid-Michigan saw a percentage increase with age groups 35-44, 55-64 and 65-74 from 2012 to 2023. The national percentage increased in age groups 25-34, 35-44, 55-64 and 65-74 from 2012-2021.

When compared to the national numbers reported by the Centers for Disease Control and Prevention, mid-Michigan's total unintentional drug overdose deaths are increasing similarly. However, mid-Michigan's average age of death due to unintentional drug overdose is increasing. It is unclear what factors may be playing a role in this trend, and more investigation is likely needed.

P69 Autopsy Findings in a Rare Case of Primary Small Bowel Volvulus

Soren Beal OMS-II[1], Aubrey Hanes OMS-II[1], Stephen Bechtel OMS-II[1], Phillip Jones DO[1], Joseph Felo DO[2], Cameron C Felty DO[1]
[1]West Virginia School of Osteopathic Medicine, Lewisburg, WV, USA. [2]Cuyahoga County Medical Examiner's Office, Cleveland, OH, USA

Small bowel volvulus (SBV) is characterized by torsion of the small bowel and its mesentery. While most cases occur secondary to an underlying condition, a rare subset are primary and occur without a predisposing condition. Herein we report a rare case of fatal primary SBV in a 9-year-old male. The decedent endorsed vomiting and mild stomach pain which was treated at home with supportive care. The evening prior to his death, he asked for a glass of water before going to bed. He was found deceased in his bed the next morning. At autopsy, a 130 cm segment of small intestine was twisted along its mesenteric axis, consistent with SBV. The volvulized small intestine showed sharply demarcated necrosis. No predisposing lesions were present. Microscopic examination revealed acute serositis and necrotizing inflammation. The cause of death was listed as small bowel infarction due to intestinal volvulus. Since no predisposing condition was identified, our case represents a rare example of primary SBV. Septic shock is the likely mechanism of death, which occurs after the mucosal integrity of the volvulized segment becomes compromised, leading to introduction of gut bacteria into vasculature. Though SBV often presents emergently, a subset of patients report mild symptoms, as was seen in our case. SBV should be included in the differential diagnosis of abdominal pain, even when mild, as early diagnosis with prompt surgical intervention is key to preventing fatalities.

P70 Central Pontine Myelinolysis Discovered at Autopsy: Cause of Death or Incidental Finding?

Kate Altmanshofer OMS-II[1], Sarah Ansari OMS-II[1], Joseph Felo DO[2], Cameron C Felty DO[1]
[1]West Virginia School of Osteopathic Medicine, Lewisburg, WV, USA. [2]Cuyahoga County Medical Examiner's Office, Cleveland, OH, USA

Central Pontine Myelinolysis (CPM) is a demyelinating condition associated with rapid correction of hyponatremia, alcohol use disorder (AUD) and malnutrition. The pathogenesis is related to osmotic injury and energy supply-demand imbalance. The clinical manifestations vary which complicates its interpretation when encountered at autopsy. Classic manifestations include confusion, quadriplegia, locked-in syndrome, coma, and death. However, a subset of cases may be asymptomatic or present with only mild symptoms, particularly AUD-related cases. Herein we present two cases of CPM discovered at autopsy.

Decedent 1 was a 53-year-old with a history of treated esophageal cancer, AUD, and chronic obstructive pulmonary disease. The decedent had been recently hospitalized for alcohol withdrawal, COVID-19 infection, and hyponatremia. Autopsy findings included hepatic steatosis, CPM, tracheoesophageal fistula, and aspiration pneumonia. His cause of death (COD) was listed as aspiration pneumonia due to tracheoesophageal fistula in the setting of prior esophageal cancer.

Decedent 2 was a 52-year-old with a history of AUD, hyperlipidemia, and hypertension. Autopsy findings included jaundice, hepatomegaly, and CPM. Toxicology revealed elevated concentrations of ethanol, acetone, and isopropanol in vitreous humor. The ketoacidosis-associated Armanni-Ebstein lesion was noted on microscopy. The COD was listed as alcoholic ketoacidosis due to AUD. Risk factors for CPM in both cases included AUD, with Decedent 1 also having a recent history of treated hyponatremia. The spectrum of manifestations associated with CPM makes its interpretation at autopsy difficult and requires exclusion of other CODs for accurate classification.

P71 Autopsy Findings in a Rare Case of Fatal Firearm Injury Using Radiolucent Ammunition

Jonathan Jansma OMS-II[1], Jason Mitton OMS-III[1], Dwight Bundy DO[1], Joseph Felo DO[2], Cameron C Felty DO[1]
[1]West Virginia School of Osteopathic Medicine, Lewisburg, WV, USA. [2]Cuyahoga County Medical Examiner's Office, Cleveland, OH, USA

Forensic autopsy is a vital part of investigating firearm-related deaths. Recovery of retained bullets from the deceased is a key part of the autopsy in these cases. While most bullets are radiopaque, some rare types are made using radiolucent material. Such cases present a potential pitfall when using radiographic guidance for recovery. Herein we present a case of fatal firearm injury using radiolucent ammunition. The decedent was a 39-year-old male who was found with a self-inflicted gunshot wound to the head. A 9mm handgun was found at the decedent's side. Postmortem radiographs revealed a foreign body in the left temporal scalp soft tissue. At autopsy, a contact entrance wound was on the right side of the forehead. The bullet path was traced through the right temporal bone, cerebral hemispheres, and left temporal bone. No exit wound was present. Fragments of black plastic were recovered from along the bullet path. A metallic spherical projectile was recovered from the left temporal scalp soft tissue. The remainder of the autopsy was unremarkable. Examination of the firearm revealed that it was loaded with a rare type of practice ammunition consisting of a plastic bullet tipped with a spherical metallic projectile. This case highlights the importance of correlating radiographic and autopsy findings with physical evidence. While rare, the use of radiolucent ammunition should be considered when there is discordance between radiographic and autopsy findings.

P72 Caustic Ingestion with Suicidal Intent: A Case Report and Brief Review

Kelsie Moeller OMS-II[1], Madeleine Bash OMS-II[1], Joseph Felo DO[2], Andrea Nazar DO[1], Cameron C Felty DO[1]
[1]West Virginia School of Osteopathic Medicine, Lewisburg, WV, USA. [2]Cuyahoga County Medical Examiner's Office, Cleveland, OH, USA

Caustic ingestion is the consumption of corrosive substances that can severely injure the upper aerodigestive tract and stomach. Most cases are accidental, but a minority are associated with suicide attempts, especially in adults. Herein we report the autopsy findings in a case of caustic ingestion with suicidal intent in a 19-year-old male. The decedent was transported to the emergency department following intentional ingestion of

drain cleaner. He was admitted to the intensive care unit where he remained critically ill for two weeks. Despite life saving measures, the decedent expired and a forensic autopsy was performed. At autopsy, serosanguinous fluid accumulations were present within the pleural and abdominal cavities. The upper aerodigestive tract and stomach were extensively ulcerated and necrotic, associated with fibrinous pericarditis and a tracheoesophageal fistula. Pertinent microscopic findings included hepatic centrilobular necrosis, diffuse alveolar damage with acute pneumonia, and acute tubular necrosis. The cause of death was listed as complications of caustic chemical ingestion, and the manner was listed as suicide. Both suicidal intent and older age have been shown to be predictors of mortality. Mechanisms implicated in fatalities include shock, perforation, airway obstruction, aspiration, and multiorgan failure. Alkalis, like the substance used in our case, are the most common agents implicated.

P73 Fibromuscular Dysplasia Involving the Cervicocephalic Arterial Tree Highlighting the Neuropathological Findings

Lorraina J. Robinson DO, MS[1,2], Drew Ferguson MD[1], Chance Walker MD[1], Bryant Oliverson MD[3], Missia Kohler MD[1], Monica P. Revelo MD, PhD[1], Qinwen Mao MD, PhD[1]
[1]University of Utah, Salt Lake City, UT, USA. [2]Oklahoma Office of the Chief Medical Examiner, Oklahoma City, OK, USA. [3]Intermountain Medical Center, Salt Lake City, UT, USA

Three types of fibromuscular dysplasia (FMD) have been described based on the dominant arterial wall layer that has been affected and include intimal (10% of cases), media (75-80% of cases), and adventitia (1% of cases). Histologically, intimal FMD corresponds to circumferential deposition of collagen within the intimal layer with the internal elastic lamina often being fragmented or duplicated. Medial FMD is by far the most common subtype and involves altering areas of a thin medial layer and thickened collagenous fibromuscular ridges. This results in multiple stenotic areas with aneurysmal outpouching giving the vessel the classic “string-of-beads” appearance as seen on magnetic resonance angiography.

We present a rare case of FMD primarily affecting the vascular network within the cervicocephalic arterial tree, also more commonly known as the Circle of Willis. While there is a multitude of medical literature surrounding the clinical and radiographic findings associated with systemic FMD outside of the central nervous system, there is an insufficient number of detailed studies that simultaneously discuss and illustrate the neuropathological findings associated with intracranial involvement of FMD within the Circle of Willis.

This case involved a 27-year-old female with a complicated hospital course due to FMD causing multifocal angiopathic associated luminal stenosis, dissections, bulbous arterial dilatation, and associated thrombi within the Circle of Willis. Downstream affects observed as a direct result from the FMD affected vessels showed numerous hemorrhagic infarcts within the cerebrum, cerebellum, and brainstem. At neuroautopsy, the Circle of Willis was dissected out of the interpeduncular cistern of the subarachnoid space located on the basilar surface of the brain for extensive microscopic examination. Microscopic examination of the vasculature demonstrated alternating areas of increased fibroblastic-like transformation of the smooth muscle cells within the tunica intima and media leading to arterial wall tearing, luminal stenosis, occlusion, and recanalization.

P74 SARS-CoV-2-Precipitated Neonatal Death in an Infant with MCAD Disorder

Isabel Brouwer MBChB, MMed For Path, BSc(Hons)(Medical Science) HonsBPA MPhil FRCPA[1], Lorraine du Toit-Prinsloo MBChB, MMed(Path)(Forens), FCForPath(SA), FRCPA[2]
[1]NSW Health Pathology, Forensic and Analytical Science Service, Forensic Medicine Sydney, Sydney, NSW, Australia. [2]NSW Health Pathology, Forensic and Analytical Science Service, Forensic Medicine, Sydney, NSW, Australia

Medium-chain Acyl-CoA Dehydrogenase Deficiency (MCADD) is one of the most common inherited metabolic disorders of β-oxidation. The introduction of newborn screening for inherited metabolic disorders has led to the early identification of MCADD, reducing the mortality from the condition in neonates. Patients with the disorder may present with hypoketotic hypoglycemia, which may quickly progress to lethargy, coma, and death.
We report a perinatal death referred to the Coroner as a sudden unexplained infant death. The 2-day-old female neonate died before newborn screening for inherited metabolic disorders could be conducted. The infant was born at full term by uncomplicated normal vaginal delivery and died within 12 hours after discharge from the hospital. A newborn metabolic screening test was scheduled for the following day. The infant was reportedly lethargic with difficulty feeding. During an attempt at feeding, she became floppy and unresponsive. On arrival of the paramedics, the infant was apnoeic, pulseless, and hypoglycemic. Resuscitation was continued for approximately an hour before she was pronounced life extinct. Detailed autopsy examination revealed no macroscopic cause of death. Microscopic examination of the heart showed widespread myocyte vacuolization. The Oil-red-O stain showed the vacuoles were filled with small fat globules. Fat stains on the liver and kidneys revealed extensive hepatosteatosis and fat in the renal tubules. Virological testing for viral pathogens by polymerase chain reaction (PCR) detected SARS-CoV-2-RNA in the nasopharyngeal, tracheal and lung swabs. The interstitium of the lungs had a hypercellular appearance with mild interstitial inflammation, likely mild viral pneumonia secondary to her SARS-CoV-2 infection. The postmortem Newborn Screening Programme results were highly consistent with an acylcarnitine profile suggesting medium-chain acyl-coenzyme A dehydrogenase (MCAD) deficiency.

Perinatal SARS-CoV-2 infection may occur due to the transplacental route or through environmental exposure to aerosolized droplets of viral particles after birth. Perinatal deaths relating to SARS-CoV-2 infection are uncommon. Neonatal hypoglycemia is a common condition and part of a transitional metabolic adaptation following birth. Severe, prolonged hypoglycemia results in brain injury and death. In this case, it is likely that physiological stress associated with the SARS-CoV-2 infection precipitated an episode hypoketotic hypoglycemia resulting in the death of this neonate due to her MCAD deficiency.

P75 The Critical Role of Autopsy in Diagnosing Ruptured Dissecting Internal Carotid Artery Pseudoaneurysm as an Adenoidectomy Postsurgical Complication

Joshua Kocemba DO[1], Christopher K. Poulos MD[1,2], Xin Zhang MD[1]
[1]Department of Pathology, Indiana University, Indianapolis, IN, USA. [2]Marion County Coroner’s Office, Indianapolis, IN, USA

Adenoidectomy is one of the most frequently conducted pediatric surgeries in the United States. Despite its generally safe nature, patients rarely experience potentially life-threatening complications, notably post-operative hemorrhage. Here, we present a case involving internal carotid dissection following adenoidectomy, underscoring the critical role of autopsy in definitively pinpointing the source of post-operative hemorrhage.

The decedent was a 5-year-old boy with a medical history marked by chronic otitis media, chronic rhinitis, Eustachian tube dysfunction, conductive hearing loss, nasal obstruction, and hypertrophied Waldeyer’s ring lymphoid tissue. He underwent adenoidectomy and bilateral myringotomies with tube placement. Three days post-surgery, he presented to the emergency department with episodes of hemoptysis. Following

stabilization, he was transferred to a pediatric hospital for overnight observation. He experienced no further bleeding episodes and was discharged. However, two hours later, he experienced significant hemoptysis and was promptly readmitted to the pediatric hospital. An angiogram revealed a bleeding dissecting pseudoaneurysm in the right internal carotid artery, which was managed through coil embolization. Despite stabilization, he exhibited poor neurological signs and, by the third hospital day, had progressed to brain death. An autopsy was requested to support potential legal action and to evaluate for possible undiagnosed vascular pathology.
A technically demanding hospital autopsy definitively identified the coil embolized perforation site in the high cervical segment of the right internal carotid artery. The 3 x 3 mm defect had irregular, thin-walled edges and was located in the posterolateral aspect of the nasopharynx, at the margin of the cauterized adenoidectomy surgical bed. No congenital malformation or other vascular pathology was identified. The autopsy findings supported the carotid bleeding being a surgical complication.

With the advancement of medicine, radiographic tools play crucial roles in both diagnosis and treatment. There have been arguments, especially in the non-forensic medical fields, that virtual autopsy may replace conventional autopsy in the future. The autopsy examination of this case confirmed that the source of bleeding was at the surgical site, which could not be visualized by angiogram. Direct macroscopic and microscopic morphological examinations, unachievable by radiographic imaging, also excluded the potential underlying conditions which could have led to the bleeding. Therefore, this case emphasizes the pivotal role of autopsy and the complementary value of both traditional autopsy dissection and imaging in the indicated cases.

P76 Two Cases of Pediatric Deaths Related to Consumer Products
Amanda Saunders MBA[1], John Walsh MD[2], Anthony Vinson DO[2], Eric Berg MD[3]
[1]Howard University College of Medicine, Washington DC, DC, USA. [2]Armed Forces Medical Examiner System, Dover, DE, USA. [3]Blanchfield Army Community Hospital, Campbell, KY, USA

Accidents are the leading cause of death in the pediatric population and may involve the use of products designed for children. In some of these cases, there is an inherent flaw in the product, while in others, caregivers are using the product incorrectly. Both instances can lead to injury or death, but in either case, it is critical the incident is investigated by the proper channels to determine if a recall is warranted. We highlight the difference between a dangerous and misused product through two cases and discuss appropriate reporting practices.

The first case involves two children, ages four and six, who climbed inside a weighted blanket while playing and may have become trapped. The blanket had a waterproof covering and zipper that could be closed from the inside and the children were not able to escape and ultimately suffocated. The cause of death for both children was found to be asphyxiation and the manner of death was ruled an accident. In another case, a nine-month-old baby was found face down in a bathtub after being left unsupervised in an infant bathtub inside of a full-sized bathtub filled with water. The cause of death was determined to be drowning and the manner of death was undetermined due to the improper use of the product as well as a prior case of domestic violence involving the child's caregiver.

Both cases were reported through the Medical Examiners and Coroners Alert Project (MECAP) which is a program that reviews cases and identifies potentially hazardous products to be examined further by the consumer product safety commission (CPSC). In the case of the weighted blanket, MECAP issued a statement about the product and selected the case for CPSC investigation. Ultimately, the blanket was recalled and over 200,000 blankets were affected. In contrast, the case involving the bathtub was also reported to MECAP, but no investigation was launched. This is because appropriate warnings were placed on the product cautioning against the possibility of drowning and investigation found that the caregiver had not used the product correctly.

These cases underscore the importance of reporting pediatric deaths secondary to a consumer product to MECAP. While the pathologist performing the autopsy may also have an opinion on whether the product is safe, it is up to CPSC to make this determination. Ultimately, prompt reporting can be instrumental in ensuring unsafe products are recalled, potentially preventing injuries or death.

P77 Pediatric Choking Deaths in Harris County, Texas: A 20 Year Retrospective Review
Marianne E. Beynon MD
Harris County Institute of Forensic Sciences, Houston, Texas, USA

Despite increased focus on prevention and caretaker education, choking remains a leading cause of mortality in the pediatric population. Young children are uniquely vulnerable to airway obstruction by food and foreign objects for many reasons, including absent/incomplete dentition, narrow airways, and tendency to place items in their mouths while exploring their environments.

Between 2003 and 2023, the Harris County Institute of Forensic Sciences performed postmortem examinations on 36 cases of pediatric choking. There were 26 males and 10 females, with ages ranging from 6 months to 12 years (median, 2 years). The manner of death was classified as accident in 35 cases (97%), with one Undetermined due to inability to exclude involvement of another person in the choking event.

The item causing airway obstruction was food in 26 cases (72%) and a foreign object in 10 cases (28%). The most common food bolus was a grape (eight cases), followed by hot dog (five cases) and chicken nugget (three cases). Other food boluses included a cherry, marshmallow, and dried beans. The most common foreign objects were small toys (five cases), including a suction dart, water balloon, and toy balls, and thumbtacks (two cases). The obstructing item was present in the airway at autopsy in 10 cases, and in another nine cases the item was received separately after removal by medical personnel.
Several notable features of the circumstances surrounding the choking events were identified. The majority of the decedents were previously healthy; however, several had underlying conditions involving developmental delay, including all decedents over 10 years old. The most common condition was Down syndrome (five cases). The decedent was being supervised by someone other than the primary caretaker in 11 cases, and there was some element of inattentiveness in 10 cases, often due to the presence of multiple children. In most cases, first aid was attempted by the caretaker, with finger sweep the most common technique (17 cases), followed by Heimlich maneuver and back blows (five cases). All decedents were transported to the hospital, with terminal hospitalization lasting between eight minutes and 6 days. At autopsy, hypoxic-ischemic brain injury was identified in all decedents with a survival period of 24 hours or more, and seven of those also had acute bronchopneumonia.

This study highlights the continued need for widespread implementation of choking prevention measures, including increased education of caretakers on appropriate food choices, environmental safety, adequate supervision, and first aid techniques.

P78 Aortic Dissection in a Teenager: A Case Report
Christian J .Perez-Torres MD[1], Jennifer Bowers MD[2]
[1]Summa Health System, Akron, Ohio, USA. [2]Office of the Chief Medical Examiner - Central District, Richmond, Virginia, USA

Acute aortic dissection is due to the separation of the layers of the aortic wall. It is an uncommon but often lethal disorder. Its incidence is approximately 5 to 30 per 1 million people per year. The mortality rate (up to 50% in the first two days if untreated) is high even after treatment (up to 30%). Risk factors include age, hypertension, family history, atherosclerosis, and genetic conditions such as Marfan syndrome (MS) or Ehlers-Danlos syndrome (EDS).

We report the case of a 16-year-old, White male that was found unresponsive in his room and was eventually pronounced by emergency medical services. He was transported to the medical examiner's office for an autopsy examination. Law enforcement investigation raised concerns about toxic effects of excessive energy drink consumption.

The autopsy revealed numerous hypertrophic blanchable nodules on the decedent's upper chest and back. Internal examination revealed aortic dissection, starting at the aortic valve and extending up to the arch, a dilated aorta with a laceration, cardiomegaly, and pericardiac tamponade. Histology confirmed the dissection and suggested cystic medial necrosis.

Aortic dissections can be classified using the Stanford and Debakey systems. These are based on the location and extension of the dissection. Typical patients are older people with hypertension; however, it can happen to younger patients. It is estimated that 0.67% to 3.5% of aortic dissections occur in people that are 21 years old or younger. In the pediatric population, the most common predisposing conditions are congenital cardiovascular anomalies. It can be associated with genetic abnormalities such as those in MS and EDS, or in Neurofibromatosis (NF), types 1 or 2.

The decedent in this case had no risk factors, however, due to the suggestive nodules, undiagnosed NF was considered as a possible trigger of the dissection. NF1 is an autosomal dominant disorder associated with a shortened lifespan due to malignancy and cardiovascular disease. Vascular involvement is a well-recognized but rare occurrence that can range from asymptomatic to catastrophic.

Vascular EDS (vEDS) is another possible trigger for this patient's demise. This syndrome usually presents features such as thin skin and visible veins. Death is usually due to vascular rupture. Some cases go undiagnosed until a major vascular event happens. This occurrence is more common among young males.

Due to the association of aortic dissection with genetic conditions, family members are advised to seek genetic testing and counseling, as in this case.

P79 Suicide by Cyanide: An Autopsy Case Report

Briana Fernandez BS[1], Marianne Beynon MD[2]
[1]Baylor College of Medicine, Houston, TX, USA. [2]Harris County Institute of Forensic Sciences, Houston, TX, USA

Suicides rose to a record high in 2022 after modest declines in 2019 and 2020. Notably, despite being a quick and efficient method of suicide, deaths by cyanide toxicity are rarely seen in the United States. The American Association of Poison Control Centers reported only three such deaths in 2022. Decedents who have occupations in which cyanide is readily available or who have spouses with such occupations are more likely than other members of the general population to commit suicide using cyanide. The presentation of cyanide toxicity is nonspecific, both clinically and at autopsy.

Our case is one of the rare cases of cyanide toxicity and serves as an excellent example of the circumstances in which cyanide should be strongly suspected. The decedent was a 19-year-old male college student who was a chemistry major and had access to cyanide through their job of stocking and inventorying chemistry laboratories on campus. They were found dead in a bathroom in their college dormitory. At the scene, an apparent suicide note, two bottles of white crystalline substances, edible film squares, gel capsules, and dextromethorphan pills were found. One of the bottles was labeled "Conc. HCl."

Notable autopsy findings in this case included bright red-pink lividity; pulmonary and upper airway edema and congestion; 100 milliliters of mucoid gastric contents with several fragments of gelatinous material; dark brown discoloration of the gastric mucosa; and mild cerebral edema. Toxicological analysis revealed a cyanide concentration of 1.9 mcg/mL in the femoral blood. Although drug chemistry testing was unable to confirm the presence of cyanide in the substances at the scene, it did reveal that the white crystalline substance labeled as "HCl" was a very basic substance (pH 12) with a foul odor.

This case is a reminder of the scenario and findings that should raise suspicion for cyanide toxicity and aims to educate death investigators and pathologists about the potential autopsy findings associated with cyanide ingestion or inhalation. Since blood cyanide concentrations change fairly rapidly postmortem, it is important to quickly recognize the need for toxicological analysis.

P80 The Diagnostic Challenge of Pets Scavenging in the Forensic Practice: A Rare Case

Ilaria Tarozzi MD[1], Alice Buzzelli MD[2], Marcello Seligardi MD[2], Luigi Mastrogiuseppe VMD[3], Valentina Bugelli MD, PhD[4]
[1]Modena Local Health Unit, Modena, Italy. [2]University of Modena and Reggio Emilia, Modena, Italy. [3]Molise Regional Health Agency, Campobasso, Italy. [4]University of Parma, Parma, Italy

Pets scavenging on human corpses is occasionally reported in forensic indoor scenes. When the animals have access to the bodies, in fact, they can feed on the remains or remove body parts. The resulting postmortem trauma can pose significant diagnostic problems for the forensic pathologist.

The authors report an unusual case of dog scavenging on it owner's body occurred in a small town of Central Italy. A corpse of a man in advanced stage of decomposition was found supine on the floor of his house. He was clothed, and widely colonized by dipteran larvae. A dog of the bracco-pointer breed was roaming freely in the house. The door was unlocked. No signs of forced entry or struggle were noted. The autopsy showed skeletonization of the head, partial absence of the pyramidal bone, total absence of the maxillary and mandibular bones, and detachment of some cervical vertebrae. The remaining bony districts were intact. No other traumatic injuries were detected.

Since the lacking bones were not found during two following death scene inspections and circumstantial data poorly supported the possibility of homicide, a controlled experiment was set up with the help of a forensic veterinary expert.

A bracco-pointer breed dog of similar weight was kept in hyponutrition for two days inside a fence. The space was adequate and there was available water. Skeletonized pig bones were put in the fence and the dog's behavior was observed and filmed by camera. The authors also captured some relevant frames. The experiment was repeated three times. Every time, the dog consumed the entire pig mixture in five days. At the end of the experiment, the dog presented a good health status.

In the forensic literature, the pets' feeding activity on the head and neck of their owner's corpse is commonly described. However, in most cases the animals feed on the soft tissues, with resulting skeletonization of the face. When bone consumption occurs, the entire cervical spine and splanchnocranium are typically removed. The presented case represents a unique observation of a dog selected only few bones to feed himself. Death had resulted from ischemic cardiac disease.

It can be difficult to detect deaths due to natural diseases because of the extensive postmortem trauma caused by pets feeding off their owner's body. Careful examination of the scene, the injuries and the correlation of the type of animal involved can be useful to reduce the possibility of diagnostic errors.

P81 One Hell of a Ride: Suicide by Vehicular Assisted Ligature Decapitation

Katie L. Shewbart DO, Kenneth S. Snell MD
University of South Dakota Sanford School of Medicine, Sioux Falls, SD, USA

Trauma associated with hangings typically results in contusions and abrasions to the neck with an angled furrow towards the apex of the ligature knot. Fall from a slight height may result in spinal cord trauma and fractures of the vertebral column. Decapitation in association with a hanging requires a larger drop as the accelerating force, and the resultant decapitation typically retains the upward slope of the ligature mark left on the decedent's neck. In contrast, manual ligature strangulation tends to leave marks that are more horizontal and potentially circumferential in nature. Differentiating death as a result of ligature decapitation from postmortem decapitation by a sharp object can be accomplished by observing the wound abrasions encircling the neck with a smooth severance of the decapitation wound.

We present a rare case of suicide by ligature decapitation using a motor vehicle as the accelerating force. In this case, law enforcement personal were perplexed by the death scene of a headless corpse found in the backseat of a locked, running car. Under the direction of the local forensic pathologist/coroner, expansion of the death scene led to additional findings, supporting the manner of death as a suicide. This case underscores the importance of trained death scene investigators who are familiar with correlating scene findings with autopsy findings, as well as considering different manners of death when dealing with unusual circumstances.

P82 Safety Before Comfort: An Unexpected Logging Accident

Brittany Holden DO, MS, Melinda Flores MD
Southwestern Institute of Forensic Sciences, Dallas, TX, USA

Within the forestry industry, a variety of machinery is utilized to cut, sort and load tree logs for further processing. A log loader is one such example with multiple variations including a knuckle boom or articulating crane. This machine operates via a hydraulic system and has multiple articulating joints to allow for precise movements with the option of having a buck saw hookup. This saw moves with great speed, allowing large logs to be cut for transport. Standards for safety and operations of such equipment are set forth by the manufacturers and agencies such as OSHA to minimize equipment and operator malfunctions that could pose potential harm.

We present a case of a 58-year-old contract logger found deceased on the ground next to an articulating crane with a buck saw in a heavily wooded area. It was noted on scene the door to the crane cab was tied open and the windows were previously removed, presumably because the cab did not have air conditioning. However, this is in discordance with operational guidelines for the equipment. Upon further inspection, coagulated blood and several broken apparent chainsaw links were noted on the floor of the cab. Inspection of the saw identified a weathered, broken cutting chain. Examination of the decedent revealed blood-soaked clothing and two irregular wounds of the left axilla and back.

An autopsy was conducted with anthropological consultation for further classification and examination of the injuries. No retained metallic objects were present on the postmortem radiograph. An anthropological correlation of the injured ribs was consistent with that of blunt force trauma without evidence of firearm involvement, with likely front to back directionality established by beveling characteristics. It was determined that the left axilla was the likely entry wound and the upper middle back was the likely exit wound. The wound tract perforated the skin, subcutaneous tissue, and musculature at both the entry and exit sites, the upper and lower lobes of the left lung and the left sixth and seventh ribs. It was reasonably ascertained that the injury occurred when breakage of the cutting chain while operational caused chainsaw fragments to propel towards the crane cab, essentially acting as projectiles, which caused a perforating and fatal wound to the decedent. There was nothing to mitigate the force or velocity of the chain fragments, such as the crane door or windows, before striking the decedent.

P83 Spontaneous Esophageal Rupture in a Child with FDXR-Associated Fe-S Synthesis Mitochondriopathy

Hannah L Coltrain MS, PA(ASCP)[1], Steven F Dunton MD[1], Wahenoor Anand OSM-IV[2]
[1]DeKalb County Medical Examiner's Office, Decatur, GA, USA. [2]Philadelphia College of Osteopathic Medicine, Suwanee, GA, USA

This case report describes a rare case of fatal Boerhaave Syndrome in a 23-month-old Hispanic child afflicted by FDXR-Associated Mitochondrial Fe-S Synthesis Disease who expressed the homozygous p.Arg386Trp variant. This autosomal recessive disease is one of several mitochondriopathies associated with mutations in the *FDXR* gene located on chromosome 17q25.1 which encodes ferredoxin reductase (FDXR), an enzyme necessary for energy metabolism and electron transport chain activity within the mitochondria. Specifically, downstream effects of the mutation interfere with the iron-sulfur (Fe-S) synthesis pathway, disrupting several integral biological activities such as DNA repair, iron homeostasis and storage, cofactor synthesis, and several others. Clinically, FDXR-associated mitochondriopathies present with a wide range of neurologic symptoms which vary in severity and often manifest within the first decade of life.

According to recent literature, less than 100 patients have been reported to have *FDXR* mutations as of 2023, and an overwhelming majority of these cases were of Mexican heritage. Of the known cases, general developmental regression is seen following symptomatic viral infections, and a high mortality rate of 18% is attributed to medical complications of early-onset symptomology. The presented autopsy case performed at the DeKalb County Medical Examiner's Office in Decatur, Georgia, contributes a unique presentation of pediatric esophageal rupture attributed to unspecified viral illness in a child afflicted with FDXR-associated mitochondriopathy, the association of which is explored further through a comprehensive literature review and case description. The heterogeneity of mitochondrial Fe-S synthesis diseases presents several possible mechanisms by which an afflicted individual would be vulnerable to esophageal rupture including an overload of iron and reactive oxygen species in affected fibroblasts, insufficient energy production in tissues with high metabolic requirements such as skeletal muscle, and association of the common p.Arg386Trp variant with severe early-onset disease.

P84 WITHDRAWN

P85 Exploring an Uncommon Roller Coaster Fatality

Erin E. Hall M.D., Tasha L. Zemrus M.D.
Tarrant County Medical Examiner's Office, Fort Worth, Texas, USA

Introduction: Amusement parks are a fun destination for Americans, with 140.5 million visitors to the top 20 US parks in 2022. The main attractions are roller coasters. Although relatively safe, they pose inherent risks. The serious injury risk is 1 in 15.5 million rides. From 1987 to 2000 there were 52 ride-related deaths, roughly 4 per year with 16 on coasters. Primary factors involved are negligence or pre-existing health conditions of guests, negligence of ride operators, and mechanical issues.

Case Presentation: We present the case of a fatality at Six Flags Over Texas in 2013 on the Texas Giant coaster, built in 1990 as the world's tallest wooden coaster, 14 stories high with a drop of 79 feet and bank of 95°. The restraint system was a simple individual rider lap bar. There was no weight requirement. Before each ride, manual checks of restraints are performed by employees and the train cannot depart unless the control panel shows no unsecured restraints.

The case involves a 52-year-old obese female riding the coaster. During a drop/bank, the decedent was ejected, striking a support beam before landing on a tunnel roof below. At autopsy, she had multiple injuries including near complete transection of the lower torso at T12, including the spine, spinal cord, aorta and inferior vena cava, multiple rib, scapula, and

pelvic fractures, avulsion of the heart, liver, kidneys, small intestine and stomach, and multiple organ lacerations.

Investigation found no mechanical failure and the ride had been properly checked and maintained. An unverified news report stated she was concerned the lap bar wasn't secure. A police report stated an employee felt her restraint was not as tight as it should be, but the safety system indicated it was locked. The news also reported repaired control panel light issues weeks prior to the incident.

The ride re-opened with redesigned lap-bar restraint pads, seat belt addition, and a test seat at the ride-line entrance. Seat belts were installed on other coasters throughout the Six Flags chain. The family filed a lawsuit against Six Flags and the coaster maker; there was an undisclosed settlement.

Summary: Six Flags operates 27 parks in the US. Multiple accidents have been documented in these parks and others, including fatalities. This case highlights the importance of pre-ride safety checks, maintenance and inspections, information for park guests, and adequate training for staff to prevent these accidental deaths.

P86 Autopsy Findings in Patients with Coronary Artery Injury Following Percutaneous Coronary Intervention

Bethany Faust MD, Harold Sanchez MD, Gabrielle Carmichael MD, Eva Mlynarski HT(ASCP), PA
Yale School of Medicine Department of Pathology, New Haven, CT, USA

Coronary artery disease (CAD) represents a major health concern in the United States, with men facing a one in two lifetime risk, while women face a one in three risk of developing the condition. Percutaneous Coronary Intervention (PCI), which employs stents and balloons to tackle coronary plaque build-up, has witnessed a significant rise in usage. Currently, around 900,000 of these minimally invasive procedures are carried out annually, a figure that has nearly doubled over the past decade.

While generally safe and effective, PCI carries a small risk of serious complications such as coronary perforation. Perforation can in turn give rise to a range of complications including pericardial effusion, tamponade, myocardial infarction, and death. The enormous volume of PCI procedures makes it increasingly likely that such cases will present as medical emergencies for clinicians and as deaths associated with therapeutic complications for medical examiners.

Coronary perforations are graded clinically using the Ellis angiographic classification: Type I involves vessel wall extrusion; Type II, myocardial or pericardial blushing; Type III, streaming of contrast material or cavity spilling.

We report five post-PCI patient autopsies revealing coronary injury. Predominantly elderly, they underwent PCIs across three hospitals with two cases involving fellows-in-training. Balloon dilation was performed in four cases; one involved rotational atherectomy and one involved cutting balloon techniques. One case, without atherosclerosis, was clinically diagnosed with vasospasm. Symptom onset ranged from immediate to five days post-procedure. Only two perforations were clinically diagnosed before death; the rest were diagnosed during autopsy. Affected arteries included the right coronary artery (three cases), posterior descending artery in a right dominant patient, and left coronary artery in the vasospastic patient. Autopsy findings of the atherosclerotic patients showed pericardial tamponade in two cases, epicardial hemorrhage in four cases, subepicardial defect with necrosis in one case, and hematoma in one case. The non-atherosclerotic case showed multifocal myocardial scars consistent with vasospasm and LCA dissection with eosinophilic coronary peri-arteritis. The autopsy findings correlate with a range of all Ellis classification types.

This series of cases highlights the serious nature of coronary perforations following PCI, emphasizing that even though such occurrences are rare, each one provides crucial insights. Autopsy examinations offer insight into pathological changes and outcomes not discernible in living patients. This knowledge can enhance patient management and treatment, improving both PCI safety and autopsy practices.

P87 What "Wood" You Do? Identification and Recognizing Patterns of Injury in Traumatic Fragmentation

Brianne Scott BS, Alexxys Clow MHS, Amy Tharp
Office of the Chief Medical Examiner - Western, Roanoke, VA, USA

Identification is one the most critical components in the field of Forensic Science; from comparing an antemortem standard to a postmortem sample to confirm the identification of a decedent to the interpretation of injuries to obtain information about objects used to create trauma. These are crucial aspects for proper identification of an individual and the categorization of cause and manner of death.

The authors present a case of the death of a 38-year-old man employed by a tree trimming service, who was operating a woodchipper when he was reported to have fallen into the woodchipper. The fall itself was not witnessed but it was reported that he was alone when working with the woodchipper machine. He had a past medical history to include migraines, hypertension, depression, anxiety and prior back and knee surgery.

Reports of woodchipper injuries are often centralized on occupational hazards as well as the prevention of fatalities. There are a reported 113 deaths occurring from 1982 to 2016 (1) in the United States. These powerful feed wheel machines which can run at speeds of 20 inches per second or faster (2) makes such equipment extremely dangerous to operate. Yet, still little focus has been brought to the forefront about the aftermath of these devastating traumatic injuries, especially in comparison to other similar traumatic deaths. This poster aims to highlight the patterns of injuries caused by these tree trimming machines and the means of possible identification in cases of total traumatic fragmentation with complete de-identification.

P88 Triple Coronary Artery Thrombosis: An Exceptional Autopsy Finding

Ekaterina Gedich MD[1], David M. Waters MD[2], Lorenzo Gitto MD[2]
[1]Pirogov Russian National Research Medical University, Moscow, Russian Federation. [2]Cook County Medical Examiner's Office, Chicago, IL, USA

Simultaneous triple coronary artery thrombosis is a rare condition associated with a high mortality rate and commonly presents as sudden cardiac death. While several clinical papers have been published in the literature, autopsy-confirmed cases of simultaneous triple-vessel coronary thrombosis are rarely reported.

A 36-year-old South Asian male collapsed at his workplace and was pronounced dead upon hospital arrival despite resuscitative efforts. According to the co-workers, the decedent complained of chest pain all day but refused to go to the hospital. A family member also mentioned that the subject complained of chest pain recently but refused to seek medical attention. Other than that, he did not have significant medical or family histories or substance use disorder, and his only relevant risk factor for coronary artery disease was obesity.

At autopsy, the subject was a class I obese male (BMI: 34.1 kg/m2). The heart weighed 458 grams, and serial sectioning of the coronary arteries revealed near-complete occlusion of all three vessels by thrombi at various stages of organization with background mild atherosclerosis. The myocardium showed a myocardial scar on the posterior left ventricle and hypertensive-related changes. Toxicology was negative. Microscopic examination of the heart revealed acute myocardial infarction with multifocal contraction band necrosis and an area of subendocardial fibrosis in the posterior left ventricular wall, consistent with a remote MI. Sections from the coronary arteries showed complex organized thrombi at various stages of organization, with aneurysm formation at the sites of

thrombosis. The cause of death was certified as acute myocardial infarction due to multi-vessel coronary artery thrombosis secondary to coronary artery disease, with obesity as a contributing factor. The manner of death was natural.

Sudden deaths due to simultaneous coronary artery thrombosis must always be investigated for potential underlying conditions. Although definitive risk factors have not been described in the current literature, a comprehensive medical and family history, including questions on potential genetic predispositions, might reveal crucial information. Additionally, direct communication of autopsy findings to families, along with advising discussions with their primary care physicians about potential genetic testing for relatives, is essential. To allow for future genetic testing, it is always suggested to collect and save a blood sample in purple (lavender) tubes in individuals younger than 40 years. Finally, given the recent association between COVID-19 infection and an increased risk of thrombosis, including multi-vessel thrombosis, testing for COVID-19 in similar cases is recommended.

P89 Not Your Typical TCA: A Review of Cases Involving Tianeptine

Stuart A.K. Kurtz MS, Kevin G. Shanks MS, Laureen J. Marinetti PhD, George S. Behonick PhD
Axis Forensic Toxicology, Indianapolis, IN, USA

Tianeptine is a tricyclic antidepressant (TCA) that is not approved for use in the USA but is prescribed in some European, Asian, and Latin American countries. It has been used in Europe since 1988 to treat depression. In the USA, it can be purchased as a dietary supplement. Unlike other TCAs, tianeptine has activity at the mu and delta opioid receptors and modulates the glutamatergic system. Naloxone can be used to reverse toxic effects. Additionally, it doesn't block serotonin or norepinephrine reuptake. Prescribed doses are typically 25-50 mg daily with higher doses taken when used recreationally. The half-life is estimated to be 3.2 hours. Primary metabolism is beta oxidation into propanoic and pentanoic side chains with metabolites named MC3 and MC5 respectively. MC5 is about 5% as a metabolite and is pharmacologically active with a half-life of 8.2 hours. Reported toxic effects include weakness, hypotension, nausea, dizziness, headache, somnolence, and insomnia.

Specimens are sent to our lab in gray top tubes containing sodium fluoride as a preservative. Volatiles are screened and confirmed using headspace gas chromatography paired with flame ionization detection (GC-FID) and a simple dilute-and-shoot extraction. Over 350 drugs of abuse and prescription drugs are screened for using liquid chromatography paired with quadrupole time of flight mass spectrometry and a cold acetonitrile protein precipitation extraction. Tianeptine is qualitatively confirmed using the same extraction and instrumentation method as the screen using fentanyl-d_5 as an internal standard.

Tianeptine has been included in our comprehensive panel since January 2023. As of February 2024, we have had 16 detections in our casework. These are in the states of Florida (5), Indiana (3), Kentucky (2), Missouri (2), Tennessee (2), Nebraska (1), and Ohio (1). Drugs detected in these cases included fentanyl (7), fluorofentanyl (4) bromazolam (4), and phenibut (3). One case quantitated at 430 ng/mL as a referral to a reference lab. In this case, toxicology was otherwise unremarkable with naloxone and caffeine detected. Other cases with unremarkable toxicology had detections of ethanol and cotinine in one and caffeine in the other.

P90 Human Immunodeficiency Virus Encephalitis Presenting as New Onset Postictal State

Natalya R. Ramirez MD[1], Janet Baranello MD[2]
[1]Duke University Hospital, Durham, NC, USA. [2]North Carolina Office of the Chief Medical Examiner, Raleigh, NC, USA

1.2 million people in the United States are estimated to have human immunodeficiency virus (HIV) infection, including approximately 158,500 who are unaware of their status. Neurologic disease is the first manifestation of symptomatic HIV in approximately 10-20% of cases. We report a 37-year-old male brought to the emergency department with altered mental status concerning for postictal state. He had no prior medical or substance abuse history. Imaging and laboratory studies were negative for trauma; no definitive diagnosis was established, and he was discharged the same day with a neurology consult for suspected seizures. One day later, he was found lying supine near a roadway approximately 500 feet from his apartment and death was pronounced without resuscitative efforts. Postmortem examination showed few minor blunt force injuries which did not contribute to death. Gross examination of the brain was unremarkable; however, histologic examination showed diffuse encephalitis with microglial nodules, neuronal injury/loss, and myelin pallor. The remainder of the autopsy was unremarkable. Toxicological analysis was negative. Whole blood testing for HIV was pursued given the microscopic findings and was positive for HIV-1. Serum or plasma specimens yield the most accurate HIV results, however whole blood HIV testing can be performed if HIV infection is suspected and the decedent has already been released or an ideal sample was not retained. In HIV encephalitis, infected monocytes and lymphocytes cross the blood brain barrier then viral replication occurs. Neuronal injury then occurs via inflammatory mediators and excitotoxicity. Neurologic disease in HIV classically presents with insidious onset of deficits in concentration, memory, and executive functions, with progression to psychomotor slowing with depressive/affective symptoms but can also present with seizures. On gross examination, the brain typically appears normal unless there is also a secondary infectious process occurring. Classic HIV encephalitis is characterized by subcortical microglial nodules (loose perivascular nodules of microglia and monocytes) with lymphocytic infiltrates and multinucleated microglial cells, which is generally considered pathognomonic for HIV encephalitis. Astrogliosis, myelin pallor, and axonal injury may also be seen with possible neuronal loss and apoptosis. In a patient with new onset seizures and/or altered mental status with a normal gross examination of the brain, additional histologic sampling of the brain is warranted. In cases where encephalitis is detected, postmortem whole blood HIV testing can be successful and should be included in your differential diagnosis.

P91 Suicide as Content in the Digital Age: A Complex, Orchestrated, and Recorded Suicide by Multiple Self-Inflicted Gunshot Wounds

Jennifer E. Davis M.S.
Virginia Office of the Chief Medical Examiner, Northern District, Manassas, VA, USA

We discuss a case in which collaboration with law enforcement was essential to safely investigate a scene as well as to attempt to stop a recording of a complex suicide being shared online as "content". In this digital age, medicolegal investigators must not only be aware of their physical exposure and risks on scene, but their digital exposure as well.

This case study involves a 23-year-old male with a background in IT, engineering, and photography. He was last known alive when he shared a cartoonish, suicidal meme in a group message. Later that same day he was reported missing by family, and law enforcement were able to utilize tracking on his cell phone to determine his location was at a hotel.

Upon entering the hotel room, investigators found a note taped to the doorframe. It stated, chillingly: "Both are still loaded – shoot me again :)."Camera equipment & studio lighting was set up throughout the room. Furniture had been moved and modified, including two tables that had been equipped with specialized vises used for sighting firearms, one labeled ".9" and one labeled ".45" in the same black marker as the brown paper bag note above the door. The vises held two handguns. Ropes with weights tied to them had been attached to the triggers of the firearms, and on the floor amidst it all was the decedent, with two gunshot wounds to the head.

The decedent had elaborately engineered the scene so he could sit in the center of the room with the two rigged firearms pointing at his head. In this spot the decedent could hold the ropes, and when released the weights would fall and pull the triggers on the two firearms, inflicting two separate gunshot wounds. To get to the decedent, the various rigging needed to be

disengaged and the firearms disarmed, as the note left in the room had all too clearly indicated they were loaded weapons that could be fired again. Throughout scene processing the cameras continued to record until they could be accessed and disconnected. The decedent's social media accounts were shut down to prevent any possible post of the events. As people continue to live in a perpetually more "online" world, medicolegal investigators will likely continue to encounter scenes of where the goal might be more than just suicide, but to create "content" for far reaching digital audiences, however gruesome.

P92 The Cold Never Bothered Me Anyway

Timothy Estrada DO, Andrea Orvik MD, Ariel Diaz BS, Emilie Cook DO
East Tennessee State University, Johnson City, TN, USA

We report an unusual case presentation of paradoxical undressing and hypothermia in a 38-year-old male with a past medical history of paranoid schizophrenia, bipolar disorder, and drug abuse.

The decedent was found dead inside his secured residence by his social worker during a welfare check. He was last seen alive four days prior, when his fiancé came by the residence. He would not let her inside and reportedly appeared under the influence at the time.

The residence was in disarray and the decedent was found in the supine position in the kitchen wearing only a long-sleeve T-shirt pulled up to the nipple line. Contusions were most prominent on his knees and thighs. There were multiple linear incised wounds on his left lower extremity and right abdomen, along with a disposable razor head lying by his feet. Blood was on the refrigerator door handle and the shelves and drawers inside were all removed and scattered throughout the kitchen floor near where the decedent was lying.

Autopsy findings were significant for Wischnewski ulcers of the gastric mucosa. Postmortem toxicological analysis of femoral blood revealed the presence of methamphetamine with metabolite and diazepam with metabolite. Vitreous fluid chemical analysis was performed and glucose concentration was not elevated.

The cause of death was deemed to be due to methamphetamine intoxication; however, when considering the constellation of findings including the scene photos and postmortem exam, it is likely that the decedent had prolonged cold exposure in his refrigerator prior to death. Weather reports from the week of his death show a low temperature range from 51-62 degrees Fahrenheit. This case highlights the importance of thorough scene investigation and a full postmortem examination.

P93 Phosphatidylethanol Biomaker: Novel Application in Negative Postmortem Toxicology of Chronic Ethanol Abusers

E. Heidi Cheek-Norgan M.H.S., Dr. Loralie J. Langman Ph.D., Dr. R. Ross Reichard M.D.
Mayo Clinic, Rochester, MN, USA

Testing for Phosphatidylethanol (PEth) homologues is used in clinical practice for assessment of ethanol abstinence, specifically in patients awaiting liver transplantation secondary to alcoholic cirrhosis or routine screening for unhealthy use. We discuss the utility and application in the postmortem setting in a decedent with well-documented chronic ethanol abuse, who tested negative for ethanol on initial postmortem toxicological studies.

We present a 40-year-old man with a medical history significant for chronic ethanol abuse with associated sequalae (hepatitis, electrolyte instabilities, and Wernicke's encephalopathy), hypertension, tobacco and marijuana use. Per his girlfriend, he had been feeling ill the last several days prior to his death, with endorsement of abdominal discomfort and reduction in his daily drinking. He reportedly had been up in the early morning hours and was later found unresponsive on his bedroom floor.

At autopsy, findings of his chronic ethanol abuse were appreciated, characterized by a steatotic liver, intact esophageal varices, and right ventricular dilatation. Microscopically, early hepatic bridging fibrosis and vacuolization of his renal tubules were identified. Ancillary testing demonstrated negative nasopharyngeal swab for COVID-19, Influenza A/B and RSV, chronic hyponatremia (sodium, 121 mmol/L; reference range: 134-145 mmol/L) and normal beta-hydroxybutyrate (0.4 mmol/L; reference: < 0.4 mmol/L) by postmortem vitreous analysis, respectively. Histologically, patchy acute bronchopneumonia was identified. Standard toxicology testing on femoral blood displayed only Delta-9 THC and Delta-9 Carboxy THC and negative ethanol. Additional testing for PEth 16:0/18:1 and 16:0/18:2 yielded values of 1983 ng/mL and 1272 ng/mL, respectively, indicating heavy alcohol consumption/chronic alcohol use (reference: > 200 ng/mL = at least 4 drinks/day several days/week).

PEth is a direct biomarker that assesses the group of phospholipids formed in the presence of ethanol. The panel utilized at our institution tests for two homologues that comprise of nearly 60% of all PEth homologues observed in blood, PEth 16:0/18:1 and 16:0/18:2. Values correspond to concentrations consumed weeks prior to testing, as the window of detection stretches up to 4 weeks. In our presented case, the decedent had negative ethanol on initial toxicological studies. PEth testing supported his marked ethanol consumption weeks prior to his death. With his endorsement of feeling unwell and decreased alcohol consumption, his PEth testing supports plausible acute alcohol withdrawal. While the application is relatively new the postmortem setting, additional research is necessary to gain further insight on how postmortem changes may contribute and cause artifacts.

P94 Everything Everywhere All at Once: A Case Study of Chronic Alcohol Abuse

Katie Fox Hanson MD, Joseph A Prahlow MD
St Louis City Medical Examiner Office, St Louis, MO, USA

Introduction: Excessive alcohol use results in a significant number of deaths annually. Due to its water solubility, alcohol can permeate many different tissues of the body and cause an array of pathologic effects. We present the case of a decedent with chronic alcohol abuse with an interesting and impressive constellation of findings, many of which are traditionally found in cases of chronic alcohol abuse and some of which are more novel.

Case: A 50-year-old White male was found down at home on a wellness check. There were two buckets of brown-black emesis in the residence, which was of normal temperature. The decedent was pronounced at the scene without resuscitative efforts. No medical history was available; however, a friend of the decedent mentioned that he was known to consume alcohol to excess on a daily basis. A scene investigation was negative for drug paraphernalia; however, an open liquor bottle as well as multiple open beer cans were present. A full autopsy was performed on the decedent including external and internal exams, toxicology, and histology.
Results: The decedent had a notable number of alcohol-related gross pathologic abnormalities, including a dilated heart, a hemorrhagic pancreas, an enlarged, fatty liver, and a black esophagus, as well as a focal area of gastric Wischnewski spots. Histologic exam revealed moderate/severe acute pancreatitis, hepatic steatosis, and acute esophageal necrosis, with normal kidney histology. Toxicology testing showed a blood acetone concentration of 32 mg/dL. Vitreous electrolytes revealed findings consisting of ketoacidosis with hyperglycemia (glucose concentration of 403 mg/dL).

Discussion: Traditionally, alcoholic ketoacidosis presents with euglycemia or hypoglycemia; however, alcoholic ketoacidosis with accompanying hyperglycemia is rare but not unknown. Wischnewski spots have been linked to hypothermia or prolonged hyperglycemia before death. As our decedent did not regularly go to the doctor (in fact we were unable to locate any relevant medical records), it is also possible that he was a diabetic, but there were no diabetic kidney findings. Another possibility is acute onset of diabetes due to beta cell destruction from pancreatitis.

Chronic alcohol abuse causes multi-systemic dysfunction. As Medical Examiners may see many or few of the sequela of alcohol abuse at autopsy. It is also not uncommon for there to be a paucity of medical records to assist us. This case highlights several classic presentations of chronic alcohol abuse as well as a few more novel findings.

P95 A Viscous Fate: Sudden Demise Due to B-Cell Acute Lymphocytic Leukemia

Aaron Amundson D.O., Kenneth Snell M.D.
USD Sanford School of Medicine, Sioux Falls, SD, USA

Sudden deaths in apparently healthy young individuals are a jarring occurrence and can lead to many unanswered questions. This poster presents a case study investigating the untimely demise of a young decedent with no prior medical history, whose unexpected death was attributed to B Cell Acute Lymphocytic Leukemia (B-ALL) with the use of flow cytometry. This case underscores the importance of relationships with other subspecialties of pathology and comprehensive evaluations, particularly in cases where symptoms are vague, subtle, or even absent.

P96 Cerebral Malaria in a Previously Healthy Adult: A Case Report of Rapid Progression and Fatal Outcome

Sierra Abdullaj DO[1], Adam Craig MD[2]
[1]University of Arkansas for Medical Sciences, Little Rock, AR, USA. [2]Arkansas State Crime Laboratory, Little Rock, AR, USA

This case report presents a 35-year-old African American male with no significant past medical history. He was found unresponsive on the floor of a flatbed semi-truck during a welfare check, three days after witnesses reported seeing the truck pull into a parking lot. The decedent reportedly had recently traveled to Conakry, Guinea in West Africa. He was reportedly feeling poorly for about a week and went to a local emergency room where he was tested for COVID-19 and influenza, which were negative. He was diagnosed with acute bronchitis and fever, and no further workup or treatment was started. Due to his prior travel history Hazmat recovered the body, and the decedent arrived at the crime lab with a suspicion of malaria.

Autopsy revealed a well-developed, well-nourished male with early decompositional changes. Internal examination showed pulmonary vascular congestion and edema. There were no other gross findings, even within the central nervous system. The brain weighed 1230 g and showed no edema, congestion, or discoloration. An initial rapid blood screen card for malaria was positive. Further testing by the Centers for Disease Control and Prevention (CDC) confirmed a Plasmodium falciparum infection. Histologic sections of the brain showed frequent small vessels that contained parasitized red blood cells with hemozoin (malarial) pigment. These organisms were seen to a lesser extent within the spleen, liver, and kidneys. Giemsa-stained blood smear slides identified the same degenerating organisms. Due to the number of organisms in the vessels in his brain and the rapid course of disease leading up to death, the cause of death was determined to be cerebral malaria due to Plasmodium falciparum, and the manner of death was natural.

Cerebral malaria is a severe complication caused by an infection from the parasite Plasmodium falciparum. It predominantly affects children, pregnant women, and foreign travelers. The incubation period typically spans one to three weeks. Patients can present with a wide array of neurologic symptoms such as fever, headache, impaired consciousness, vomiting, and seizures. Rapid progression to coma and death may occur within a few days of symptom onset without any treatment. It is often difficult to diagnose, and even with appropriate treatment, outcomes are often fatal. It is important to properly screen for malaria in clinics/emergency departments based off travel history, to provide early intervention and best chance of survival in cerebral malaria cases.

P97 Forensic Tale of Two Countries: Overview of Medico Legal Death Investigation in India and United States of America

Maneesha Pandey MD[1,2], Monisha Pradhan MD[3]
[1]The Forensic Pathologists LLC, Holland, Ohio, USA. [2]Forensic Medical, Kansas City, KS, USA. [3]Vardhman Mahavir Medical College and Safdarjang hospital, New Delhi, Delhi, India

In this era of rapid globalization, the authors have collaborated together to increase awareness of the medicolegal death investigation in India and United States of America (USA) and to eventually enable both countries to benefit from this shared knowledge.

It is also important to note that Indians represent second largest US immigrant group in USA after Mexicans. Indian Americans are considered one of the fastest growing minorities in USA.

Each country has a national organization, which is working to increase standardization of the medico legal death investigation. Indian Academy of Forensic Medicine (IAFM) was founded in 1972 and it is the largest association of the specialty of forensic pathology in India. Their membership is more than 1200 members and is open to medical professionals from India and abroad. They are definitely younger than National Association of Medical Examiners (NAME), USA, which was founded in 1966. Current NAME membership is approximately 1700 members and is open to medical professionals from USA and abroad.

The focus would be on the available resources, the infrastructure, legal systems, forensic pathology procedures, as well as the outcome of the medicolegal death investigation in both India and USA.

P98 Drug Overdose Decedents in the United States with any Reported Mental Health Disorder, 2022

Amanda Dinwiddie MPH, Stephanie Gupta MPH, Christine Mattson PhD, Puja Seth PhD
CDC, Atlanta, GA, USA

Data from the National Vital Statistics System indicate that over 107,000 drug overdose deaths occurred in the United States in 2022. Previous research suggests that individuals with mental health disorders have increased risk of overdose, and mental health disorders and substance use disorders (SUD) are known to frequently co-occur. The study objective is to examine characteristics of individuals who experienced a fatal drug overdose in 2022 and had a reported mental health disorder.

Data from CDC's State Unintentional Drug Overdose Reporting System (SUDORS) were analyzed to identify evidence of mental health disorders among individuals that died of an unintentional or undetermined intent drug overdose in 2022. Evidence was primarily identified in medical examiner/coroner (ME/C) reports. Mental health disorders were categorized according to the DSM-5. Counts and percentages were calculated for demographics and drug-involvement. Analyses included 42 states and the District of Columbia, which had complete death certificate data and ME/C reports for ≥75% of deaths during either 6-month reporting period (January–June or July–December 2022).

There were 62,746 unintentional and undetermined intent drug overdose deaths across 43 U.S. jurisdictions in 2022; 21.5% of decedents had a reported mental health disorder. By DSM-5 criteria, the three most frequently reported mental health disorders were depressive (n=8,092; 12.9%), anxiety (n=5,924; 9.4%), and bipolar (n=3,706; 5.9%) disorders. Among overdose decedents with a reported mental health disorder, 71.0% were non-Hispanic White, 15.8% were non-Hispanic Black, 9.0% were Hispanic, and 4.2% were other race; 60.0% were male and 40.0% were female. Overall, most overdose deaths (81.4% among decedents with a mental health disorder, 82.4% among those without) involved opioids, primarily illegally-made fentanyls (IMFs). Higher proportions of deaths among decedents with a mental health disorder involved antidepressants (9.7%) and benzodiazepines (15.4%) compared to decedents without a mental health disorder (3.3% antidepressants, 8.6% benzodiazepines).

Mental health is an important consideration for drug overdose risk, as persons with certain mental health disorders may use substances as a coping mechanism. This highlights the need for prevention and treatment efforts to identify and address co-occurring mental health issues and SUD. Although most overdose deaths involved IMFs, it may be helpful for providers to consider overdose risk when prescribing antidepressants and benzodiazepines among patients with known or suspected SUD. Drug overdose prevention and response strategies, including SUD screening, integrated treatment options, and harm reduction (e.g., increasing naloxone access) may reduce overdose deaths among persons with mental health disorders.

P99 The Next "Big Bad" in Synthetic Opioids? The Tale of N-pyrrolidino etonitazene

Nicole A Croom MD-MPH[1,2], Catalina Kenney MD[3]
[1]Wayne County Medical Examiner's Office, Detroit, MI, USA. [2]Wayne State University, Detroit, MI, USA. [3]Ascension St. John, Detroit, MI, USA

A substantial proportion of medicolegal cases are drug-related. N-pyrrolidino etonitazene, etonitazepyne colloquially, is a novel synthetic opioid agonist in the nitazenes subclass. Those in death investigation should recognize current trends in novel synthetic opioids are shifting from fentanyl to nitazene analogs due to core-structure scheduling.

Drugs in the nitazenes subclass were first studied for use as therapeutic analgesics in the 1950s but were deemed too dangerous for medical purposes. In 2019, the emergence of isotonitazene in the drug supply heralded the nitazene surge. Isotonitazene contributed to hundreds of fatalities prior to placement under Schedule I control. N-pyrrolidino etonitazene (NPE) was first discovered in the US in a 2021 death investigation case from West Virginia. Here we describe the first case involving NPE encountered at the Wayne County Medical Examiner's Office (WCMEO) in Detroit, MI.
Case Description: The decedent was a 33-year-old female with history of heroin use. Postmortem examination was significant for pulmonary edema. Toxicological analysis of postmortem blood was significant for cocaine (110 ng/mL) and NPE (not quantifiable by NMS Labs). Given the absence of fatal anatomic lesions, cause of death was determined to be cocaine and NPE toxicity, and the manner of death accident.

Discussion: NPE was the first nitazene analog to contain a pyrrolidino ring rather than the typical amine configuration. Studies performed by Vandeputte et al. confirmed that NPE is a selective and highly potent μ-opioid receptor agonist. Their in vitro activation assay revealed that NPE is over 800 times more potent and 2.5 times more efficacious than morphine, and over 40 times more potent than fentanyl. Examined NPE-positive postmortem samples had a mean concentration of 2.5 ± 1.9 ng/mL (range 0.3 – 25 ng/mL). Other substances were often present including fentanyl, methamphetamine, and novel benzodiazepines. Nitazenes are of particular public health importance because they cannot be detected by fentanyl test strips, placing even conscientious consumers at risk; are often co-ingested with other substances; and because naloxone is not efficacious in cases of overdose.

NPE is a nitazene analog opioid implicated in fatal overdoses since 2021. Despite NPE classification as a Schedule I drug, this was the first case of NPE toxicity at WCMEO. Due to everchanging effects of legislative bans on the recreational drug market, it's important to recognize that trends in novel synthetic opioids are shifting from fentanyl to nitazene analogs since this may impact testing and treatment.

P100 A Rare Case of Rapidly Fatal Metastatic Interdigitating Dendritic Cell Sarcoma

Chloe Lessard MPH[1], Serina Williams MD[1,2], Soham Roy MD[3], Yunan Wang MD[3], Christopher Peterson MD[3], Riya Patel MS[1], Joshua Morales MD[3,4,1], Michael S Stump MD[1,3,5]
[1]Virginia Tech Carilion School of Medicine (VTCSOM, Roanoke, VA, USA. [2]Virginia Commonwealth University, Richmond, VA, USA. [3]Carilion Clinic, Roanoke, VA, USA. [4]Blue Ridge Cancer Care, Roanoke, VA, USA. [5]Dominion Pathology Associates, Roanoke, VA, USA

Interdigitating dendritic cell sarcomas (IDCSs) are exceptionally rare and often fatal neoplasms that are difficult to diagnose and manage. Interdigitating dendritic cells are normally found in secondary lymphoid organs where they antigen-present and activate T-cells. IDCSs tend to involve lymph nodes but in some cases are extranodal. Here we describe a unique case of a 75-year-old female with an IDCS of the spleen and metastatic disease that was unfortunately fatal due to tumor lysis syndrome.

The patient initially presented with extreme fatigue, weakness, and emesis. Her hospital course revealed jaundice and splenomegaly as well as thrombocytopenia, leukocytosis, elevated liver enzymes, and high C-reactive protein. She had a history of treated non-Hodgkin lymphoma of the right chest wall four years prior with subsequent negative PET imaging. Soon after admission she underwent bone marrow biopsy which demonstrated a low-grade CD5-/CD10- B-cell lymphoproliferative disorder consistent with marginal zone lymphoma. She subsequently developed tumor lysis syndrome with multiorgan dysfunction and died despite best medical efforts.

Autopsy was requested to elucidate the cause of death as the rapid progression was usual for a low-grade B-cell lymphoma and ultimately demonstrated a B-cell lymphoma with an unexpected co-occurring metastatic IDCS. Grossly, the spleen was enlarged (1125 g) and had a smooth capsule with focal disruptions and tears. The parenchyma was widely hemorrhagic and congested. Splenic sections showed broad areas of necrotic pleomorphic tumor with spindled to ovoid cells and some multinucleation. Similar-appearing neoplastic cells were seen within sections of the mediastinal lymph nodes and liver, which correlated with round fleshy nodules seen on gross examination. Tumor cells stained positive for S-100, CD45, CD68, and fascin, and negative for AE1/AE3, CD3, CD20, PAX5, CD30, arginase, myeloperoxidase, CD23, CD35, CD1A, and D2-40. The cells were largely negative for langerin. Autopsy also confirmed the CD5-/CD10- B-cell non-Hodgkin lymphoma consistent with a splenic marginal zone lymphoma seen on bone marrow biopsy.

Although IDCSs remain rare and poorly understood, cases have more than tripled since 2008. They can be observed in any age group and have a male predominance. Clinical presentation is often vague, usually appearing as a slow growing asymptomatic mass with systemic symptoms in some patients. Associations between IDCSs and low-grade B-cell lymphomas have been previously documented. This case highlights the distinct morphology and IHC pattern of IDCS, only revealed on autopsy in this tragic circumstance, and contributes to the sparse literature on its clinical course.

P101 The Prevalence of Viral Co-Infections among Pediatric Deaths with a Postmortem Respiratory Virus at the New York City Office of Chief Medical Examiner: 2018-2023

Haley Moore Masters In Forensic Medicine, Natalie Medders BFS, Melissa Pasquale-Styles MD
New York City Office of Chief Medical Examiner, NYC, NJ, USA

Pediatric viral respiratory infections are common, and viral respiratory co-infections are known to occur. This study sought to identify single and multiple respiratory viral infections in pediatric deaths examined at the New York City Office of Chief Medical Examiner (NYC OCME) in the years before and after the emergence of SARS-CoV-2 to determine whether respiratory viral co-infections increased relative to single-virus

infections. The study also sought to assess the impact of positive postmortem respiratory virology on the causes of deaths.

All pediatric deaths examined and tested for respiratory viruses at NYC OCME between 2018 and 2023 were reviewed to identify those with positive postmortem respiratory virology results. Medicolegal, autopsy and virology reports were reviewed to assess the number of viruses, viral symptoms preceding death, histologic evidence supporting viral infection and whether respiratory viral infection was determined to be the cause of death or significant contributing factor.

From 2018-2023, 330 pediatric deaths tested positive for one or more respiratory viruses. Before the pandemic in NYC (2018-February/2020), 143 deaths had a respiratory virus; 67.1% (96) had 1 virus, and 32.9% (47) had more than one virus. During NYC's pandemic period of March/2020-2021, 67 deaths had a respiratory virus; 73.1% (49) had 1 virus, and 26.9% (18) had more than one virus. From 2022-2023, 119 deaths had a respiratory virus; 54.6% (65) had one virus, and 45.4% (54) had more than one virus.

Of the 330 pediatric deaths with positive postmortem respiratory virology, 49.4% (163) had known viral symptoms preceding the death. Of 298 deaths with positive virology and completed histology findings, supporting histologic inflammation was seen in 61.4% (183/298), but some of these had other potential explanations such as prolonged hospitalization following resuscitation or injury. Of 329 deaths with reported final cause and manner, virus was the cause or contributing factor in 34.7% (114). Of 329 deaths with reported final cause and manner, an injury caused the death in 21.6% (71), and virus was a purely incidental finding.

This study found that postmortem detected respiratory viral co-infections are common in pediatric deaths examined at NYC OCME. Compared to pre-pandemic, 2022-23 saw an increase in viral co-infections compared to single-virus infections among pediatric deaths with a positive postmortem respiratory virus. Many pediatric deaths with single or multiple detected respiratory viruses had no known viral symptoms and/or associated histologic findings. A positive postmortem respiratory virology was often determined to be an incidental finding unrelated to the cause of death.

P102 Alive or Dead?

Luisa Andrello MD, Matteo Moretti MD, Rosa Maria Martinez MD
Institute of Forensic Medicine, Bellinzona, Canton Ticino, Switzerland

The remarkable ability of humans to survive adverse events, whether they be debilitating illnesses or devastating traumas, is a testament to the resilience of the human body. In America, medical examiners are responsible for investigating cases involving deceased individuals. In contrast, in Europe, forensic doctors not only evaluate cases of death but also individuals who have suffered injuries of criminal significance (ranging from minor to life-threatening) and, at times, some conditions may appear incompatible with human survival.

In some instances, we are faced with situations that challenge our understanding, as individuals who have endured extreme traumas have managed to survive with few or no permanent injuries.

Thorough analysis of such cases of "non-deaths" provides valuable opportunities to gain a better understanding of the body's healing mechanisms and to more carefully assess the severity of injuries observed during autopsies or medicolegal investigations.

As an illustrative example, we will examine some cases of "non-lethal" injuries.

P103 Necrotizing Fasciitis following Closed Muscle Injury while Weightlifting

Daniel C Butler MD, Susan Erin Presnell MD
Medical University of South Carolina, Charleston, SC, USA

Necrotizing fasciitis is a rapidly progressive infection of the subcutaneous tissues and fascia with potentially debilitating and fatal consequences. Microbial agents are thought to gain access through small cutaneous disruptions and quickly spread through the poorly vascularized fascial planes once infection is established. However, in some cases, necrotizing fasciitis may develop without discrete cutaneous injuries, and in rare cases may be associated with muscle strain and bruising.

We present a case of a 31-year-old previously healthy male who developed abrupt right-sided abdominal and groin pain following weightlifting which progressed in severity over the next four days requiring hospitalization. At admission, he was noted to have cutaneous bullae on the right flank and CT imaging that showed findings suggestive of an abdominal oblique muscle injury. He rapidly developed multi-organ system failure, resulting in death one day later. The cause of his rapid decline was unknown and a medicolegal autopsy was authorized.

At autopsy, the decedent was found to have diffuse purulent necrosis of the subcutaneous soft tissues of the right side of the torso with extension into the right peritesticular soft tissues confirmed histologically to represent necrotizing fasciitis. Hospital blood toxicology showed diphenhydramine and methorphinan. Postmortem urine screening for anabolic steroids documented testosterone 32 ng/mL and epitestosterone 12 ng/mL with a ratio of 2.6 and was negative for common anabolic steroids of abuse. Postmortem serum procalcitonin was significantly elevated at 11.67 ng/mL. No discrete cutaneous injuries were noted other than healed folliculitis on the lower abdomen. The cause of death was certified as necrotizing fasciitis and the manner of death accident due to the temporal relationship between his muscle injury and death.

This case represents a rare example of a closed muscle injury resulting in necrotizing fasciitis. Due to the increased risk of muscle trauma, athletes, and in particular weightlifters, may represent a subgroup of patients at risk for the development of this rapidly progressive and often fatal disease.

P104 Data Element Exchange in Specialized Types of Medicolegal Death Investigations

Kelly Keyes, Erica Fornaro, Dr. Jeri Ropero-Miller
RTI, International, RTP, NC, USA

The National Institute of Justice (NIJ), in partnership with its Forensic Technology Center of Excellence (FTCOE) at RTI International and the Center for Disease Control and Prevention (CDC) convened the Medicolegal Death Investigation Data Exchange Working Group (MDI-Data-WG) from 2020-2023. The MDI-Data-WG was formed to advance forensic science and ensure communication between medical examiners, coroners, and other stakeholders. The publicly available reports of these efforts related to data collected and exchanged in medicolegal death investigations (MDI), with the initial report focused on core data elements that apply for all investigations. This presentation will focus on more recent guidance for data collection in five types of specialized death investigations (infant, and suspected drowning, fall, substance, or firearm), as well as data exchange workflow for that data.

The WG was comprised of forensic pathologists, medicolegal death investigators and other specialized interested parties. The WG focused on five specialized death investigations and identified the core elements to be collected when a case of that type is suspected to have occurred in a jurisdiction. The WG obtained consensus to define these elements as necessary components of a comprehensive medicolegal death investigation. When nuances of elements were identified, exemplars were provided. Data elements were then integrated into the previously established core data elements list.

To correlate with additional efforts other than map the MDI data flow, the primary high-level source for each data element is identified. Finally, several federal mortality data collection efforts were identified, and each core and specialized data element was mapped to the identified users of that data within those efforts. The identification of data used by a small subset of data collection efforts shows how impactful the use and communication of data collected by an MDI office can be.

All guidance was documented in graphical representations to help visually communicate the identified elements. The ongoing standardization of identified data elements can be viewed as necessary for modernized exchange of data with public health and public safety entities, including the multitude of forensic practitioners and interested parties that MDI interacts such as researchers, media, organ procurement organizations, and families.

P105 Fatal Dog Mauling Provoked by Seizure Activity in the Setting of Demyelinating Disorder and Androgen Suppression

Mary K. Schwerdt MD, Heather L Maioli MD
New York City Office of Chief Medical Examiner, New York, NY, USA

introduction: Dog mauling provoked by seizure activity is a well-documented phenomenon, as is seizure activity in the setting of demyelinating lesions. Burgeoning research has shown demyelinating disorders to be associated with gonadotropic hormone imbalance, more specifically with androgen suppression.

Case Report**:** We present a case of a fatal dog mauling of a transgender woman in her 30's on hormone replacement therapy with a history of frequent seizures beginning 1 year prior to death. The decedent owned multiple large dogs that had a history of aggression in response to her seizure activity.

Scene investigation showed extensive blood-stained paw prints throughout the locked and secured residence without disarray or evidence of barricades. Medications on scene included spironolactone, estrogen, and an empty prescription of Valproate. Autopsy examination revealed extensive perimortem animal predation confined the neck and chest with clean plantar aspects of the feet, indicating unresponsiveness during the attack. Given the decedent's history of seizures, the brain was submitted for formal neuropathology evaluation which revealed a firm, tan-gray lesion in the right parietal periventricular white matter on macroscopic examination.

Microscopic evaluation of the lesion was remarkable for myelin pallor on hematoxylin and eosin (H&E), loss of myelin on Luxol fast blue (LFB), and preservation of axons on Bielschowsky silver stain consistent with a demyelinating lesion. Additional regions of demyelination were not identified in the brain. The spinal cord was not submitted for evaluation. Ancillary testing, including toxicology, was non-contributory. There was no other significant natural disease.

Discussion: Dog attacks can be provoked by seizure activity, even for individuals well known to the dog. While demyelinating lesions can cause seizure activity, the relationship between demyelination and androgen suppression therapies is still under investigation. Here, we highlight a case where androgen suppression therapy may have contributed to the development of demyelination with resultant seizure disorder.

P106 *ADCY3* Gene Variant and Obesity Associated Death in a Pediatric Patient

Katrina Taylor DO, Emilie Cook DO
East Tennessee State University, Johnson City, TN, USA

The largest genetic contributors to non-syndromic obesity control energy balance are via the leptin-melanocortin signaling pathway, including *LEP*, *LEPR*, *POMC*, *PCSK1*, and *MC4R* genes. The gene involved in our patient, the transmembrane enzyme *ADCY3*, is one of several cell-signaling genes interacting with this pathway peripherally or that can influence the development of neurons responsible for energy homeostasis. Previously described pathogenic variants (especially monogenic variations) of the *ADCY3* gene have been associated with autosomal recessive severe early onset obesity. Candidates for *ADCY* testing include individuals younger than 18 years of age with a body mass index in the 97th percentile or over. Known complications of childhood obesity include obstructive sleep apnea, hypoventilation, aspiration pneumonia, hypertension, and right sided heart failure.

We present a case of a morbidly obese 3-year-old male weighing 123 pounds with a BMI of 46.8 Kg/M2 (>99th percentile) and a past medical history of obstructive sleep apnea, morbid obesity, and prior respiratory viral illnesses. He had an oxygen saturation averaging in the low 80's while awake and reaching as low as the 50's while asleep. In the emergency room, he was given racemic epinephrine and steroids. He was admitted to the hospital and diagnosed with pneumonia caused by Human metapneumovirus. His condition declined while on BiPAP. At autopsy he was found to have cardiomegaly (heart weight: 270 grams), a fatty liver, and firm lungs with a moderate amount of frothy exudate. Histology confirmed hyaline membranes in the lungs and hepatic steatosis. Unlike individuals with other syndromic obesities such as Bardet-Biedle or Prader-Willi, our patient lacked dysmorphic facial features, dental anomalies, or variations of the extremities.

A genetic panel "Uncovering Rare Obesity Gene Panel" was performed prior to death and revealed that he was heterozygous in the *ADCY3* gene for a sequence variant defined as c.775C>T. This variant has not yet been reported as a top contributor to death in the literature to our knowledge.

P107 Microvascular Occlusions and Acute Myocardial Infarction in the Setting of Sickle Cell and Excipient Lung Diseases

Andreah De La Hoz MD, Allen P. Burke MD
University of Maryland School of Medicine, Baltimore, Maryland, USA

Introduction: Sickle cell disease (SCD) manifests as a number of complications related to the chronic sickling and unsickling of red blood cells (RBCs), leading to oxidative membrane damage affecting every organ of the body. While microvascular disease and anemia are major presentations of the disease, acute myocardial infarction (AMI) is uncommon in SCD and is rarely considered in the differential of a young SCD patient with acute chest pain. Discussed here is a case of an 18-year-old man with SCD who presented with acute chest pain, quickly developed acute hypoxic respiratory failure, and who ultimately succumbed to his illness.
Case Report: An 18-year-old male with hemoglobin SS disease (HbSS), presented to an outside emergency department with 2-3 days of chest pain and one day of fever. Given concern for acute chest syndrome, he was transferred to the pediatric intensive care unit. The patient decompensated, was placed on venous-arterial extracorporeal membranous oxygenation (VA ECMO), and was ultimately transitioned to comfort care due to his poor prognosis. Autopsy demonstrated multiorgan injury compatible with SCD. Mottling and hemorrhage was readily identified throughout the myocardium of both ventricles, as well as the interventricular septum. On histology, cardiomyocytes with extensive contraction band necrosis and waveform myocytes were seen alongside intraluminal capillaries with diffuse sequestration of sickled cells, indicative of acute ischemia due to microvascular disease. Foreign body granulomas were identified in the vascular and perivascular spaces of the right ventricle and bilateral lungs, consistent with excipient lung disease (ELD).

The pathophysiology of SCD is such that the heart is considered relatively protected from the effects of sickling. Nonetheless, one of the highest contributors to morbidity and mortality in SCD is cardiac complications. AMI is thought to be a rare manifestation of SCD whereby ischemia occurs secondary to an imbalance of oxygen as a result of chronic anemia or due to an inciting hypoxic event—like ELD—inducing sickling and microvascular thrombosis. This etiology of AMI in SCD falls under the umbrella of myocardial infarction in the absence of obstructive coronary artery disease (MINOCA). As such, AMI must be included in the differential for patients

with SCD presenting with acute chest pain, regardless of age, to facilitate early treatment and improve prognoses for this patient population. Excipient lung disease should additionally be considered for patients with a history of chronic pain or substance use disorder in cases of PHTN and transient hemodynamic instability.

P108 Homicide in Children: a Retrospective Study of Autopsy Population in Maryland:2020-2022

Sorina Iulia Tomoiaga BS[1,2], London M Beckett BS[1,2], Tra'Mya Lauderdale BS[1,2], Stephanie A. Dean MD[2], Ling Li MD[2]
[1]University of Maryland Baltimore, Baltimore, MD, USA. [2]Office of Chief Medical Examiner, Baltimore, MD, USA

This research project aims to evaluate and interpret child homicide rates in the State of Maryland between 2020 and 2022, from newborn to 10 years old. The data was collected from the cases examined by the Office of the Chief Medical Examiner. This research was conducted by identifying common themes, demographic characteristics, and contextual factors associated with child homicides. The research's objective is to inform targeted prevention strategies, intervention efforts, and policy initiatives aimed at safeguarding the well-being and safety of vulnerable young children. In addition to being aware of the number of homicides involving children within the local to state communities from the 3-year period, the objectives of this research can allow for more productive measures in talk of opposition to policy changes and explore more research that can assist in development of this topic.

During the three-year period, there were 37 children homicide cases, of which 17 (48.6) involved infants up to two years of age. The leading cause of death of in the group aged two years or less was illicit drug intoxication (N=7), followed by blunt force injuries (N=6), malnutrition and neglect (N=2), smoke inhalation and/or thermal injuries (N=2), and suffocation (N=1). Among children ages between two and 10 years, the leading cause of death was gunshot/shotgun injuries (N=10, followed by blunt force injuries (N=8), sharp force injuries (N=1) and methadone invocation (N=1). Of the 37 cases, 54% were female victims. African American victims accounted for 70.3%, whereas White individuals represented the 24.3% and the remaining 5.4% were Hispanic. Among the perpetrators, fathers accounted for 16.2%. Additionally, in more than 21% of the cases, the perpetrators were unknown leaving 78.4% of the perpetrators being known in the cases. This is the first time the Maryland OCME has witnessed more than 41% (N=7/17) young children homicide (aged two years or less) were resulted from illicit drug intoxication. Our data provides a dangerous alarming trend of young children died from illicit drug intoxication. This trend needs a great public attention and awareness to implement public health policies and prevention services. Further study from other states is needed to explore the psychological, social, and emotional ramifications of child homicides on families, communities, and society at large, emphasizing the urgent need for proactive measures to address this pressing public health issue.

P109 Spotting Wischnewski Spots: Harder Than You'd Think

Kyla M Jorgenson MD, MS, Caroline R Dignan MD
University of Rochester Medical Center, Rochester, NY, USA

Introduction: The eponymous Wischnewski spot (WS), historically linked to hypothermia and more recently to diabetic ketoacidosis (DKA), vividly brings to mind its characteristic appearance. However, the literature on WS remains inconsistent, ranging from descriptions of raised lesions to hemorrhagic erosions. In the setting of a hospital autopsy service, with the unique opportunity of detailed medical records, lab values, and medically induced hypothermia, we aimed to examine WS clinical scenarios and provide clarity to the field of spots.

Methods**:** Over eight months, one hundred adult stomachs from autopsies were photographed fresh and fixed. Photos were examined for decomposition, petechiae, or WS-like markings. WS were defined as multiple well-circumscribed, oval-to-round, brown-black discolorations greater than 0.1 cm, scattered across the gastric mucosa. Clinical history review included body temperature, blood glucose (BG) concentrations, and ketone presence. Stomach histologic sections were examined for autolysis, capillary dilation, red blood cell extravasation, erosion or ulceration, inflammation, or pigment.

Results: No stomach exhibited the stereotypical "leopard spotting" WS, as all lacked a widespread distribution. However, eight stomachs grossly had markings with features of WS. Clinical scenarios of these stomachs varied, including normothermic cases with low BG concentrations and hypothermic cases with high BG concentrations. In contrast, despite hypothermic body temperatures and/or high BG concentrations, twenty-one cases had no spots. Seventy-one cases had no features of WS and no relevant clinical findings. On microscopy, three of the eight cases with features of WS had zonal deposition of a brown, granular, polarizable pigment that coated the luminal epithelium, readily apparent at low power. While background congestion, RBC extravasation, and inflammation were variably present, rarely was this within the zones of pigment. Despite varying degrees of autolysis, ulceration was not present and an erosion was only seen in one case in conjunction with fungal yeast forms within the pigment.

Discussion: The hospital setting unfortunately proved a more difficult environment than anticipated to study the known associations of WS and explore new ones. The aim of keeping patients alive perhaps reduces or delays the physiologic stress posited to cause WS, diminishing their appearance. Studying WS is further encumbered by the lack of consensus on objective criteria for what constitutes a WS. Despite WS having an almost canonical imagery, finer details such as size, shape, and degree of distribution are less established, if discussed at all. Clear, objective criteria are increasingly necessary as WS become recognized in further clinical scenarios.

P110 Subdural Empyema: A Case Series and Review of Common and Uncommon Causes at Autopsy

Danea Pirtle MS[1], Dr. Clare Bryce MD[2]
[1]University of Nevada, Reno, School of Medicine, Reno, NV, USA. [2]Washoe County Regional Medical Examiner's Office, Reno, NV, USA

A subdural empyema is an intracranial infection characterized by a collection of purulent material within the subdural space. The most common causes of subdural empyema in children include sinusitis and otitis media; however, in adults, subdural empyema is less common and usually related to sinusitis, recent trauma with skull fracture, or infection following neurosurgical procedures. The microorganisms associated with subdural empyemas in adults are typically Streptococcus species or *Staphylococcus aureus*. Mortality is typically low. In a retrospective review of cases from 2015-2023 in the Washoe County Regional Medical Examiner's Office Vertiq Database, three cases were identified where the cause of death was attributed to subdural empyema. Of the three cases, two cases had a typical underlying pathology; one was attributed to bacterial meningitis (*Streptococcus constellatus*) and the other was secondary to sinusitis (*Streptococcus intermedius*). However, in the third case, the subdural empyema had an atypical underlying etiology. In this case, the decedent was a 30-year-old woman was found deceased in her residence. Her past medical history included Celiac Disease, Barrett's Esophagus, and persistent dental infections. Further investigation revealed recent complaints of increasing weakness and progressive confusion in the weeks leading up to death. On external examination of the decedent's mouth, the decedent's teeth were noted to be in poor condition, with prominent caries on several of the decedent's molars. An autopsy revealed a collection of purulent fluid in the subdural space along the right cerebral convexity. A small amount of subdural hemorrhage was noted in conjunction with the purulent fluid and punctate hemorrhages were observed in the cortical ribbon and right frontal lobe white matter. Histological examination of the subdural surface of the dura mater showed evidence of inflammation and bacterial colonies. A similar inflammatory process with bacterial colonies was present in the subcortical white matter and frontal cortex and included necroinflammatory debris. A bacterial culture of the subdural empyema grew Viridans Streptococcus, while a blood culture grew Viridans Streptococcus*, Staphylococcus aureus, and Serratia marcescens*. Viridans

Streptococcus is a group of Gram-positive bacteria that are most abundant in the mouth, and often also colonize the gastrointestinal and genitourinary tracts. Ultimately, the cause of death in this case was determined to be subdural empyema due to complications of dental caries.

P111 Hypothermia Related Deaths: A Retrospective Study of Forensic Autopsy Population in the State of Maryland

Tara S Dillman BS[1], Anne M Francavilla BS[1], Jiro Ezaki[1], Dr Ling Li MD[1,2], Stephanie Dean MD[3]
[1]University of Maryland, Baltimore, Baltimore, MD, USA. [2]Office of the Cheif Medical Examiner, Baltimore, MD, USA. [3]Office of the Chief Medical Examiner, Baltimore, MD, USA

About 700 to 1500 hypothermia-related fatalities (0.21 to 0.42 per 100,000 population) are reported in the United States each year. According to the report from National Center for Health Statistics, death rates attributed to hypothermia were generally higher in rural areas and males had higher death rates than females. A retrospective study of hypothermia-related deaths was conducted at the statewide medical examiner system in Maryland. The database of the Maryland Office of Chief Medical Examiner was searched for all fatalities related to hypothermia between 2018-2022. A total of 130 hypothermia-related deaths were identified and evaluated in this study. The rate of hypothermia-related deaths in Maryland was an average of 0.77 per 100,000 population per year. Of the 130 cases, 83% (N=108) cases were classified as accidents, 5% (N=6) were suicide, and 12% (N=16) could not be determined. Males (N=101) were more likely to die of hypothermia than females (N=29) (OR 3.7, 95%CI 2.42 - 5.54). There was a difference in race with White being the most predominate at 49% (N=64) followed by African American at 41% (N=53). The ages ranged from 8 to 96 years old with the majority of victims' ages between 40 – 64 (N= 68, 52%). 28% (N=36) of victims were 65 years and older. Of the 130 deaths, 33% (N=43) were homeless and 70% of (N=97) were found outdoors. Maryland consists of 23 counties and Baltimore city with a population of 6.046 million. Of the 43 homeless victims, 17 were found in Baltimore City and 26 were found in the 23 counties combined. Postmortem toxicological analysis revealed that 34% (N=44) were positive for alcohol. Seventeen cases had a blood alcohol concentration > 0.20%. Thirteen (10%) cases were positive for cocaine. Autopsy showed that 35% (N=46) had Wischnewski spots and 5% had pancreatitis. The environmental temperature was much lower in the cases with Wischnewski spots than the cases without Wischnewski spots (Temperature 34.4±9.9F vs 37.3±13.1F, p=0.043). Cardiovascular disease was the leading underlying cause of death (N=78), followed by pulmonary disease (N=15), history of Dementia (N=12), and Diabetes Mellitus (N=11),. Other significant medical conditions included Schizophrenia in 5% (N=6) and bipolar disorder in 6% (N=8) of cases. Hypothermia-related deaths are preventable and commonly occur in vulnerable populations. Our data can be used by the local public health agencies to target those higher-risk populations, such as the homeless and elderly, and provide appropriate interventions to prevent such deaths.

P112 Apetamin: A Fatal Case of Small and Large Bowel Ischemia

Denise Sarah Dailey MD, Fatima Al-Baqali MD, Kimberly Golden MD
George Washington University-DC OCME, DC, USA

Apetamin is a weight alteration drug currently unapproved by the Food and Drug Administration. Its active ingredients include cyproheptadine, a potent histamine and serotonin antagonist, and amino acid lysine. The common side effects of Apetamin include dizziness, disorientation, decreased cardiorespiratory drive, constipation, blurry vision, and weight gain. These result from the anticholinergic and sedative effects of cyproheptadine at high concentrations. Additionally, it may cause life threatening effects such as seizures, hypotension, and arrythmias. Cyproheptadine is used to treat serotonin syndrome and allergies. Common drug interactions occur between Cyproheptadine and numerous other drugs such as ethanol, barbiturates, psychiatric, and cold medications. Notwithstanding, there have been several published cases of fatalities due to Cyproheptadine after intentional, as well as accidental overdose and drug interactions.

This is a case of a 29-year-old Black female who was 6 months post-partum and admitted at the hospital due to abdominal pain, nausea, and vomiting. She had no other significant past medical history. She reported a two-week-long consumption of 40 milliliters/day of Apetamin. The patient admitted to consuming 200 milliliters/day of Apetamin, the equivalent to one full bottle, for a total of 4 days prior to admission. An abdominal computated tomography scan showed evidence of small bowel obstruction. On exploratory laparotomy, she was found to have a loop of bowel wrapped around a single adhesive fibrous band within the pelvis as the primary cause of obstruction. There was also frank diffuse small and large bowel ischemia. Additional abdominal findings included a non-expanding, non-pulsatile, peritoneal hematoma on the left pelvic sidewall, along with ascites. All other organs were unremarkable. Furthermore, internal examination revealed necrosis of the entire large and small bowel.

Histology findings revealed liver congestion with mild to moderate peri-portal chronic inflammation without fibrosis or steatosis. The bowel showed significant transmural ischemic changes and congestion. Toxicology screening revealed non-toxic concentrations of Cyproheptadine, Hydromorphone, Ketamine, and Fentanyl. The latter three were all administered during hospital stay.

The cause and manner of death are as follows:
Cause of Death: Bowel ischemia due to small bowel obstruction due to fibrous band exacerbated by Cyproheptadine use.
Manner of Death: Accident

This case demonstrates the extent to which body dysmorphism, and weight alteration drugs can place the lives of patients at risk. Moreover, the use of unregulated drugs without the supervision of a licensed physician in patients with significant histories increases the likelihood of exacerbating minor issues into life-threatening events. The decedent's overconsumption of Apetamin likely exacerbated small bowel obstruction into bowel ischemia and ultimately necrosis.

P113 Death Characteristics of Maricopa County's Unhoused Population

Madeleine Taddei[1,2], Amber Wang MD[1]
[1]Maricopa County Office of the Medical Examiner, Phoenix, AZ, USA. [2]University of Arizona College of Medicine Phoenix, Phoenix, AZ, USA

The population of unhoused individuals in Maricopa County has grown rapidly over the past 5 years, with over 9,000 people in 2023. Unhoused people have been shown to experience a higher rate of death at younger ages than the general population, with the majority of these deaths requiring further medical investigation. Despite the vast majority of these deaths being investigated by the Maricopa County Office of the Medical Examiner (MCOME), many facets revolving around the passing of some of the county's most vulnerable populations remain poorly understood; such factors include manners of death by different ages, genders, and local hazards. Similarly, few counties across the country have published research regarding deaths among their unhoused communities. The goal of this presentation is to delineate the characteristics of deaths in Maricopa's unhoused population between July 2021-July 2023 and discover notable features affecting the community in this area. Data is derived from MCOME records on deaths of decedents categorized as "transient" housing status at the time of death investigation. Key comparisons in this study include numbers of people dying by various manners and stratified by age group, sex, location and time of year; results also include breakdown of sub-manners seen in this population. A total of 1291 deaths met criteria to be included in the study, with 82% males and 26-45 years being the most common age group (37%). Accident was the most frequently encountered manner of death (76.6%), with 55% involving acute intoxications, 9% involving elevated environmental temperatures (heat-related), and 7.7% resulting from pedestrians struck by motor vehicles. As the unhoused population grows, more individuals are expected to die in similar manners if no action is taken by local community services which are designed to help unhoused people survive. Understanding which causes and manners of death may disproportionately affect portions of the

unhoused population may be used to guide community and governmental services/relief efforts to be as effective as possible, reducing unhoused individual's risk of harm and ultimately death.

P114 Fatal Exertional Rhabdomyolysis in Police Cadet with Underlying Sickle Cell Trait

Brittany J Ritzman BS[1], Christopher Kiefer MD[2]
[1]Indiana University School of Medicine, Indianapolis, IN, USA. [2]Kentucky Office of the Medical Examiner, Madisonville, KY, USA

Sickle cell trait has been proposed as a sudden cause of death in circumstances of extreme exertion in military recruits, law enforcement and firefighting trainees, and in athletes at many levels of competition. Though affected individuals may lead normal lives, and some are even unaware of their diagnosis, heavy physical activity has been linked to sickling crises known as exertional sickling. Postmortem exam, however, may not be straightforward in determining a cause of death. In 2023, a young police cadet was pursuing his dream career when, near the end of a week of intense physical training exercises, his fellow officers report he became visibly fatigued, lost consciousness, and collapsed. Despite quick action by his colleagues and emergent medical attention, he did not regain consciousness and ultimately passed away within hours of his collapse. Blood labs drawn in the hours before death showed numerous remarkable characteristics; the previously healthy patient appeared to be in severe renal failure, with a creatine phosphokinase (CPK) concentration of 7,462 U/L — more than 40 times the upper range of the lab reference concentration — an ABG-determined blood pH of 6.8, and serum creatinine of 2.5 mg/dL. On microscopy, the vasculature of the heart, liver, and kidney had marked congestion with red blood cells, many with sickled forms. Further investigation revealed that he had been complaining of severe pain and fatigue for several days, and that in his efforts to prepare for his rigorous training schedule, he had been consuming multiple over-the-counter protein and creatine supplements. Adding to the mystery surrounding this sudden death was a known diagnosis of sickle cell trait. Though he was aware of this diagnosis, which he shared with two of his three children, he maintained an active lifestyle and was not prevented from pursuing a physically demanding career. Could this young cadet's life have been lost as a result of excessive consumption of bodybuilding supplements, or was his underlying genetic condition the major contributor to his death? This challenging case illustrates not only the risks of over-exertion in individuals with sickle cell trait, but also showcases the potential dangers of over-taxing renal health with nutritional supplements, especially in those who may be at increased risk for fatal rhabdomyolysis.

P115 Chill Out: A Fatal Case Involving the Mammalian Dive Reflex Due to Dry-Ice Exposure

Noelani-Mei P. Ascio MD[1], Medical Examiner Paul S. Uribe MD[2,3]
[1]Oak Hill Hospital, Brooksville, Florida, USA. [2]Fort Bend County Medical Examiner's Office, Rosenberg, Texas, USA. [3]Office of the State Medical Examiner, Pearl, Mississippi, USA

Sudden, unexpected deaths can pose diagnostic challenges, especially when conventional explanations such as trauma or toxicological causes are absent. We present a case of a 28-year-old female who collapsed and died suddenly at work after a rapid exposure to dry ice. The decedent was a previously healthy female working at a dry ice company. Video surveillance demonstrated her opening the lid of a dry ice container, and being engulfed by cooled carbon dioxide gas for a brief period of time before closing the lid. She then took several steps before collapsing and becoming pulseless and apneic. Despite resuscitation efforts, she was pronounced dead in the emergency department. Autopsy findings revealed an enlarged thyroid gland consistent with multinodular goiter with lymphocytic thyroiditis and cardiac histology indicative of perivascular and scattered interstitial fibrosis. No evidence of trauma or airway edema was identified. Toxicology analysis of antemortem blood detected caffeine and naloxone. No acute traumatic injury or other anatomic, histologic, or toxicologic cause of death was identified. Several possible explanations for her sudden death were considered. A sudden cardiac death unrelated to the dry ice exposure was excluded due to the temporal relationship to the dry ice exposure. The exposure to carbon dioxide gas was too brief for a purely hypoxic death. The arrhythmogenic nature of the physiologic mammalian dive reflex was also considered. The mammalian dive reflex, often associated with cold water exposure, can also be included by super-cooled gas exposure. The combination of the sympathetically driven cold shock response in conjunction with the bradycardic response of the mammalian dive reflex likely created an autonomic conflict that resulted in a fatal arrhythmia and sudden cardiac death. Understanding the physiologic responses of the cold shock response and mammalian dive reflex are essential for accurately diagnosing and preventing similar fatalities. This case underscores the need for thorough investigation and understanding of applicable physiologic mechanisms in cases of sudden, unexpected deaths, particularly when conventional causes of death are not apparent.

P116 Cerebral Fungal Infections in Clinical Autopsies: A Single Institution Retrospective Series

Thomas Denize MD, Maria Martinez-Lage MD
Massachusetts General Hospital, Boston, MA, USA

Introduction: The incidence of fungal infection is rising yearly, in part due to the increasing use of immunomodulatory agents in the treatment of auto-immune/auto-inflammatory diseases, in addition to chemotherapies and immunosuppression for organ transplant. This retrospective study aims to document the incidence and characteristics of fungal infections of the central nervous system in a high-volume institutional clinical autopsy service.

Methods: The pathology reports of every central nervous system autopsy from 2000 to 2024 were manually reviewed for mention of a fungal infection. Twenty-two cases were identified (over 2500 total). Clinical information was extracted from the electronic medical record and autopsy report to include date of birth, date of death, type of fungal species, medical history of immunosuppression, and cause of death. All deaths were certified as natural.
Results: Of the 22 decedents, seven were females and 15 males, with a median age of 58.5 years (range: 21 days-75 years). Eleven patients were immunosuppressed at the time of death (four solid organ transplant [one liver, two kidneys, one heart and kidney], one chronic lymphocytic leukemia, one acute myelogenous leukemia [AML], one acute prolymphocytic leukemia, one AML in blast crisis, one treatment for multiple sclerosis, and one treatment for granulomatosis with polyangiitis). Aspergillus spp was the most frequent organism, with 10 cases (45%), followed by four cases of Cryptococcus (19%), four mucormycoses (19%, including two Mucor, one Rhizopus, and one untyped zygomycete), and three cases of Candida (14%). Aspergillus was associated with hemorrhagic findings secondary to mycotic aneurysms, ischemic lesions secondary to fungal thrombi, and abscesses. Candida was associated with infarcts and meningitis. Cryptococcus caused meningitis and meningo-encephalitis. *Mucor* cases presented with small and medium-caliber vessel thrombosis, while Rhizopus resulted in extensive damage of the patient's right internal carotid artery causing a massive infarction of the downstream circulation. The neonate with an untyped zygomycete presented with meningo-encephalitis in the context of prematurity and hypoxic brain injury.

Discussion: Brain fungal infections in our clinical autopsy series are overall rare, affect immunosuppressed patients disproportionately, and are most commonly caused by *Aspergillus* spp.

P117 Are There Benefits to Performing Federal Aviation Administration (FAA) Toxicology Boxes on Civilian Motorists?

Richard A. Reynolds, Matrina J. Schmidt MD
District XVIII Brevard County Medical Examiner, Rockledge, FL, USA

Federal Aviation Administration (FAA) toxicology boxes are well known to medical examiners/coroners. These boxes are well used with aviation deaths. FAA boxes are also used for non-aircraft deaths, such as rail and marine collisions. The Brightline train started transportation through

Brevard County in September 2023. We present two cases of FAA kits performed on civilians, at the request of the National Transportation Safety Board, involved in train versus motor vehicle collisions. We questioned whether the performance of toxicology boxes on civilian motorists would have a different outcome than evaluation of just the toxicology results from the autopsy.

The collisions occurred within two days of each other and at the same intersection, in Brevard County. Videos, from nearby cameras, of both collisions are posted on the internet. The first decedent, a 62-year-old male is recorded driving around another motor vehicle stopped for the train and driving around the crossing gate arms, prior to impact. The toxicology results from the medical examiner's testing laboratory and from the FAA were both positive for N, N-dimethylpentylone and cannabinoids. The second decedent, a 52-year-old female was recorded driving around the crossing gate arms prior to impact. The toxicology results from the medical examiner's testing laboratory and from the FAA were both positive for cocaine.

Data collection using the toxicology boxes is done to determine the cause of the collision and to protect public safety. These two cases where the toxicology boxes were used on civilian motorists did not demonstrate different toxicology results between the two laboratories. In addition, there was not a different outcome with use of the FAA boxes. Safety posts (bollards) were installed at the intersection, prior to completion of the final toxicology results.

P118 Pituitary Apoplexy, Black Esophagus, and Noroviral Gastroenteritis in a Case of Sudden Death.

Scott Albright DO, Dennis Firchau MD
University of Iowa, Iowa City, IA, USA

Pituitary apoplexy is caused by the sudden infarction and/or hemorrhage of the pituitary gland and most often occurs in the setting of a pituitary adenoma, though other predisposing factors exist. Acute esophageal necrosis is a rare finding characterized by circumferential black esophageal mucosa in the distal esophagus. It is believed to occur due to an initial ischemic event followed by increased exposure to gastric acid and is classically associated with diabetic ketoacidosis, viral infections, trauma, gastric volvulus, as well as other disease states. We report the case of a 63-year-old decedent who died at home after experiencing several days of headache, nausea, and vomiting. Autopsy examination demonstrated pituitary apoplexy that most likely progressed from a previously unknown pituitary adenoma. A cell lineage was unable to be determined due to a lack of viable pituitary cells, however, the adenoma was most likely a "silent" nonproducing adenoma due to the lack of prior symptoms. Autopsy examination also revealed acute esophageal necrosis and severe atherosclerotic stenosis of the coronary arteries. PCR testing for enteric pathogens was positive for Norovirus. Vitreous chemistry analysis revealed hypochloremic hyponatremia that would be consistent with the pituitary apoplexy and viral gastroenteritis. This report highlights some of the classic clinical and autopsy findings in pituitary apoplexy leading to sudden death. It is also the first report to identify acute esophageal necrosis in a case of pituitary apoplexy and norovirus gastroenteritis.

P119 Norfentanyl:Fentanyl Ratios in Fentanyl-Related Overdose Deaths With and Without End Stage Renal Disease

Ari Pape MD[1], Nicole A Yarid MD[2]
[1]University of Washington, Seattle, WA, USA. [2]King County Medical Examiner, Seattle, WA, USA

Introduction: Prior to 2019 black tar heroin was the dominant opioid in overdose deaths in the Pacific Northwest. After 2019 fentanyl overtook heroin as the dominant opioid, but unlike intravenous use of black tar heroin, fentanyl does not have a known association with secondary amyloidosis and end-stage renal disease (ESRD). Fentanyl is metabolized almost exclusively by the liver and is predominately converted to norfentanyl, an inactive metabolite, and cleared by the kidneys. Limited data is available on fentanyl and norfentanyl clearance in patients with ESRD.

Methods: We searched the King County Medical Examiner's database for fentanyl-related overdose deaths with toxicology results for fentanyl and norfentanyl and a history and/or microscopic evidence of ESRD from 1/2019 – 3/2024; 15 cases were identified. We collected all fentanyl-related overdose deaths between the same time period with grossly/microscopically normal kidneys. Cases with completely autolyzed kidneys and/or no norfentanyl concentrations were excluded. The mean and medians were calculated and the groups were compared using a two-tailed T-Test. Lastly, all cases with a norfentanyl:fentanyl (N:F) ratio greater than 10 were evaluated in greater detail.

Results: Fifteen cases were included in the ESRD group; N:F ranged from 10-161.9 (3105.26 was excluded as an outlier). The mean was 33.5 and the median was 18.5. 320 cases were included in the control group; mean N:F was 0.3 and the median was 0.2. The p-value was 0.008. Out of all the overdose deaths with N:F ratios during this time period, 18 had N:F ratios greater than 10. All 15 ESRD cases had ratios greater than 10. Of the other three cases, two showed microscopic evidence of mild kidney injury and the last was completely autolyzed. Of note, heroin was seen in nearly half of the ESRD group (7 of 15 cases), despite heroin only being present in 18.6% of fatal fentanyl overdoses in King County since 2019.

Discussion: In our dataset we identified a tentative association between elevated N:F ratios and renal failure. Our hypothesis is that patients with renal failure take longer to clear fentanyl and norfentanyl, so as the liver continues to metabolize fentanyl to norfentanyl, norfentanyl concentrations build-up, leading to an elevated N:F ratio. Secondly, the high proportion of amyloidosis as the cause of renal failure suggests that these patients used heroin prior to switching to fentanyl.

P120 Threads that Kill: Skin Histopathology in a Fatal Case of Jellyfish Envenomation

Mohd Suhani Mohd Noor MBBS, MPath (Forensic)[1], Wan Zafirah Zamaliana Alias MBBS, LLM[1], Nor'amirah Ahmad MD, DrPath (Forensic)[2]
[1]Sultanah Bahiyah Hospital, Alor Setar, Kedah, Malaysia. [2]Sultan Idris Shah Hospital, Serdang, Selangor, Malaysia

Introduction: Jellyfish envenomation is a means for securing prey and for protection against predators. It is also among the most commonly encountered marine fauna-related injuries to humans globally, numbering in the millions. Whilst most of these stings are non-life-threatening, some species of box jellyfish can be lethal to humans. Jellyfish envenomation is effected through nematocysts within the cnidocytes or specialized stinging cells that cover their tentacles, which will discharge coiled threads or tubules into a target such as the human skin upon contact and inject toxins. Autopsy studies concerning fatal jellyfish envenomation have been published in the literature, albeit only a few discuss the skin histopathology of the stings in detail. We report the skin histopathology of a fatal case of jellyfish envenomation.

Case Report: A 60-year-old male tourist on a resort island collapsed on the beach within minutes after coming out of the water crying in pain with apparent jellyfish tentacles clinging to his body and was dead on arrival at the local hospital. An autopsy performed the next day showed multiple long, overlapping linear and serpiginous weals on his torso and limbs, and there were no tentacles on the skin. Skin histology of the weals revealed cigar-shaped nematocysts (microbasic mastigophores) on the surface of the stratum corneum and fine thread tracks penetrating the dermis up to 280 µm deep. The morphology of the nematocysts and the dermal thread penetration depth suggest a Chironex species or box jellyfish. The autopsy also showed critical stenosis of one of his major coronaries by atherosclerosis. His death was certified as jellyfish envenomation, with coronary atherosclerosis as a significant comorbidity.

Discussion: The mechanism and skin histopathology of jellyfish envenomation will be discussed. This case highlights the importance of

postmortem histology in understanding the dermatological manifestations of jellyfish envenomation and its potential in identifying the genus/species of the jellyfish. The identification of venomous jellyfish in fatal stings will facilitate governmental efforts to establish a monitoring and alert system for public safety at beaches where fatal jellyfish envenomation has occurred.

P121 A Case of Amyloid Angiopathy-induced Cerebellar Hematoma Resulting in Severe Motor Ataxia Leading to Suspicion of Foul Play

Babette Van Rafelghem MD, Anne Sieben MD,PhD, Maarten Spinhoven MD, Werner Jacobs MD, PhD, Tomas Menovsky MD, PhD
University Hospital of Antwerp, Antwerp, Belgium

Multiple external wounds and a disordered and bloodstained scene frequently arouses suspicion of foul play. We describe a case of a 76-year-old man found dead in his living room. The death scene revealed overturned furniture, while both the hallway and living area displayed blood contamination including pooled blood, smears, and droplets, suggesting a struggle had taken place. The body was discovered in a supine position on the floor, exhibiting multiple external wounds (hematoma, lacerations) on the head, arms, and torso consistent with blunt trauma. At autopsy, supplemented with postmortem CT-scanning, evidence of a nasal fracture, a fracture of the C5 vertebral body, and costochondral fractures of the right ribs 2 to 5, along with signs of blood ingestion/aspiration, were observed. Additionally, a cerebellar hematoma was identified, likely originating from primary spontaneous bleeding rather than a traumatic injury. Histological evaluation confirmed the presence of cerebral amyloid angiopathy. We hypothesize that this cerebellar bleeding induced severe motor ataxia and disorientation precipitating numerous falls that resulted in multiple external wounds and a chaotic scene. This case underscores the necessity of integrating death scene inspection to a full autopsy, including postmortem imaging and histopathology, for a comprehensive medicolegal reconstruction.

P122 A Rare Case of Heterotopic Mesenteric Ossification After Remote Abdominal Gunshot Wounds

Bartlomiej L Radzik MD, Libby Aronson MD, Lorenzo Gitto MD
Cook County Medical Examiner's Office, Chicago, IL, USA

Heterotopic mesenteric ossification (HMO), also called intraabdominal myositis ossificans, is a subset of myositis ossificans traumatica and is characterized by the abnormal formation of osseous, cartilaginous, and sometimes bone marrow elements. It is generally associated with trauma or previous abdominal surgeries and can lead to potential life-threatening complications. Autopsy findings may highlight the presence of extensive ossified tissue formation in the mesentery, along with signs of the associated complications. Due to the rarity of these findings, the diagnosis at autopsy is challenging.

In the present case report, the body of a 34-year-old Black male who died of multiple gunshot wounds was examined at the Cook County Medical Examiner's Office. He had a history of remote abdominal trauma with subsequent exploratory laparotomy. During the postmortem examination, dense fibrous adhesions were noted in the abdominal cavity and multiple fragments of ossified tissue were removed from the mesentery. The observed findings were suggestive of HMO.

Though the etiology of HMO is unknown, proposed theories suggest inoculation of periosteal or perichondral particles intraoperatively or differentiation of mesenchymal cells due to trauma. Although HMO is generally benign and represents an incidental finding at autopsy, it carries the potential for abdominal compartment syndrome, small bowel obstruction, ischemia, and perforation, all of which can lead to mortality. Therefore, autopsy plays a crucial role in assessing the extent of ossified tissue formation in the mesentery and identifying potential signs of associated complications. When complications of HMO result or contribute to death, evidence of remote abdominal trauma might change the manner of death certification.

This case highlights the importance of recognizing and considering this rare entity in the differential diagnosis when no apparent causes of death are detected at autopsy. If HMO is found, inquiring about remote trauma or surgery to the abdomen is important, as it can potentially influence determinations of cause and manner of death.

P123 Suicide by Inhalation of Carbon Monoxide Produced by Mixing Formic Acid and Sulfuric Acid

Marcello Seligardi MD[1], Benjamin J Soriano MD[2,3], Lorenzo Gitto MD[2]
[1]University of Parma, Parma, Italy. [2]Cook County Medical Examiner's Office, Chicago, Illinois, USA. [3]Rush University Medical Center, Chicago, Illinois, USA

Inhalation of carbon monoxide (CO) is a common suicide method worldwide due to its easy accessibility and method of execution. Although inhaling car exhaust fumes remains the most common method of intentional CO toxicity, other unconventional methods can also be employed. Among these, intentional CO toxicity by combining sulfuric and formic acid is a rare method of suicide, with only a few cases reported in the English literature.

In the presented case, a 23-year-old White male was found unresponsive in a minivan inside a closed garage at his residence. Bottles of formic and sulfuric acid were found in the vehicle, along with their respective shipping boxes, and a suicide note was discovered in the decedent's bedroom. The external examination of the body showed pronounced bright red lividity and white foam emanating from the mouth. Due to preliminary concerns for potential intentional exposure to sodium azide or other hazardous materials, only an external examination was performed. Postmortem blood for toxicology analyses was collected from the right jugular vein following a modified sodium azide protocol. Toxicology results showed the presence of formic acid, methemoglobin, and lethal concentrations of carboxyhemoglobin (90% saturation) in postmortem blood. The cause and manner of death were certified as inhalation of carbon monoxide produced by mixing formic acid and sulfuric acid in an enclosed space, and suicide. While the first recorded case of CO toxicity by mixing sulfuric and formic acid was reported in 1987, this method has garnered more interest in recent years following the introduction of regulations concerning the toxicity of vehicle exhaust. This has led to increased difficulty in reaching lethal CO concentrations by simply inhaling exhaust fumes. Therefore, alternatives such as combined sulfuric and formic acid are now being discussed online and on other sources as easier and safer means of committing suicide.

This case report aims to shed light on a suicide method that, although still rare and infrequently discussed in literature, merits consideration in the differential diagnosis of CO toxicity due to its potential rising incidence as a method of intentional poisoning.

P124 Pediatric Suicides in Utah: A 10-year Retrospective Study

Neil Haycocks MD, PhD[1,2], Jessicia Schmitt MD[2], Michael J. Staley PhD[1]
[1]Utah Office of the Medical Examiner, Salt Lake City, UT, USA. [2]University of Utah School of Medicine, Salt Lake City, UT, USA

The suicide rate in the pediatric population (below the age of 18) has increased over the last 10-15 years, garnering much public attention. Many reasons have been put forth to explain this trend, including the rise of social media, mental health disorders, school-related stress, and the disruption brought about by the COVID-19 pandemic. Utah is a geographically large western state with a rapidly growing and diversifying population. It is currently the youngest state in the country, with a median age of 31.1 years and over a quarter of the population below the age of 18. It also has a relatively high rate of pediatric suicides. From 2011-2015, the suicide rate in Utah among 10 to 17-year-olds increased by 151% before stabilizing. The Utah Office of the Medical Examiner (OME) maintains a statewide electronic database of deaths that was used for this study.

For the 10 calendar years from 2014-2023, a total of 370 pediatric suicides were investigated, consisting of 277 (75%) males and 93 (25%) females. The number of pediatric suicides per year fluctuated, with a low of 28 (2023)

and a high of 44 (2017), but without any discernible temporal trends. Overall, 90% of the suicides occurred by one of two methods: ligature hanging or self-inflicted gunshot wound. The remaining 10% comprised cases of non-ligature asphyxia, blunt force injuries, drug overdose, intentional poisoning, drowning, and combined-method suicides. Of the suicides in males, there was a preference for firearms (53%) and hanging (39%). Of the suicides in females, there was a preference for hanging (67%), firearms (17%), and drug overdose (10%). Handguns were the most common firearms used by both genders, and males were substantially more likely than females to use a rifle or shotgun. Suicides were rare up to age 12, with only 21 recorded in the time frame researched. From age 13 onward, the rates steadily increased for both genders, reaching plateaus at ages 16-17.

The overall patterns shown in this study, in terms of gender and age distributions and preferred methods, are similar to those reported in a previous 25-year retrospective review of 219 pediatric suicides in Bexar County, Texas (Molina et al. 2019). Utah and Bexar County are geographically and demographically distinct from each other, although both share strong cultures of gun ownership. Taken together, these studies point to a fundamental consistency in the forementioned aspects of pediatric suicides.

P125 Cardiac Mucormyocisin a Pancytopenic Patient with Treatment-Refractory Acute Myeloid Leukemia

Aleks P Penev, Annie N Samraj
University of Washington, Seattle, WA, USA

A 79-year-old male with treatment-refractory acute myeloid leukemia (AML) recently status-post salvage chemotherapy presented with persistent fever in the context of treatment-related neutropenia. He received transfusions due to anemia and thrombocytopenia and blood and urine cultures revealed Escherichia coli bacteremia and urinary tract infection. He was admitted and started on antibiotics but developed right lung lower and middle lobe consolidation concerning for pneumonia. Antibiotic coverage was expanded and antifungal agents were added with little improvement and he was transferred to the ICU for worsening dyspnea with bilateral patchy opacities and concern for ARDS. Labs showed new hyperbilirubinemia, worsening kidney function and transiently elevated troponins. Imaging revealed new lesions in liver, spleen and kidneys concerning for infarcts vs abscess. Bronchoalveolar lavage was performed for suspected Mucor infection; PCR was positive for Rhizomucor pusillis and cultures were positive for coagulase-negative Staphylococcus. His condition continued to decline with signs of shock and multiorgan failure and he was transitioned to comfort care. An autopsy was requested to rule out hematopoietic malignancy in the new kidney, liver and splenic lesions. Autopsy revealed extensive multiorgan fungal infection, including the lungs, spleen, and focal involvement of the myocardium. The lungs in particular were extensively involved by consolidation in all lobes. Histologic sections of the lesions showed infiltrative fungal yeast and hyphae, including angioinvasive fungus and many foci showed hemorrhage and infarction typical of Rhizomucor species. An unusual finding was invasive fungal myocarditis associated with early infarct. There was no histologic evidence for leukemic involvement of solid organs, which was confirmed by flow cytometry.

Neutropenic fever in a patient undergoing chemotherapy is considered a medical emergency and immediate treatment is imperative. Fungal organisms, notably Aspergillus sp., are a common causal agent for pneumonia in immunocompromised patients, however Mucor and related species are seen and require specific management when initial treatment is ineffective. Progression can often lead to vascular invasion and hematogenous spread to distant organs and the most heavily vascularized organs (liver, spleen and kidneys) are most likely to be affected by embolic infarcts as identified here. Even with rapid treatment, mortality in immunocompromised patients with invasive fungal disease is high, reportedly exceeding 30% in multiple reports. In this patient, multiple organ systems were heavily impacted by septic emboli, uniquely including the myocardium, which the authors could not identify in existing literature involving Rhizomucor. This case highlights the critical nature of neutropenic fevers and invasive fungal pneumonia.

P126 WITHDRAWN

P127 Is Carfentanil on the Rise? A Five-Year Positivity Evaluation of Carfentanil Trends

Meaghan R Hessler MSFS, Donna M Papsun MS, Daniel S Isenschmid PhD
NMS Labs, Horsham, PA, USA

Carfentanil is a synthetic mu-opioid receptor agonist that is approximately 10,000 times more potent than morphine and 100 times more potent than fentanyl. It is used as a large animal tranquilizer in veterinary medicine but also made its way into the illicit drug market initially in 2016, where positivity declined after domestic scheduling efforts. Carfentanil is generally found in conjunction with fentanyl or other fentanyl analogs but has occasionally been found alone.

In this study, authentic specimens collected from medicolegal investigations submitted to NMS Labs between January 2019 and December 2023, including postmortem samples, were evaluated for carfentanil presence in blood to determine quarterly positivity trends. Average and median concentrations were calculated from positive carfentanil cases. Distribution of positive cases across the United States (US) and Canada were plotted to establish pharmacoepidemiologic maps.

There was a notable increase in positive cases between Q1 2019 and Q1 2020. Positive findings remained relatively constant between Q2 2020 and Q1 2023 (approximately 55 cases per quarter) with significant Canadian prevalence. From Q2 2023 to Q4 2023, an increase from 56 to 96 positive cases was noted, with prevalence in Canada and the US east coast. Median concentrations from 2019 to 2023 remained relatively constant at approximately 0.23 ng/mL with small interquartile ranges with the highest concentration noted in 2020 at 95 ng/mL. Low median concentrations with variable concentrations ranges were observed, consistent with previous reports. Of the positive carfentanil cases, most also had fentanyl as a finding. An increase in carfentanil positives from 2019 to 2020 was noted, where case numbers across the US and Canada increased from 23 to approximately 50 per quarter. Increased findings stemmed from reports in Canada (BC), as well as Illinois, Texas, North Carolina, and West Virginia. Following Q1 2020 to Q2 2023, the number of positive cases remained relatively constant with approximately 50 cases per quarter. A new wave of carfentanil cases was observed in Q2 2023 in select areas of the US (FL, WV, MI, IL).

From a public health perspective, carfentanil could have significant implications and should be included on death certificates as it can pertain to cause of death. Low blood concentrations were routinely observed, which is reflective of the potency of carfentanil. Due to current positivity trends, even as a fentanyl adulterant, carfentanil should remain in the scope of comprehensive postmortem toxicology testing and methodologies must be sensitive to low concentrations.

P128 WITHDRAWN

P129 The Ins and Outs of Toxicology Testing on Exhumed and Embalmed Remains: A Presentation from the NAME Toxicology Committee

Laura M. Labay PhD[1,2], Charles A. Catanese M.D.[3]
[1]NMS Labs, Horsham, PA, USA. [2]CFSRE, Horsham, PA, USA. [3]Retired, Langhorne, PA, USA

Interpretation of toxicology results obtained from exhumed and/or embalmed remains add an extra layer of complexity to an already challenging task. Due to postmortem changes such as dehydration, it may

be impossible to collect traditional liquid samples such as blood, urine, vitreous, or bile. Furthermore, supplies used in the embalming and burial preparation process such as cosmetics, dyes, and adhesives can introduce contaminants into the collected samples. One case example pertains to an allegation that a female was forced to consume PineSol prior to death. Because this information was unknown at the time of autopsy, an exhumation was warranted. Directed toxicology testing, as supported by work published in Journal of Analytical Toxicology, was performed on tissue by GC and GC/MS for terpineol, a primary ingredient in pine oil. Positive results were obtained. Even though law enforcement was understandably excited, it was recommended that the funeral preparatory materials be identified and tested for terpineol. Further analytical work showed the presence of terpineol in drying compound. This one instance stresses the importance that each case must be evaluated with proper external controls and should not be interpreted without certain other considerations in mind. For instance, can methanol in embalming fluid cause the methylation of a drug over time resulting in the presence of a drug that was not present at the time of death (e.g., amphetamine converted to methamphetamine)? Can microbial activity break glucuronide bonds, so metabolites (e.g., morphine-6-glucuronide) are no longer detectable? What about environmental contamination if there is a concern about heavy metal poisoning (e.g., mercury)? The purpose of this presentation is to review best sample collection practices, procurement of control samples, testing options, and the extra considerations that should be applied to these cases so the most complete and accurate interpretation can be made.

P130 Sudden Cardiac Death due to Extensive Cardiac Inflammatory Pseudotumor

Tracy Wadsworth MD, Michael Eckhardt MD, Lorenzo Gitto MD
Cook County Medical Examiner's Office, Chicago, IL, USA

Sudden cardiac death due to cardiac inflammatory pseudotumor is an extremely rare entity. Inflammatory pseudotumor (IPT) is a quasineoplastic, mesenchymal lesion that can mimic malignancies due to its mass like and/or infiltrative characteristics. It has been found in almost every organ system; however, it is most described in the lung and orbit. Majority of cardiac IPTs occur in the right side of the heart; and have been described mostly in children and young adults, often in the second decade of life. IPTs are thought to be a reactive proliferation due to localized or systemic inflammation, underlying infections, auto-immune diseases, surgical/medical intervention, and/or trauma. IPTs have been documented in cases of underlying human immunodeficiency virus (HIV) infections, however a direct causal relationship has still not been found.

This case report describes a 38-year-old Black male with recent diagnosis of HIV infection, who was discovered dead in his home in October 2023. He was last known alive 1 hour prior to death and had complaints of stomach pain and generalized fatigue. An autopsy was completed at the Cook County Medical Examiner's office which diagnosed cardiomegaly with asymmetrical anterior septal hypertrophy, subaortic stenosis, marked subendocardial transmural pallor of the left ventricle and interventricular septum, and an irregular fibrous lesion of the mid interventricular septum. Histology identified an extensive mesenchymal tumor composed of scattered spindle cells within myxoid atypical stroma, and copious infiltration of acute and chronic inflammatory cells replacing the myocardium. The cause of death was certified as "Cardiac Inflammatory Pseudotumor", with HIV infection considered a significant contributing factor, and the manner of death was natural.

Fatalities due to IPTs are rare, with only two cases certified as the cause of death in Cook County, Illinois between January 1950 and March 2023. While lacking malignant potential, these lesions can be fatal and should be considered in the differential diagnosis of sudden cardiac deaths. IPTs present grossly as a singular mass, multiple masses, or an invasive lesion composed of polymorphous inflammatory cell infiltrates, accompanied by varying degrees of fibrosis, sclerosis, myofibroblastic spindle cell proliferation, granulomatous reactions, necrosis, and calcification. Radiographic features of IPTs are nonspecific and variable, limiting diagnosis.

This case of sudden cardiac death due to cardiac inflammatory pseudotumor aims to increase the knowledge about this type of "benign tumor" and serves as an example of another rare cause of sudden cardiac death in the pediatric and young adult population.

P131 The Lethal Consequences of Train Surfing: Autopsy Findings of Two Cases from the Washington D.C. Metrorail System

Maria Elisa Smith MD[1,2], Tatyana Zinger DO[3], Babatunde Stokes MD MS[1]
[1]Maryland Office of the Chief Medical Examiner, Baltimore, MD, USA. [2]DeKalb County Medical Examiner's Office, Decatur, GA, USA. [3]District of Columbia Office of the Chief Medical Examiner, Washington, DC, USA

Train surfing, a dangerous and illegal behavior involving riding on the exterior of moving train cars, traces its origins back over a century and has been reported in multiple countries. Recently, this behavior has become an increasing problem for major metropolitan areas, fueled by social media. Notably, New York City witnessed five train surfing-related fatalities in 2023, matching the total deaths recorded in 2018 to 2022. This study is the first to report two teenage fatalities occurring in less than one year in the Washington D.C. Metrorail system, highlighting the urgent need for comprehensive measures to curb this growing problem.

The first case involved a 15-year-old male who was found deceased on the train tracks after reportedly engaging in a "jumping game" atop of a moving passenger train. An autopsy revealed extensive injuries including calvarium and facial bone fractures, lacerated brain and brainstem, subarachnoid hemorrhage, and multiple rib, vertebral, and extremity fractures. His cause of death was "Multiple Blunt Force Injuries" and the manner of death was "Accident."

The second case involved a 13-year-old female and a group of friends who were seen on surveillance footage taking turns accessing the exterior space between the train cars. During her turn, she placed her head above the moving train and was seen suddenly falling back into the train after striking an unknown object at high speed. An autopsy revealed a right partial hinge skull fracture, cortical contusions and lacerations on the brain, subarachnoid hemorrhage, intraventricular hemorrhage, and dislocation of the atlanto-occipital joint. There were minor abrasions on her extremities. Her cause of death was "Blunt Force Trauma to the Head" and the manner of death was "Accident."

In both cases, the victims were live streaming or recording video before their deaths. The variation in the injury pattern between these two cases illustrates the unpredictable and highly dangerous nature of train surfing. These incidents also emphasize the urgent need for proactive public health campaigns and targeted oversight of social media content that glamorizes this dangerous behavior.

P132 WITHDRAWN

P133 Oh Shoot! An Accidental Discharge of a Firearm Causing a Postmortem Gunshot Wound in a Suicide

Rebecca Wyma MD[1], Meredith A. Frank MD[1,2], Ian Puffenberger MD[1,2]
[1]University of Colorado, Aurora, CO, USA. [2]Denver Office of the Medical Examiner, Denver, CO, USA

Postmortem injuries which occur at the time of scene investigation are rare and not well documented in the literature, with postmortem gunshot wounds seemingly being unheard of or severely underreported.

We report the death of a 79-year-old male who was found deceased in his secured apartment on a welfare check after his brother received an email from the decedent describing the intent to commit suicide. The decedent was found in a right lateral recumbent position on the floor. During scene investigation, a handgun was discovered underneath his torso and held by his right hand.

Initially, two gunshot defects were noted, one on the chest and one on the back. As a member of the crime scene unit moved the handgun, the trigger was inadvertently pressed and a single shot was fired. Subsequently, two new defects were noted on decedent's head and neck.

At autopsy, the antemortem gunshot wound entered the anterior left chest which had a round defect with a circumferential black abrasion and surrounding soot. The wound path was markedly hemorrhagic and involved both lungs creating bilateral hemothoraces and periesophageal and periaortic hemorrhage before exiting through the right back.

In contrast, the postmortem gunshot wound entered the right side of the neck, did not have soot or stippling, and perforated the skin and soft tissues of the right side of the neck, fracturing the right side of the mandible before exiting out the right ear. Of note, this postmortem gunshot wound showed less hemorrhage when compared to the antemortem gunshot wound. However, there was still a moderate amount of hemorrhage in the depths of the wound track in the upper cervical region.

The presence of hemorrhage into the tissues is one means of grossly distinguishing antemortem from postmortem wounds; however, the congestion related to positioning of the body may result in slightly more hemorrhage than expected, as seen in this case. If not for the known inadvertent discharge of the weapon at the crime scene, it could have been difficult to accurately report on the injuries sustained. The importance of knowledge about all events during scene investigation and safe handling of weapons at the scene, cannot be overemphasized.

P134 You'll Shoot Your Eye Out: A Unique Case of Air Gun Homicide

Ashley Leigh Smith MD, William Thomas Harrison MD
Department of Pathology, Wake Forest University School of Medicine, Winston Salem, NC, USA

Although gunshots are the most common method of homicide in the United States, non-accidental fatalities involving air-powered guns are rarely described in the forensic literature. Air weapons are commonly associated with unintentional injuries in the pediatric population, and the risk of lethal organ damage is low compared to traditional combustion propelled projectiles. Despite their potential for high velocity, the smaller mass of pellet ammunition used for air guns results in a lower kinetic injury transferred upon impact with its target.

Here we present the case of a 60-year-old woman who died from complications of an air-powered pellet gunshot wound to the head. She was physically assaulted in her home one week prior to death, at which point she was admitted to a local hospital and treated for extensive craniofacial trauma. Although she denied any gunfire at the scene, computed tomography of the head detected an intracranial metallic density concerning for ballistic fragments. Several days after discharge, the decedent developed a high fever and became unresponsive. She arrived at the emergency department in asystole and was pronounced dead.

Autopsy revealed a gunshot wound of indeterminate range involving the left eye, orbit, and brain. The projectile first entered the lateral bulbar conjunctiva of the left eye, and then continued along its front-to-back trajectory where it grazed the lateral sclera before penetrating the greater wing of the left sphenoid bone, basilar dura mater, and finally the temporal lobe. The anterior pole of the left temporal lobe demonstrated a focal hemorrhagic wound track with an adjacent two-centimeter cerebral abscess. Histologic examination demonstrated a necrotic core with mixed inflammation of the surrounding parenchyma. A five-grain round metal pellet was recovered from the abscessed area, consistent with pellet gun ammunition. The manner of death was homicide.

This case serves as an example of a rare method of homicide that may be easily missed on initial examination. The entrance wounds are usually small and may be indistinct in a location such as the eye. Although the penetrating injuries of firearms are considered more severe, the projectiles of air-powered weapons have the potential to be fatal and should not be underestimated.

P135 Postmortem Absorption of Methanol and Ethanol through the Skin and the Eyes in a Complex Homicide with Burning of the Victim

Biliana Mileva[1], Metodi Goshev[1], Vesela Ivanova[1], Alexandar Alexandrov[1], Ivan Tsranchev[2], Mihaela Georgieva[1], Vasil Atanasov[3]
[1]Medical University Sofia, Sofia, Bulgaria. [2]Medical University Plovdiv, Plovdiv, Bulgaria. [3]Military medical academy, Sofia, Bulgaria

Different substances can passively transfer through mucous membranes and skin layers, leading to various changes in concentration of electrolytes, body fluids and even toxic substances. This process could be moderated by various factors even in the postmortal interval, leading to serious expert diagnostic difficulties.

A White 43-year-old man was found dead on the front passenger seat of a car, with superficial burns on the clothes and skin, and hair on the right side of his body. At autopsy there were findings consistent with neck compression as well as scattered abrasions on the left cheek, nose and surrounding skin, and contusions at the base of the nose.

Toxicology analysis of volatiles performed on biological samples collected at autopsy by Gas Chromatography coupled with Flame Ionization Detector (GC-FID) showed the following results: blood from the skull cavity: ethanol 18 mg/dL and methanol 84 mg/dL; vitreous fluid ethanol 258 mg/dL and methanol 1673 mg/dL; blood from the right leg (superficial blood vessels) – negative for ethanol and positive for methanol 27 mg/dL; urine showed negative results for both alcohols. There was no carboxyhemoglobin detected in postmortem blood. All other tests for drugs of abuse were negative.

The victim's wife and her mother later confessed the homicide. According to their statements one was sitting on the back seats of the car, producing asphyxia due to ligature strangulation to his neck, while the other was compressing his mouth and nostrils. After his death they decided to burn the body and the car to conceal the evidence. They poured flammable liquid containing ethanol and methanol on the body, and inflamed him closing the car doors and windows, which eventually stopped the burning due to the consumption of the oxygen.

Based on the autopsy findings, toxicology reports, and the available investigation, the cause of death was attributed to combined asphyxia due to ligature strangulation and smothering and the manner of death was certified as homicide. Toxicology findings suggested that there was postmortem absorption of the alcohols through the skin and mucous membranes (via the eyes).

The unique features of this case highlight the importance of considering the toxicology results within the context of the available investigative information to prevent incorrect conclusions or interpretations of the postmortem findings.

P136 Do Opinions of Forensic Pathology Differ from Opinions of Other Pathology Subspecialties? A Survey of Interviewees in the 2024 Match

Eleanor Abreo MD[1], Ross Miller MD[2]
[1]Oklahoma Office of the Chief Medical Examiner, Oklahoma City, OK, USA.
[2]Oklahoma Office of the Chief Medical Examiner, Tulsa, OK, USA

While the forensic pathologist workforce shortage is multifactorial in origin, one theory as to why fewer trainees choose forensic pathology (FP) is that physician trainees are exposed to negative views about our profession which influence them to choose other specialties. This survey was created to target those interviewing for pathology positions in the 2024 National Resident Matching Program (NRMP) to evaluate if held and encountered opinions on forensic pathology differed from encountered and held opinions of other pathology subspecialties.

The anonymous, voluntary survey was distributed via social media and to interviewees at the University of Oklahoma Health Sciences Center (OUHSC). 48 responses were received and 44 of those respondents had past or scheduled interviews for the 2024 match. Respondents were asked if they had heard or seen any comments made about subspecialties during the interview process. If they had, they were directed to answer follow up questions about the nature and source of comment(s) and their attitude toward the subspecialties. Respondents were only able to answer questions regarding subspecialties they heard comments about.

No statistically significant (χ^2 significance at $p < 0.05$) relationships were identified between the nature of the comments made about and personal attitudes towards FP and cytopathology, microbiology, molecular genetics, neuropathology, pediatric pathology, blood banking/transfusion medicine, dermatopathology, hematology, surgical pathology subspecialties. Few negative comments were reported about any subspecialty. All comments reported regarding FP were neutral, positive, or very positive and all respondents noted their personal attitudes towards FP were neutral, positive, or very positive.

The lack of statistically significant differences in this data set is likely due to small sample size. We postulate that the positive and neutral nature of the comments made, and attitudes held about forensics may be in part due to opinions shared by staff and residents at OUHSC during the interview process and firsthand experience of rotators, highlighting the importance and impact of local outreach by medical examiner's offices. Between 2019-2023, a total of 16 OUHSC residents and 68 medical students rotated through the two office sites via the work of an Education Coordinator (a current forensic pathologist in Oklahoma City) and a member of the administrative staff in Tulsa who answer all rotation inquiries received, irrespective of the visitor's level of education. In the future, distributing the survey via medical schools and other residency programs would be beneficial, particularly in locales where FP training is not available.

P137 Congenital Partial Laryngotracheal Malformation: An Unanticipated Nonpatent Airway at Birth Despite Normal Lung Development

Tyler Kerrick Murray DO, Meghan Koch DO, Joseph M Guileyardo MD
Baylor University Medical Center, Dallas, Texas, USA

This is the case of a term female infant presenting with a congenital laryngo-tracheal malformation resulting in a nonpatent airway at delivery, undetected by prenatal screenings. This interesting case invites us towards discourse on the scope of neonatal screenings and the use of emergency airway devices in neonatal cases. Principal attention is given to autopsy findings with a review of the clinical implications of potential intervention strategies.

Born at 37 weeks and 3 days gestation to a 21-year-old G1P000, the mature female infant presented with known intrauterine growth restriction, but otherwise had no known congenital anomalies or risk indicators. Upon birth, the baby exhibited poor respiratory effort despite relatively well-developed lungs by imaging and appropriate physical development. Several attempts at intubation were made following delivery without success. The vocal cords were visualized but the tube could not be passed into the trachea.

Upon autopsy, a tight area of stenosis distal to the vocal cords was discovered, preventing a probe from passing into the trachea. Attempted water irrigation from above and below produced minimal flow. The lungs and trachea otherwise appeared normal grossly and no tracheoesophageal fistula was observed. The death was attributed to respiratory failure due to congenital laryngotracheal malformation.

P138 "Biting" the Hand that Feeds: Death to Critter Caretakers

Tera Jones MD[1], Dawn B. Holmes MD[2], Dr Kendall Von Crowns MD[1]
[1]Tarrant County Medical Examiner's Office, Fort Worth, Texas, USA. [2]Jefferson County Coroner's Office, Golden, Colorado, USA

This article highlights two cases of envenomation, as a complication of potentially dangerous hobbies in the United States. Namely the keeping of venomous reptiles and separately, tending Africanized bees with understanding that deaths, while rare, can occur.

Both hobbies are enjoyed across the nation to varying degrees. Owning venomous reptiles is limited by state and city with laws ranging from absolute illegality to relatively lax. People who tend Africanized honeybees live in southern states since the insects cannot survive extended cold and the laws regarding beekeeping depend on different states and cities.

Gila monster bites to humans are uncommon and only one death has been attributed in the last 100 years. It is estimated that Africanized bees kill 2-3 people per year.

Gila monsters are most likely to bite humans if threatened. Since their venom glands are in the posterior mouth, when they bite, they exhibit a chewing motion so their neurotoxin can be distributed to the wounds. In the first case, the decedent was a 34-year-old male who illegally owned Gila monsters in Colorado. He reportedly sustained a four-minute bite, had waxing/waning consciousness for a couple of hours prior to transport to hospital, and he died four days later. The larynx and epiglottis had submucosal edema with mast cells identified by tryptase stain. His death was attributed to the complications of the envenomization by the Gila monster with complications including mixed anaphylactic and distributive shock.

Africanized bees are respected for their apparent resistance to colony collapse disorder, which affects North American bees. Compared to their more docile counterparts, they are quick to swarm when protecting the hive and on average more bees will sting at a time. The second case was a 78-year-old beekeeper who was found unresponsive, with a fire around his body attributable to the smoker scorching the tinder on the ground around the collapsed decedent. The number of bee stings on the decedent could not be determined as he had sustained burns to over 90% of his body with charred bee carcasses on his person. His tongue and airway were edematous without evidence of soot deposition. Serum IgE for honeybee venom was markedly elevated. His death was attributed to anaphylaxis due to bee envenomation.

In these cases of envenomation, various methods including immunohistochemistry and serology proved useful to determine cause and manner. Overall, these hobbies since innately dangerous, should be handled by skilled practitioners.

P139 Factors Supporting Certification of Suicide as Manner of Death in Case of Drug Toxicity.

Shamaya M. Creagh Winters MD[1], Karen E. Sullivan MD[2]
[1]Emory University, Atlanta, Georgia, USA. [2]Fulton County Medical Examiners Center, Atlanta, Georgia, USA

A 19-year-old Black female with a past medical history of mental health/mood disorder was an inmate at a city jail when she was found unresponsive, face-down in bed, inside her secured, single-occupant cell, by a staff member. Emergency medical services responded to the scene and she was subsequently pronounced deceased.

The cause of death was determined to be olanzapine toxicity. Autopsy examination revealed minor superficial injuries but no internal evidence of significant recent injury; there was no evidence of acute natural disease processes. Postmortem toxicology testing was positive for elevated Olanzapine, as well as resuscitative-associated drugs, and was negative for alcohol. Review of records from the correctional institution revealed she had a reported history of bipolar disorder, and was prescribed olanzapine,

which was administered daily by staff. Additionally, she had a self-reported history of an overdose by ingestion of 50 unknown pills prior to being detained. However, based on information available at the time of autopsy, and due to unclear circumstances surrounding the ingestion of the medication, the manner of death could not be determined.
In this and similar cases, the following factors can strongly support certification of suicide as the manner of death:

- Lack of other individual present to provide access to added quantity of drug.
- Lack of other individual present to assist/cause decedent to ingest drug.
- Record of serial distribution of drug to decedent in low therapeutic dosage that can be combined to form an aggregated large dose.
- History of prior ingestion of large quantity of drugs/pills with intent of overdose.
- Lack of medical causes of death.
- Lack of injuries resulting in death.

P140 Fatal Iatrogenic Cardiac Tamponade: An Unreported Complication of Laparoscopic Cholecystectomy
Dr Alfredo Eugene Walker FRCPath, DMJ (Path), MB.BS
Department of Pathology and Laboratory Medicine, Faculty of Medicine, University of Ottawa, Ottawa, Ontario, Canada

Cholecystectomy is the most common elective abdominal surgery, the vast majority of which are performed laparoscopically. Laparoscopic cholecystectomy (LC) is a very safe procedure with only 2% of complications which range from surgical site infection to serious morbidity and death. The experience of the surgeon plays a major role in the incidence of complications.

In a review of 233 published studies on LC, 967 complications were reported of which 204 (21%) were defined. Conversion to open cholecystectomy was most common in 135 (58%) studies, followed by bile leak in 89 (38%) and bile duct injury in 75 (32%). Mortality was reported in 89 studies (38%).

The case of a 76-year-old woman who developed cardiac tamponade from 300 mL of clotted hemopericardium secondary to traumatic perforation of the posterolateral wall of the left ventricle within 24 hrs of an elective LC for cholelithiasis is presented. There was fair bit of hemorrhage within the soft tissues overlying the inferior region of the pericardium ventrally, near its junction of the ventral and diaphragmatic pericardium which made identification and avoidance of any puncture sites in that region of the pericardium a challenge.

Formal cardiac pathology consultation of the heart and pericardial sac revealed two epicardial defects (2.0 cm and 1.3 cm) of the posterolateral and posterior walls of the left ventricle with significant tracked epicardial hemorrhage. The defects extended into the underlying myocardium, with full-thickness perforation of the wall into the ventricular cavity by one of the defects, without features of associated acute myocardial infarction.

The pattern of injury in this case is explained by iatrogenic perforation during LC. To our knowledge, this is a first reported case of fatal iatrogenic perforation of the left ventricular wall as a complication of LC and this case adds to the spectrum of published complications.

P141 The Autopsy Diagnosis of Arrhythmogenic Cardiomyopathy in Sudden and Traumatic Deaths: A Series of Case Reports
Wan Zafirah Zamaliana Alias MBBS, LLM[1], Mohd Suhani Mohd Noor MBBS, MPath (Forensic)[1], Muhammad Sakti Abdullah MB BCh BAO[1], Nor'amirah Ahmad MD, DrPath (Forensic)[2]
[1]Sultanah Bahiyah Hospital, Alor Setar, Kedah, Malaysia. [2]Sultan Idris Shah Hospital, Serdang, Selangor, Malaysia

Introduction: Arrhythmogenic cardiomyopathy (ACM) is an inherited myocardial disease characterized pathologically by fibrofatty replacement of the ventricular myocardium that progresses from the subepicardium to the subendocardial region. Its presentations are widely diverse, ranging from asymptomatic to ventricular arrhythmias to cardiac failure, but oftentimes, the initial and only presentation is sudden death. With an estimated prevalence of 1:1000 to 5000 in Western countries, it is a significant cause of sudden cardiac death in young adults. Although there are currently no universally established criteria for diagnosing ACM at autopsy, histopathology of the myocardium and molecular autopsy are invaluable in reaching an accurate diagnosis of ACM that will prompt screening in the surviving family members. Unfortunately, molecular autopsy can be a missed opportunity in regions that are less well-endowed financially. Forensic pathologists, knowing full well there is no budget for molecular autopsy, might also be less keen to acquire suitable samples during an autopsy for those costly tests that are unlikely to materialize.

Case Report: We report a series of four deaths with the phenotype of ACM on autopsy, hitherto undiagnosed during life. All four deaths involved males from 22 to 62 years old. They had no significant past medical history and no family history of sudden cardiac deaths. Only one was a case of sudden natural death, and the others involved immersion in shallow water (one case) and vehicular crash (two cases). On histology, three cases showed right and left ventricular involvement with myocardial fibrofatty replacement, and one showed only left ventricular involvement. Only one case had tissue samples, albeit paraffin-embedded, submitted for molecular autopsy, but disappointingly enough, the genome could not be extracted due to severe degradation. Molecular autopsies were not attempted for the rest because of financial constraints.

Discussion: The pathology and autopsy diagnosis of ACM will be discussed. This case series highlights the importance of recognizing ACM in assisting death investigations with medicolegal issues, as most ACM-related deaths occur without preceding antemortem diagnosis or significant family history. Forensic pathologists must raise awareness of ACM and other genetically linked causes of sudden cardiac death among health administrators in order to secure resources for molecular autopsy. It is proposed that further research should be conducted to identify the genes associated with ACM precisely and provide a specific panel so that molecular autopsy becomes inexpensive.

P142 Intraoral Firework Suicide: An Unusual Cause of Death and the Interagency Collaboration behind the Investigation
Sarah Boring BSc[1], Chloe Padasak MHS[1], Alana Engleson BSc[1], Jennifer Hammers DO[1,2]
[1]Jennifer Hammers Pathology, LLC, Beaver Falls, PA, USA. [2]Duquesne University, Pittsburgh, PA, USA

Suicide by explosive device is rare and can be difficult to differentiate from a suicide by gunshot wound at autopsy, especially without an informed and comprehensive scene investigation. Here the authors present a case of suicide by intraoral firecracker explosion in a coroner-based system, where an educated and experienced deputy coroner, state trooper in the forensic services unit, and the autopsy team at an independent forensic pathology practice collaborated to yield a complete and thorough scene investigation, autopsy, report, and death certification. In discussing this unusual case, the authors will highlight the complexities and challenges of working in a coroner-based system and as an independent pathology firm, and will demonstrate the importance of continuing education and how open communication between agencies, a logical and systematic scene investigation, and the ability to access literature during a death investigation benefited all agencies, and improved the quality of the autopsy, the education of observing students, coroners, and investigators, and drew from the knowledge, expertise, and experience of all parties involved to ultimately identify and document the details and findings that were important to the determination of the cause and manner of death for this suicide by explosive device.

An accurate and thorough death investigation is important for many reasons, including providing answers for surviving family and friends, aiding in criminal prosecution or civil litigation when warranted, and for creating complete public health records. However, death investigations lacking informed and complete scene investigations can easily veer off course with the forensic pathologist ultimately reaching substandard conclusions and the coroner completing a death certificate lacking an accurate cause and manner of death. This case will demonstrate how educated and knowledgeable teams through communication and sharing of expertise between organizations allows for high quality decision making within a coroner system. The authors will also demonstrate how having an active relationship with a local university program and access to the literature has benefited the independent forensic pathology practice, as well as served as a springboard for master's level research for the program's students.

P143 Carbon Monoxide Poisoning from Charcoal Burning: A Single-Institution Experience

Radiah Mat Yasin[1], Mohd Suhani Mohd Noor[1], Nor'amirah Ahmad[2], Wan Zafirah Zamaliana Alias[1], Ashkurina Zakaria[1]

[1]Department of Forensic Medicine, Sultanah Bahiyah Hospital, Alor Setar, Kedah, Malaysia. [2]Department of Forensic Medicine, Sultan Idris Shah Hospital, Serdang, Selangor, Malaysia

Charcoal can emit a dangerous amount of carbon monoxide (CO) during incomplete combustion in enclosed or poorly ventilated spaces. While charcoal may be used for heating purposes in temperate countries, it is commonly used as a domestic fuel for cooking in rural households in the tropics and not an essential household item in urbanized societies. When used as an indoor heating source in temperate countries during winter, CO poisoning from charcoal burning is often accidental in domestic settings. In the USA, about 200 people die yearly from accidental CO poisoning associated with domestic charcoal-burning for indoor heating. By contrast, CO poisoning from charcoal-burning as a method of suicide is more prevalent in some East Asian countries. This method accounts for a significant proportion of suicides in these regions, where one-third of suicides in Taiwan and up to one-quarter of suicides in Japan and Hong Kong have been attributed to CO poisoning. However, the data on fatal CO poisoning due to charcoal-burning in Malaysia is lacking.

We present a series of three cases of fatal CO poisoning from charcoal-burning that a forensic pathology center in Malaysia has investigated. Case 1: A 56-year-old male was found in a closed, smoke-filled car cabin. Case 2: A 33-year-old man was found on the bathroom floor of a hotel room, sealed shut with duct tape at all reachable ventilatory holes. Case 3: A 33-year-old man was found on the floor in a closed bedroom. Evidence of charcoal burning was found in all cases. The circumstances in these deaths showed a planned method of charcoal burning in enclosed spaces, which is in keeping with the manner of death by suicide.

While deaths from CO poisoning are often associated with vehicle exhaust or fire-related fumes, it is essential to recognize that other sources, such as charcoal burning, can also pose significant risks, albeit less commonly. In Malaysia, where the use of charcoal inside rooms or enclosed spaces is not a typical practice, the presence of charcoal in such circumstances should indeed raise suspicions of possible charcoal-burning suicide. In conclusion, recognizing the potential risk of charcoal-burning suicide and addressing the lack of awareness surrounding CO poisoning from charcoal burning is important in ensuring a comprehensive investigation to reduce mortality and morbidity.

P144 WITHDRAWN

NOTES

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