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ABSTRACTS

LECTURES

July 5th, 2012

SCIENTIFIC SESSION 1: IMAGING IN FORENSICS

CT SCANNING AS A ROUTINE PROCEDURE IN MEDICO-LEGAL DEATH INVESTIGATION

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Forensic pathology is the core discipline in medico-legal death investigation. The centre-piece of the specialty is the autopsy, but there are numerous other components of the medico-legal death investigation. These include: death scene examination, photography, forensic science generally, neuropathology, pediatric pathology, cardiac pathology, physical anthropology, odontology, entomology, toxicology, microbiology, molecular biology and conventional radiology. The forensic pathologist requires a level of proficiency in these components to at least be able to incorporate their results in the final report.

A new component is modern radiological imaging starting with CT scanning. Its advent has been characterized in popular thought by the word 'virtopsy', and the phrase 'autopsy no; virtopsy, yes'. Such phrases create expectations that virtopsy (that is, imaging of a cadaver using techniques such as CT scanning) is a routine and reliable replacement for autopsy in all settings. This is not the case now, and is unlikely ever to be the case.

In any particular case, there are a number of questions to be answered by the medico-legal death investigation. In some cases, the questions are fewer and simpler; thus, fewer investigative modalities may be required to provide the answers; for example, assessment of the medical and circumstantial history and an external examination of the deceased. In other cases, CT imaging may provide answers to some additional questions, without the need for autopsy, allowing the case to be completed. In cases where there are more questions of greater complexity, autopsy will still be required. In such cases, CT imaging adds information that would not be available from conventional autopsy alone, considerably strengthening the results and value of the medico-legal death investigation. The issue is not "autopsy no; virtopsy yes" but rather, what are the questions and issues which need addressing in this case, and how do we get the answers.

What are the principles which determine how modern radiological imaging should be incorporated into the daily work of the forensic pathology institution. First, the new imaging techniques are very powerful tools which assist the forensic pathologist in coming to conclusions in particular cases. Thus, the forensic pathologist should acquire a certain level of proficiency in interpreting the imaging, within an environment supported by a specialist radiologist. It needs to be remembered that the clinical radiologist's focus, by training and education, is on providing diagnostically useful advice to a clinician for use in the medical management of a patient. The forensic pathologist's focus is the end point of the forensic investigation: often a judicial process, usually a criminal trial, an inquest or a coroner's finding made without inquest. This distinction is important to appreciate, to avoid the risks inherent in radiologists unthinkingly straying into forensic territory. The radiologist, as with other components mentioned above, should provide reports to the forensic pathologist for incorporation, with full acknowledgement, into the forensic pathologist's final conclusions.

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POSTMORTEM MRI-CURRENT APPLICATIONS AND FUTURE DEVELOPMENTS

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Background: Since more than a decade postmortem magnetic resonance imaging (pmMRI) is used to augment forensic investigations. In the beginning close collaborations of radiological departments and forensic institutes have enabled a postmortem use of the clinically installed MR scanners. Meanwhile, there are forensic institutes that possess their own MR installations with scanners dedicated for the postmortem use only. The present opening lecture will give an overview on current pmMRI applications and will provide an outlook into the future based on ongoing pmMR research activities.
Method: So far 300 pmMR examinations were performed in situ on a 3 T MR scanner installed next to the autopsy facilities. Forensic corpses received a focused organ examination such as head, neck or heard in non-traumatic cases or a whole body acquisition was performed in traumatic cases. Imaging included regular T1- and T2-weighted images with and without fat saturation, proton density weighted with and without fat saturation, diffusion tensor imaging (DTI), MR spectroscopy and MR quantification scans. At forensic autopsy including histological examinations validation of the MR findings was carried out.
Results: Gross morphologic findings such as cerebral hemorrhages, cerebral tumors, cerebral trauma, pericardial tamponades, aortic dissections etc were well visualized by pmMR. Myocardial infarctions were detected and could be assessed regarding the survival time (age of infarction) based on different age dependant signal alterations. Especially in peracute infarction cases only hard to see at autopsy pmMR seems to be very sensitive. Even thrombotic coronary occlusions were visualized by native pmMR. DTI based fiber tracking enabled visualization of fiber damage in traumatic cases and MR quantification allowed to characterize different healthy body tissues and pathological alteration in a quantitative

manner. The latter provides the background to automatically search for pathological alterations within a given MR data set.

Conclusion: PmMR is a valuable supplement for forensic investigations as it provides relevant case information prior to the autopsy and allows optimizing and adapting the individual autopsy approach to the individual case. It is especially worth a consideration in assumed cases of natural death and as a three dimensional documentation technique for soft tissue injuries.

ADVANCES IN POSTMORTEM CT ANGIOGRAPHY

Grabherr Silke, University Center of Legal Medicine Lausanne-Geneva, Rue du Bugnon 21, CH-1011 Lausanne

The investigation of the vascular system by post-mortem angiography has been undertaken since the discovery of X-rays. Although multiple techniques have been developed and some of them have regularly been used in the beginning of the 19th century, their application nearly disappeared during the last century. Nowadays, the integration of modern cross-sectional imaging techniques, especially of MDCT (multi-detector computed tomography) into post-mortem investigation led to a revival of post-mortem angiography through the development of technique for post-mortem CT-angiography.

In order to introduce post-mortem CT-angiography into the daily routine of forensic medicine, a standardized technique, appropriated material and guidelines for the radiological interpretation are necessary. With this aim, a research group was created in Switzerland which recently developed a new technique called Multi-phase post-mortem CT-angiography (MPMCTA). It consists in the performance of one native CT-scan and three angiographic phases (arterial, venous and dynamic phase). Data acquisition is performed after and during the perfusion of the body with a mixture of paraffin oil and the oily contrast agent Angiofil that has been developed for this method. In order to establish the perfusion, a cannulation of the femoral artery and vein is performed in the inguinal region of one side and the vessels are connected to a special perfusion device called Virtangio®.

Different studies have been performed with the aim to investigate the advantages and limits of the new approach. One of them shows that, depending on the findings, the sensitivity of the post-mortem CT-angiography is even higher than the one of conventional autopsy, especially in cases in which the source of hemorrhage should be detected. However, there are still some diagnoses that have to be confirmed by conventional autopsy. In order to interpret the radiological data correctly, a close collaboration between radiologists and forensic pathologists is necessary as well as the knowledge of artifacts that have to be recognized in order to avoid misinterpretation.

MPMCTA can increase significantly the sensitivity of the post-mortem investigation. The recently developed technical equipment and standardized protocol allow the introduction of this new technique into the routine legal medicine. This presentation explains the new method and explains its limits and advantages.

APPLICATION OF CT SCANNING FOR MEDICO-LEGAL IDENTIFICATION PURPOSES

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Identifying the dead is one of the primary four objectives of an autopsy examination no matter where one practices in the world. The United Nations Universal Declaration of Human Rights Article 6 states "Everyone has the right to recognition everywhere as a person before the law". The need for this identity is also paramount after the death of the individual and represents a basic human right. The methods used for identification of the dead must therefore be scientifically sound, reliable, and reproducible under field conditions and must be able to be implemented in a timely fashion.

X-ray imaging of a body is classified as a secondary identifying system and has had a recognised role in mass fatality investigations since Singleton first used mobile x-ray equipment to assist with the identifications of the victims of the SS Noronic disaster, Toronto, Canada, September, 1949. Although modern day practitioners will be acquainted with a three stage radiological survey approach to mass fatality investigations using fluoroscopy, dental and plain x-ray, post-mortem computed tomography (PMCT) has, in recent times been shown to replace the need of many of the aspects of such an approach. It can provide a permanent record of the body, to the standards of the criminal justice systems, allowing for remote reporting around the world and future review for audit, teaching and research purposes.

This talk will update the audience as to current applications of PMCT to mass fatality investigations in both conventional and contaminated incidents. It will discuss the availability of scene and temporary mortuary based PMCT as typified by the United Kingdom FiMag system. It will draw upon the experience of Exercise Hounslow, an international PMCT remote reporting identification exercise from 2011. From this it will be illustrated how elements of the Interpol DVI form can be completed remotely without the need for those reporting to observe the body themselves and how features such as age, stature, gender as well as natural and un-natural disease, prosthesis, clothing, and other identifying features can be acquired and reported by PMCT.

SCIENTIFIC SESSION 2: TOXICOLOGY

PERSPECTIVES FOR A FORENSIC INTELLIGENCE APPROACH IN ANTI-DOPING

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Background: Doping is an attractive illicit practice or/and business based on a variety of substances, people and legal or illegal trading routes. A significant proportion of athletes involved in doping, as well as criminal organizations responsible for the trafficking of doping substances, live through the relative safety created by the lack of information sharing between Anti-Doping authorities and their partners. The fight against doping is almost strictly centered on the traditional judicial process, whereas the World Anti-Doping Agency (WADA) and the Code aim at detection, reduction, solving and/or prevention of doping. Efficiency is measured in analytical case numbers only and is based on adverse analytical findings related to the presence of a prohibited substance in a biological sample. This current approach lacks any strategic vision designed to understand the phenomenon based on material and forensic evidence. An innovative approach provides a most promising avenue and is based on crime analysis and forensic intelligence developed in forensic science to fight doping.

Method: Forensic Intelligence supports the gathering of knowledge on the size, seriousness and evolution of a phenomenon to help with decision-making in the areas of law enforcement, crime reduction and crime prevention. This logical process depends on a structured memory of data and information organized in a repertoire of

continuously updated and possibly applied inferences. It represents the knowledge we have at a certain time about the criminality under consideration: current criminal problems, serial crimes, etc… New information is integrated to previously memorized information, allowing postulating and testing assumptions on their relation in order to reveal a network of hypothesized links. Organizing and scrutinizing the memory is an iterative and dynamic process that can permanently update the picture of a phenomenon.

Discussion: Anti-Doping information may come from various sources other than analytical results, such as sociological studies on substance use or abuse, notices of release on new medications, statistics on substance trafficking, etc… This knowledge may help in detecting and describing a potential, emerging or existing doping phenomenon, whether in the consumption or trafficking of a substance.

This approach allows eliciting information of a complementary nature and provides for intelligence-led decision-making to help direct the selection of target athletes or teams and the deployment of large scale operations to neutralize doping networks.

Conclusion: Doping Intelligence is designed to provide a real-time insight and comprehensive knowledge on any phenomenon to support a more proactive and accurate response for doping reduction, solving and/or prevention.

DEATHS RELATED TO PROPOFOL

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Background: Propofol is a most frequently used anesthetic agent; however, due to its euphoric feelings, sexual hallucinations and relaxing effects, the abuse of propofol recently has been noticed. Since it has been widely used not only for medicinal but recreational purposes, it was necessary to study the prevalence of propofol in Korean society. In order to study the prevalence of propofol, determination of propofol in blood was established and postmortem bloods were screened.

Method: The determination of propofol in blood was performed by GC/MS after liquid-liquid extraction using thymol as an internal standard. To each 1 mL of blood and distilled water in a test tube, thymol and 0.5 mL of 0.05 M phosphate buffer (pH 6.0) and 0.2 mL of 0.1 N sodium hydroxide were added, and then extracted with 5 mL of chloroform-ethyl acetate (70:30, v/v) and centrifuged. The organic layer was dried with a slow stream of nitrogen at 30°C. The residues were reconstituted with methanol and a 1 μl aliquot of the solution was injected into GC/MS. The validation was conducted. The regression curves were linear within a range of 0.05–2 mg/L. Intra- and inter-assay accuracy and precision were less than 16 %. Recoveries were good (82–116 %) at 0.08, 0.2 and 0.8 mg/L of propofol.

Results and conclusion: Whole bloods collected from autopsied cases from 2005 to 2010 in the National Forensic Service (NFS) were screened for propofol. Propofol was detected in 130 cases. Among them, propofol alone was detected in 49 cases and the combination with other drugs was shown in many cases. Those were lidocaine (n=53), atropine (n=30), chlorpheniramine (n=18), tramadol (n=10), valproic acid (n=9), ketamine (n=8) and others. The concentrations of propofol in 130 cases ranged from 0.05 to 8.83 mg/L (average 1.66) in heart blood whereas 0.08 to 8.65 mg/L (average 1.71) in femoral blood. The ratios of heart to femoral blood concentrations for propofol were from 0.45 to 3.66 mg/L (mean 1.53).

In addition, 16 fatal cases related to self-administered propofol intoxication were demographically studied. The occupation of deaths was either medical doctor or nurse in 50 % of all deaths. 75 % were female while 25 % were male. Those who were in 20's comprised 37.5 % followed by 31 % in their thirties. Femoral blood concentration ranged from none to 6.56 mg/L.

KEYNOTE LECTURE 1:

SUICIDES THAT MAKE YOU WONDER!

Fawzi Benomran
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Determining the manner of death is one of the most important tasks of the forensic medical examiner. The manner of death is defined as: how the cause of death came about or achieved. Certain suicidal deaths are very unusual, and some of them pose a challenge to the forensic pathologist. In this paper a number of remarkable suicidal deaths are presented and discussed. It included: cut throat, stabbing, hanging, ligature strangulation and drowning. A number of unusual group suicides are also presented

KEYNOTE LECTURE 2:

STATEMENT VALIDITY ASSESSMENT

Guenter Koehnken

Witness statements may be incorrect for different reasons. For example, witnesses may unintentionally confuse perceptions and memories, they may have pseudomemories due to suggestive influences and they may intentionally lie. The lecture will address these possible causes of incorrect statements and present different approaches for judging the correctness of a statement (e. g. nonverbal behaviour, anatomically correct dolls, content analysis of the statement). Statement Validity Assessment (i. e. the content analysis of a statement) will be described as a diagnostic procedure that is guided by specific hypotheses. In particular, the analysis of consistency across statements, the criteria based content analysis (CBCA) and the analysis of the "birth" of the statement will be described and explained.

SPECIAL SCIENTIFIC SESSION 3 (IN SPANISH LANGUAGE)

THE LEGAL MEDICAL EXPERT AS GUARANTOR OF HUMAN RIGHTS

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The violation of human rights is perpetual in countries all over the world, often brutal and apparent, but also carried out in subtle and concealed ways. The problem is particularly severe in many Spanish speaking countries, in which fundamental rights, such as freedom, the right to life, dignity, access to health services, respect for personal autonomy, etc. are not always guaranteed in accordance with modern standards of protection.

As a Spanish-speaking expert in Legal Medicine, I have been invited by the International Academy of Legal Medicine to organize a discussion on human rights from a perspective of forensic science, within the context of Spanish speaking countries. The aim of the event is to discuss the role of forensic experts in the protection and guarantee of individual human rights covering areas such as: the evaluation of signs of torture, appropriate means of identification of individuals, the complete expert study of abused, raped or battered women, the right of an accused person to independent expert reports and the right to

accurate assessment of accident injuries, independently of the victims socio-economic status.

It is felt that forensic experts should be aware of cases of malpractice in order to provide fair and just resolutions to both parts: patients and physicians. Although there are differences in the socio-economic and cultural conditions throughout the Spanish speaking countries of the world, we believe that the subjects to be covered are highly relevant to all, even though the quantitative and qualitative incidence of human rights issues may differ from one country to another. The conference will undoubtedly provide an opportunity to gain a greater insight into the different realities presented within each country, allowing practical conclusions to be drawn that may be of help in constructing a more positive future.

The issues concerned may be approached from the following perspectives:

1. Methodology in dealing with human rights issues: the organization of legal-medical services and their involvement in cases. Guarantees of the independence of experts.
2. Epidemiology: data and figures on the phenomena analyzed.
3. The ethical and deontological principles of the issues involved.
4. Legal frameworks: right to justice, how legal-medicine experts are selected and nominated, legal medical procedures and how tests should be performed, procedural guarantees, etc.

July 6th, 2012

AAFS - NAS REPORT AND DEVELOPMENTS FROM 2007 UNTIL 2012

THE NAS REPORT: HAS IT CHANGED YOUR LIFE?

Haskell M. Pitluck, J.D., Retired Circuit Court Judge, State of Illinois, 19th Judicial Circuit

It has been over 3 years since the National Academy of Sciences (NAS) released the report "Strengthening Forensic Science in the United States: A Path Forward", in February, 2009. Of the 13 key recommendations made by the report, the primary recommendation to which the others are tied is the creation of an independent science-based federal agency with strong ties to state and local forensic entities, but, not in any way committed to an existing system or part of a law enforcement agency. For those knowledgeable of the forensic situation in the United States, and the world, there were few surprises in the report.

Some questions were raised about certain forensic disciplines. Many of which had been raised, and considered, previously. The report has generated much criticism and commentary since its release. Committees and working groups have been formed and legislation has been introduced. But has anything really changed?

Other than alerting attorneys, judges and the public that some forensic testimony may be flawed, the report has increased an awareness that forensic evidence must be based upon a good scientific foundation. Has the practice of forensic science really changed for the competent, ethical, honest, trustworthy, and conscientious expert witness?

This presentation will briefly discuss the report and the aftermath with some issues to think about.

NEW RESEARCH DIRECTIONS IN THE FORENSIC SCIENCES

Douglas H. Ubelaker
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The 2009 NAS report advocated scientific strengthening within a multitude of areas of the forensic sciences. The NAS recommendations essentially called for fundamental, substantial new research addressing issues throughout the forensic sciences. Subsequent discussions of "gap analysis" have clarified further many of these research needs. While government discussions of forensic reform continue, the scientific community has focused on many of the key issues through new research initiatives. These new research directions are apparent in the topics of grant awards and presentations at scientific meetings, and are beginning to appear in our journals and related publications. Although this session focuses on the impact of the NAS report, a development specific to the United States, new research directions are international in scope, often involving multinational and interdisciplinary teams.

One view of innovative research directions relating to the NAS report can be gleaned from the topics of recent research grant awards in the forensic sciences. In the United States, a key source of new grant funding resides in the National Institute of Justice (NIJ). This Institute was created four decades ago within the United States Department of Justice with the aim to promote scientific research and related development in the forensic sciences, especially at the state and local levels. Priorities for funding are developed utilizing input from community practitioners, with grant applications then being peer reviewed and judged. Since 2009, NIJ approved 143 research awards totaling 61.3 million dollars. Most of these awards focused on issues directly relating to the recommendations of the NAS report.

Many NIJ awards (32 %) were directed toward DNA research. Although DNA analysis was largely presented as the "gold standard" in the NAS report, advances are both needed and welcomed even in this widely accepted area of forensic science. Research in the DNA field tends to be technologically complex and expensive and thus remains dependent on substantial research funding.

Within the other areas of forensic science, many research awards focused on issues within trace evidence, latent print analysis, and general forensic topics. Also included was funding directed toward skeletal analysis, fire debris, chemistry, toxicology, ballistics, tool marks, document examination, forensic pathology, bloodstain patterns, digital evidence, gunshot residue, facial imagery, entomology, tire track impressions and odontology. The awards targeted issues in new methodology, new statistical approaches, evaluation of current methodology, new computer applications and quantification factors.

GOVERNMENT REFORM EFFORTS IN THE USA AFTER THE NAS REPORT

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Office of the Chief Medical Examiner, Baltimore, Maryland, United States

Background: The 2009 National Academy of Sciences' Strengthening Forensic Science in the United States: A Path Forward was the most powerful call for governmental reform of the forensic sciences yet. Thirteen recommendations were made: 1) creation of an independent science-based federal agency; 2) establishment of standard terminology; 3) grant research into the scientific foundations of the forensic science; 4) incentives for independence from law enforcement; 5) research on cognitive bias and mechanisms to avoid it; 6) standards of practice; 7) mandatory accreditation of laboratories and certification of practitioners; 8) quality assurance and quality control; 9) a code of ethics; 10) support of graduate school education for forensic science students and continuing legal education for law students, practitioners, and judges; 11) replacement of coroner offices with medical examiner systems; 12) interoperability of fingerprint databases; and 13) integration of forensic science practitioners into the homeland security first responder community.
Method: The response by the U.S. government to the report is surveyed.

Result: The Executive branch created a White House OSTP Subcommittee on Forensic Science with five Interagency Working Groups under it: Education and Ethics; Accreditation and Certification; Outreach and Communications; Research, Development, Testing and Evaluation; Standards, Practices, and Protocols. The federal government has begun to implement recommendations for itself. The National Institute of Justice has promulgated grant programs in accord with the report. The Senate Judiciary Committee has consulted with the forensic science community and proposed legislation to be enacted. The initial bill created: 1) an Office of Forensic Sciences which supports the Forensic Science Board, 2) creates forensic science discipline-specific committees supported by the National Institute of Standards and Technology, 3) mandates certification of practitioners and accreditation of laboratories, 4) develops standard practices, and 5) funds grant programs to support the scientific foundations and innovations. The SJC subcommittee subsequently revised its bill. Others in the House and Senate have also worked on legislative bills of their own. The future of federal legislation remains in doubt. The Supreme Court has made significant new case law on forensic science issues and referenced the NAS report.
Conclusion: The Executive, Legislative, and possibly the Judicial Branches of the U.S. government have responded to the NAS report, but the ultimate outcome of the efforts is not yet clear.

ADVANCING MEDICOLEGAL DEATH INVESTIGATION - THE SECOND MILLENIUM

J.C. Upshaw Downs
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Background: The NAS Report on improving the practice of forensic science in the U.S. singled out medicolegal death investigation (MDI) as deserving special mention.
Objective: improve service by modernizing performance. The challenge was nothing new for a specialty in place for at over 2000 years and re-instituted over a millennium ago. The issue was recognizing the inherent advantages of the medical aspect of the mission in serving the legal requirements of those served. The challenge was how to overcome inertia in order to effect meaningful change in the context of a medico-political quagmire in an on era of austerity.
Method: The over two-thousand year history of medicolegal death inquiry is reviewed and summarized in order to establish a modern-day baseline of the status quo and how it came to be. A possible strategy for enhancing MDI service delivery focuses on professionalization and potential.
Result: The high middle ages era saw the reintroduction of the coroner which has come to symbolize for many the shortcomings of a lay medicolegal system—overt political connections and monetary influences. Modern day reality is that no unified national MDI standard exists and that roughly half of the U.S. population is receiving suboptimal professional services reasonably expected. Scientific scrutiny has repeatedly called for the abolition of the elected lay coroner and in its place the establishment of a professional medical examiner system. The same NAS through the NRC and IOM called for such changes in 1928, 1932, and in 2003.

Repeated scientific calls for overall modernization have stagnated in the modern day. This despite an evolutionary expansion of MDI responsibilities. Some indices suggest a possible impending decline with de-emphasis of the professional aspect of the service for the sake of governmental budgetary bottom-lines.

The exponential advances in medicine have dwarfed the anemically funded U.S. forensic system as a whole and MDI in particular. With technological advances such as the virtual autopsy, genetic diagnoses, etc. becoming increasingly available, resources to employ such costly diagnostic tools in MDI remain lacking.
Conclusion: The contrast between the possibilities for MDI and practical reality suggests that reassessment of priorities and expectations is in order. In order to forge a path forward for MDI, the map of history's lessons serves as the guiding light. The fundamental principle of potential overall long-term cost-savings to the populace should be reinforced in order to assure equal justice for all—even the dead.

THE GOLDEN OPPORTUNITY TO PUT OUR FORENSIC HOUSE IN ORDER IS SLIPPING AWAY: CAN ANYTHING BE DONE ABOUT IT?

Thomas Stephen Lynch Bohan, PhD, JD, F-AAFS, D-IBFES
MTC Forensics

Inertia, political and social, ensures that major changes in society's key functions are difficult to achieve even with near-universal support. When the changes are opposed by powerful interests, success can become nearly impossible. And this is true regardless of the injury to society that the failure to change will bring. The National Academy of Sciences' Report of February 2009 presented us with what will probably be the only opportunity in our generation to address the forensics-rooted flaws in the US justice system. Since no forensic scientist now in practice will likely have a second chance to remedy these flaws, seizing this opportunity is of critical professional interest to us all. Success in this will require recognizing the factions striving to maintain the status quo and appreciating the tactics they are using. Some of the tactics are overt, such as the lobbying by the crime-lab-director-driven Consortium of Forensic Science Organizations commenced the day before the Report issued. Others are covert, appearing in the guise of efforts to enact the changes called for by the Report. Still others, in particular those spearheaded by the National Criminal Defense Lawyers Association, take the form of demanding that the whole system be shut down until complete forensic reform is accomplished.

Forty-one months after the Report issued, three-and-a-half-years with no responsive enactments legislative or executive, it is timely to review its conclusions and recommendations. Shockingly to the public, the Report concluded that essentially no crime lab practice now in use has been validated. It found that the US Department of Justice had failed to recognize, let alone address, this "Emperor Has No Clothes" flaw in the justice system, a failure leading to the Report's fundamental recommendation: creation of an independent national forensic agency. Relatedly, the Report asserted that because forensic facilities funded by law enforcement agencies are inherently vulnerable to improper influence, they must be made independent of law enforcement.

Resistance to reform has, collectively, opposed every path to reform laid out by the Report including especially (1) the creation of an independent national forensic agency, (2) probing existing-practices validity, and (3) making crime labs independent of law enforcement. The present discussion will examine the degree to which this resistance has managed to stymie legislative and executive responses to the alarms sounded by the Report.

AAFS SCIENTIFIC SESSION

THE ABFO NO. 2 SCALE A RETROSPECTIVE STUDY: THE HISTORY AND ACCURACY OF THE ABFO NO. 2 SCALE

Adam J. Freeman, D.D.S. 22 Imperial Avenue, Westport, Connecticut 06880

After attending this presentation, attendees will better understand the history, accuracy and markings on the ABFO No. 2 scale.

This presentation will influence the forensic community by providing an increased understanding of the history, use tolerance, stability and accuracy of the ABFO No. 2 scale.
Since 1987, the American Board of Forensic Odontology Number 2 scale has been the accepted standard for use in the field of forensic odontology as well as many other forensic disciplines. William G.

Hyzer and Thomas C. Krauss, D.D.S. developed the ABFO No. 2 scale in February 1987. The American Board of Forensic Odontology encouraged the development of a "standard photogrammetric reference scale" and officially accepted the scale February 18, 1987. In 1987, Lightening Powder Company agreed to manufacture the scale, and that same year the scale was commercially available.

The designation ABFO No. 2 stems from the fact that there was an ABFO No. 1 scale that was developed by the then President of the American Board of Forensic Odontology, Dr. Ray Rawson, in the mid 1980's and presented to the board. After discussion of the ABFO several revisions were suggested, Thomas Krauss was assigned the task to develop a revised scale.

The ABFO No. 2 scale is unique in its design. The original paper stated that the incorporation of three circles is useful in recognizing and compensating for distortion resulting from oblique camera angles. Graduations are metric and the overall accuracy was stated to be +/−0.1 mm or +/− 1 % for the major centimeter graduations. The width of the legs is one inch wide for standard reference, and are stated to have a +/−0.0002 in. The centimeter division lines are longer for tracing over and extending across the photographic print for gridding purposes. Measurements within the image are then made relative to the inscribed 1 cm grid lines to compensate for distortion resulting from non-parallelism between the film and object planes. The gray areas of the scale have a reflectance value of approximately 18 %. The inclusion of alternate bars of black and white makes it possible to salvage useful metric reference information from poorly exposed photographs in which the finer graduations cannot be resolved. The scale is constructed from three layers of 0.343 mm laminated plastic with an overall thickness of 1.016 millimeters. The overall size of the scale is 105 mm × 105 mm.

ABFO No. 2 scales were purchased from Lightening Powder Company a subsidiary of Armor Holdings. Additionally, 12 scales that are similar to the ABFO No. 2 scales were purchased from three other manufacturers. These scales were sent to the National Institute for Standards and Technology. NIST is a non-regulatory federal agency within the U.S. Commerce Department's Technology Administration. Each scale was compared to the purported error rates that Hyzer and Krauss published in the Journal of Forensic Sciences. They were overall accuracy of +0.1 mm or +1 % for the major centimeter graduations. The widths of the two legs are 1.000 + 0.002 in., which translates into a percentage error of +0.2 %. That the legs are mutually perpendicular to +2 rain of arc. The internal and external diameters of the three circles are 19.75 and 23.0 ram, respectively. The error in placement of the three circles is within 0.25 % of the nominal 80-ram separation between their centers.

The results were originally reported at the American Academy of Forensic Sciences 2008 annual meeting in Washington D.C. in the Odontology Section. Since the original report, additional work has been performed and a summary of which will be reported.

William G. Hyzer and Thomas C. Krauss, D.D.S. were men of remarkable foresight, 20 years ago they set out to create a "modestly prices standard reference scale providing the information needed to recover maximum information available from high-quality bite mark photographs." Since its creation in 1987, the scale has and continues to be used by law enforcement, around the world.

DVI TEAMS: PRESENT AND FUTURE OF FORENSIC DENTAL IDENTIFICATION

Emilio Nuzzolese[1], Alain Guy Middleton[2]

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INTERPOL, the world's largest international police organization, at its 49th General Assembly held in Manila in 1980, adopted a resolution with recommendations directed to the member states on the identification of victims of disasters. For this purpose it instigated the disaster victim identification guide, published for the first time in 1984 as the result of the work of the Standing Committee on DVI. In the last 25 years these forms have been modified and amended by the committee following developments in forensic sciences, and lessons learned from their application to the identification process. Among Interpol recommendations it was suggested that all member countries create a specific unit for human identification composed of forensic experts capable of collecting and analyzing primary and secondary identifiers thus creating an international standard and a unique multinational protocol.

An international survey was conducted by the sub working group of forensic odontologists of the Interpol DVI standing committee with the purpose of investigating the establishment of one or more DVI teams in each national police agency and the direct/indirect involvement of odontologists.

Each mass disaster victim identification process is characterized by random aspects which rely on different identifiers on each occasion, depending on the type of disaster, the condition of the deceased and the ante mortem data available. Nevertheless, dental data remains one of the primary identifiers, together with DNA and fingerprints. The review of mass disaster management over the last 10 years confirms the importance of dental data as an identifier in terms of both time and efficiency, even when non ante mortem dental data is available.

Not every country has a DVI team following Interpol guidelines and not all countries have put enough effort into maximizing the involvement of forensic odontologists within their DVI team.

The forensic dental community should note these results and encourage all national and international scientific societies, such as IOFOS, to recognize the importance of human identification to the relevant governmental authorities allowing the best practice in human identification applying, when possible, all DVI methods available. INTERPOL recommendations, although not mandatory, expressly recognize the basic right of individuals to be identified after death.

THE PATRICIA FLORES'S COLD CASE. AN INTERDISCIPLINARY APPROACH ABOUT DEATH AND RAPE INVESTIGATION IN A SCHOOL IN BOLIVIA

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On Friday, August 27th, 1999, Patricia Jaqueline Flores Velasquez, a Bolivian 9-year-old girl, disappeared from the public school she was attending in the city of La Paz, and 4 days later her body was found inside the school warehouse. The body showed signs of asphyxia, rape and torture. Once the body of the girl was discovered at 11 p.m. there were several mistakes and lacks related with the crime scene investigation, including analysis and technical/scientific procedures, chain of custody, the absence of sexual abuse protocols and a proper necropsy. DNA samples were taken by the FBI to 2 suspects. In one of them, Patricia's DNA was found in a belt and in a shoe of the suspect, but the Bolivian court did not accept this evidence argued contamination. The case became in a cold case.

After 11 years, the criminal process was re-opened thanks to 2 NGOS, Funderes (a Human Rights non-profit organization from Bolivia) and Women's link, an international (international human rights non-profit organization working to ensure that gender equality is a reality around the world). In March, 2012 an interdisciplinary team composed of an

Interdisciplinary group of Colombian Forensic Scientists went to Bolivia in order to exhume and analyze the body through a second necropsy, taken new DNA and other biological samples, as well as to do a new analysis at the crime scene.

After attending this presentation, attendees will know the results from the second forensic analysis, including anthropology, archaeology, pathology, DNA and crime scene reconstruction and analysis, showing how the forensic evidence was used to condemn to both suspects.

FORENSIC TOXICOLOGY AND PHARMACOGENOMICS: THE ROLE IN THE MOLECULAR AUTOPSY

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Background: Pharmacogenomics, the study of the relationship between an individual's genomic information and the disposition or response to medications, is rapidly becoming a tool available to a broader forensic community. Although it may provide a deeper mechanistic insight necessary for forensic pathologists to interpret postmortem toxicology results, the pathologist should understand its limitations to correctly determine the cause and manner of death.
Methods/Results: Review of published literature using keywords**:** forensic medicine, forensic pathology, forensic toxicology, pharmacogenomics, postmortem toxicology, standards.
Conclusion: The use of pharmacogenomics as a molecular autopsy tool in forensic medicine is discussed briefly, and the current limitations and hurdles for using pharmacogenomics in the postmortem forensic setting are reviewed.

BEHAVIORAL BIOGENETICS IN FORENSIC PSYCHIATRY: PROBLEMS AND PROSPECTS AFTER AN ITALIAN CASE

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Background: In recent decades, considerable progress has been made in the study of the biological bases of violent behavior, so much so as to rekindle a heated debate on the notions of "free will" and "criminal responsibility". These questions gained renewed prominence in Italy after the sentence of a criminal Court that decided to admit a "diminished responsibility defense" because the offender was found to be carrier of a few genetic variants that were thought to be associated with a predisposition to violence.
Case report: An adult female was charged with the murder of her sister. The first forensic psychiatric report excluded the presence of a mental disorder, so she was assessed responsible. A second forensic psychiatric evaluation took place, including: (1) psychometric assessment (MMPI-2 & PPI-R); (2) neuropsychological examination; (3) morphometric analysis with VBM and (4) genetic analysis of DNA aimed at identifying genetic polymorphisms associated with violence. The final report picked out the presence of a multiple personality disorder and of abnormalities in brain-imaging scans and in five genes that have been linked to violent behavior,.

The Court ruled a sentence of "diminished responsibility" arguing that the defendant's genes "*would make her particularly reactive and vulnerable to aggressiveness in stressful situations*".
Discussion: A growing number of researches have investigated the relationship between biogenetics and violent behavior. In particular, recent studies have combined behavioral genetics and functional brain imaging with the rationale that specific polymorphisms may lead to brain changes which, in turn, may increase vulnerability to various forms of violent behavior.

A critical next step in testing this "from genes to brain to violent behavior" hypothesis is to identify the role of the environment (epigenetics).
Conclusion: The use of neuroscience and behavioral genetics is increasingly considered potentially useful in providing objective data on the assessment of a defendant's criminal competence.

From a forensic psychiatric standpoint, nonetheless, it must be remembered that the necessary conditions whereby a mental disorder can take on the meaning of "insanity" should be that it has caused, in the specific case, such mental impairment as to compromise the capacity for cognition and/or volition and that it was causally linked with the crime.

FORENSIC SCIENCES IN PERSONAL INJURY CASES

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When referring to forensic sciences, most people think of criminal investigations and prosecutions. Images of crime labs with professionals wearing lab coats peering into microscopes come to mind. Less commonly appreciated is the fact that forensic sciences are integral to most if not all of the vast universe of civil actions.

This presentation will cover some of the forensic sciences presented in personal injury matters from the incident, through the legal process concluding with the verdict. The presentation will include the more routine forensic disciplines applied in personal injury actions, such as medicine, engineering and toxicology, as well as the less commonly seen areas such as psychiatry, digital and multimedia and questioned documents.

The diversity of forensic sciences applied in personal injury cases is limited only by the creativity and available funds of the attorneys; all with the hope that justice will prevail.

READING THE FACES OF THE JAPANESE

Yoshihiro Takaesu

Background: It has been known that the facial form of the Japanese can be broadly divided into two types: "Jomon" and "Yayoi" types. Jomon type is the type of people called "Jomon man", who came to Japan islands from Asian continent approximately 20,000 years ago. The other type is the type of people called "Yayoi man", which arrived from the Korean Peninsula approximately 2,800 years ago. There are distinguishing differences in the features of these two facial types, and major differences in ears, eyelids, noses, cheekbones and chins are clearly noticeable. Although it is likely that Jomon and Yayoi people have been mixed with each other for many years, there is no study that refers to the mixture of these two types in terms of facial characteristics of Japanese.
Method: To see the effects of the mixture on Japanese faces of our time, I examine the facial characteristics such as the shape of ears, eyelids and the bony framework using pictures of Japanese faces, and compare them with typical "Jomon" and "Yayoi" facial types.
Results: As a result, it is found that there are many Japanese who have facial characteristics of both Jomon and Yayoi types.
Conclusions: In conclusion, "mixed type" is the major facial type of Japanese today; many Japanese people today are mixed race descendants of both Jomon and Yayoi peoples, and the number of people with typical facial types has decreased as times have progressed. I hope this data may contribute in some ways to the forensic sciences.

SCIENTIFIC SESSION 4: INTERNATIONAL COMPARATIVE ASPECTS FOR MEDICAL MALPRACTICE AND COMPENSATION

MEDICAL MALPRACTICE & COMPENSATION FROM THE CIVIL LAW SIDE

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(2) Tokyo University of Social Welfare

Background: Losses by physicians are increasing for medical malpractice civil actions in Japan. At the same time, it has been reported that in Japan even if an autopsy is performed in a medically related case, cause of death is made clear by autopsy for a mere 10 % of these. While fraught with such problematic issues, the system for no-fault compensation in relation to medical care is taking shape in Japan.
Method: Along with an introduction to the legal configuration of medical malpractice civil liability in Japan while referring to judicial precedents, problematic issues of current medical malpractice compensation will be made clear by taking a comparative legal perspective in regards to the system for no-fault compensation.
Results: The legal configuration of medical malpractice civil actions in Japan consists of both of cases due to unlawful conduct configuration and cases due to default configuration, in the former burden of proof lies with the medical care side, and in the latter burden of proof lies with the patient side. In recent medical civil actions often both configurations are taken simultaneously. Especially for proof of causal relationship, the extent of proof by the patient is being lessened, and cases of loss by the physician side are increasing. Therefore the system for no-fault compensation was brought under consideration and this same system was realized for immunization shots, drug side effects, obstetrics and gynecology. Upon comparison with systems in New Zealand, France, the United States of America and Germany, it became clear that for the no-fault compensation system there is the large problem of securing financial resources which are the basis of compensation, and that realization throughout medical care services in nations with large populations, such as Japan, would be difficult.

MEDICAL MALPRACTICE IN JAPAN FROM PENAL LAW SIDE

Prof. Do. Makoto TADAKI
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This report discusses Japan's criminal law regarding medical error and points out problems that need to be addressed.
Allegations of medical malpractice have been relatively rare in Japan, in part perhaps because of an imbalance of power in the doctor/patient relationship. Those who complained rarely prevailed. Awareness of such problems, however, has been growing, and the law has started to respond.

Nowadays, in fact, overzealous criminal prosecution of medical error has developed. For example, in both the Ono-Hospital case and the Kyorin-Hospital case, the defendants were acquitted. They had undertaken difficult operations that ultimately were not successful. Not surprisingly, the medical profession is critical of such prosecutions, saying they discourage physicians from providing appropriate treatment. Especially in emergency situations, when a consent form has not been signed, medical personnel may be reluctant to do all that they could, for fear of being subjected to legal action later.

On the other hand, the recognition of victims' rights has been increasing in Japan along with the punishment of offenses that arise from negligence. Medical error cases fit within this framework. A decision to prosecute may arise after investigation by professional prosecutors or by inquest committees made up of ordinary citizens. The latter method increases the likelihood of physicians being subjected to court procedures and arduous cross-examination.

Considering the substantial amount of energy spent on a search for responsibility and efforts to make error decrease through deterrence, it seems important to get back to basics: examining an alleged offense involving negligence and confirming the principle of responsibility through punishment. Even so, society needs to be attentive to any tendency to overreach in subjecting medical personnel to criminal law.

The legal formation of a crime of involuntary wounding and manslaughter through negligence is indefinite, and the characterization of a doctor's responsibility is problematic. In a notorious case involving use of HIV-tainted blood products, the physicians were found innocent based on a consideration of "the ability of the actor."

This decision has been criticized. Nevertheless, it illustrates how a legal formation of the offense of involuntary wounding and manslaughter through negligence has become important in judging the propriety of the actions of medical professionals.

MEDICAL MALPRACTICE FROM FORENSIC MEDICINE IN JAPAN

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Three autopsy and judgment cases for medical malpractice in Japan will be presented. [Case 1] History: A 28-year-old housewife underwent abdominal cesarean hysterectomy. Four hours after the operation, She complained sever abdominal pain. Although a nurse called a doctor on duty, the doctor instructed her to inject the patient with an analgesic without medical examination. The nurse prepared the injection and visited the patient who was dying. Immediately, various emergency procedures were employed but failed. Autopsy findings: In the abdominal cavity, there was 2100 ml of bleeding accompanied by a lot of coagulated blood which adhered to the suture on the uterus. Not only in the right ventricle but also in blood vessels on the surface of the brain along with hepatic arteries, innumerable fine foam was observed. Although the suture on the uterus was sewed appropriately, a great deal of fluid blood leaked from the suture when the uterus was pressed. Cause of death: Immediate cause of her death was hemorrhagic shock derived from the bleeding in the abdominal cavity. Air embolism occurred during the cesarean hysterectomy, and innumerable fine foam formed in blood vessels caused disseminated intravascular coagulation which resulted in the bleeding from the suture sewed appropriately. Punishment and compensation: Criminal liability was not asked. Forty-seven million yen were paid to the family of the deceased in accordance with the reconciliation by a local court. [Case 2] History: A female out-patient of 60 years of age was injected intravenously with 1 g of cefazolin sodium dissolved in 100 ml of saline. She fell into shock 15 min after the injection and various emergency procedures were employed. Nevertheless, the patient died 90 min after the injection. Autopsy and laboratory findings: Pharyngeal and laryngeal mucous membranes were edematous, and several petechial hemorrhage existed on both membranes. Cefazolin was identified and measured to be 70 μg/ml in the serum obtained from the cadaver by high-performance liquid chromatography/mass spectrometry. The cause of death was thought to be shock following the intravenous injection of cefazolin sodium. Punishment and compensation: Criminal liability was not asked. Twenty-six million yen were paid to the family of the deceased in accordance with the reconciliation by a local court. [Case 3] As this case is being disputed in court, no mention was made here.

PERSONAL INJURY ASSESSMENT – IS THERE A POSSIBILITY FOR MEDICO-LEGAL DEVELOPMENT AND HARMONISATION?

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The legal and medical assessment structures for the assessment of compensation for personal injuries vary greatly in different jurisdictions. Legal adjudication falls into two broad categories: litigation through a process of law through the courts and a no-fault liability process with assessment procedures. The legal processes within the European jurisdictions are diverse and the levels of compensation awarded cover a wide range for similar injuries. Harmonisation of the laws within Europe has been difficult to achieve even in specified areas subject to EU Regulation (864/2007) such as compensation principle for injuries as a consequence of road traffic collisions. A brief comparison of legal systems and court awards will be presented. The legal framework for personal injuries was radically reformed in Ireland in 2003 with the establishment of the Personal Injuries Assessment Board (PIAB) which in 2011 assessed 27,669 new claims, made 9,834 awards to the value of €210 million with an average award of €21,339 and average processing time of 7.2 months. The PIAB engages the services of a panel of expert medical practitioners and bases financial compensation on a standardised range for injury types, the Book of Quantum. Medical assessments by doctors throughout Europe are undertaken by practitioners without any necessary further training requirements (example: Ireland, Austria, Sweden) or with specific university qualification (example: Italy). Compensation awarded may be based on non-medical scoring by the courts, on non-determinative medical scoring or on determinative medical scoring by doctors reflecting the varying relationships of medical experts with the courts in different jurisdictions. The systems in France (Bareme and Office National d'Indemnisation des Accidents Médicaux [ONIAM]) and the widely used American Medical Association Guides to the Evaluation of Permanent Impairment (2008) are further examples of medical assessment procedures and protocols. For harmonisation of medical assessments to progress a number of requirements must be addressed: training and qualification of doctors, postgraduate training in forensic and legal medicine, professional memberships, pro forma reports and evaluation guidelines. The need for medico-legal development and harmonisation in personal injury assessment and compensation is clear.

SCIENTIFIC SESSION 5: FORENSIC SCIENTIST AS EXPERT WITNESS PRACTICAL SKILLS, LEGAL LIABILITIES AND ETHICS

INSURANCE MEDICINE AND FORENSIC EXPERTISE

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Background: Insurance companies request medical expertise mainly when they feel that coverage should be denied, most often in the field of disability insurance and less often in the field of critical illness, life or travel insurance. Another domains requesting experts' contribution are cause of death, future care costs evaluation and life expectancy or work life expectancy calculations.
Methods: we looked back at how Insurance Medicine and Medicolegal Expertise were taught at University level; ethical principles should apply, whatever the field of insurance involved; when an insurance company, an employer or an union requires the help of a medical expert in a complex case, the expert shall clarify medical issues within his field of expertise in a totally independent manner. These ethical duties and principles should be taught *ad nauseam* in all Insurance Medicine or Medicolegal Expertise curriculum.
Results: the body of knowledge of any academic program of Insurance Medicine of Medicolegal Expertise should start with ethical lectures highlighting the independence of the medical expert as an auxiliary to justice, clarifying medical issues in his field of expertise. The expert shall never become an advocate, a tentation in the Anglo-Saxon adversarial judiciary system. The body of knowledge should be very complete, explaining country specific legal issues pertaining to the field of an Insurance contract, and should include technical lectures and workshops on how to motivate an opinion using high levels of Evidence Based literature, and how to demonstrate medical causation. Litigation issues should be covered in detail, in all the domains of Insurance medicine: disability, life, critical illness, travel insurance, life care plans, life expectancy calculation, as well as discussions on the most probable cause of death. Underwriting principles in all the domains of Insurance medicine should also be very well understood by the expert, as litigation might occur regarding the insurance eligibility of an applicant having only received a letter of coverage subject to his medical eligibility by the Insurance company.
Conclusions: experts behaving as mercenaries or venal fools with highly priced biased opinions-for-sale should be banned from the Court arena. All academic curriculum in Insurance Medicine and Medicolegal Expertise should insist on ethical issues, then teaching technical issues to help the expert deliver a well-founded independent opinion.

The Expert Witness and Ethics

Haskell M. Pitluck, Retired Circuit Court Judge, State of Illinois, 19th Judicial Circuit

It should go without saying that an expert witness should be ethical. An expert witness has to be qualified in his or her field of expertise to testify as an expert witness. Included in these qualifications is the necessity to be ethical.

Unfortunately, there are some 'so-called experts', who are not ethical. While these individuals are a minority, the problem is they can give all experts a bad label. How many times have you heard the phrase 'that particular expert is a hired gun who will say anything the case requires?'. An expert should not want to have that type of reputation.

Many organizations have Codes of Ethics, but a Code of Ethics will not make you ethical.

This presentation will discuss some things that an expert should and should not do to enhance their creditability and their ethical reputation. Good and bad examples and practical problems will be discussed.

SCIENTIFIC SESSION 6: PEDIATRIC FORENSIC MEDICINE & PATHOLOGY

SIDS AND CHILD DEATH FROM FORENSIC PATHOLOGY

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The mortality rate of infants and children has fallen during previous decades due to rapid progress in medicine in industrialised countries. As total mortality fell, sudden and unexpected deaths including SIDS became more frequent and more important. One cause explaining the forensic significance of these deaths is the high prevalence of SIDS and the need to differentiate natural from non-natural causes of death. For these reasons a significant number of sudden and unexpected deaths in infants and children are being investigated by forensic pathologists. It is important that the investigators are highly qualified and have a profound knowledge of natural diseases which could cause a sudden death in these specific age groups. Furthermore, some diseases are typical for infants and younger children while other diseases are

characterised by symptoms in childhood that are different to those in adulthood.

While autopsy techniques used for children do not significantly differ from those employed for adults, in the case of newborns, infants and toddlers special protocols have been published which take into consideration the eventuality of the sudden and unexpected death. Furthermore, special guidelines have been developed for performing autopsies in a number of countries, including the European Community. Additional investigations of histology, toxicology, microbiology, virology, neuropathology, and clinical chemistry also have to be considered. The material examined in such investigations has to be sampled during autopsy and stored in an appropriate manner prior to investigation.

Between two and 10 % of infants who die suddenly and unexpectedly are victims of violence. These children have to be identified by autopsy. Particularly, in cases of suffocation and child abuse, diagnosis may be difficult. Injuries may not be obvious on external investigation (for example in cases of shaken baby syndrome, suffocation under soft covering, blunt abdominal trauma, poisoning).

SIDS FROM NEUROPHYSIOLOGY

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Background: Incomplete respiratory regulation across sleep/wake states may be one of the etiologies of SIDS. Mechanisms of respiratory regulation by the brainstem and sleep/wake regulation by the higher brain centers have long been separately studied by the different research groups. However, recent discovery of an awake-promoting neuropeptide, orexin (hypocretin), in the hypothalamus and succeeding development of orexin-deficient mice opened a new avenue to simultaneously study respiratory regulation and sleep/wake regulation in an animal.
Method: In orexin-knockout (KO) mice and their control (WT) mice, sleep/wake states were determined by EEG and EMG recordings together with ventilation using body plethysmography. Hypoxic and hypercapnic ventilatory responses were measured and separately analyzed across vigilance states.
Results: Average ventilatory frequency and volume were indistinguishable between KO mice and WT mice at a resting condition. However in a detailed observation, there were several abnormalities in KO mice: They suffered from increased sleep apnea episodes during both slow wave sleep and rapid-eye-movement sleep. Hypercapnia-induced ventilatory reflex was blunted, especially during wake period. Intermittent hypoxia-induced respiratory augmentation was almost disappeared. Double immunostaining for orexin and c-Fos, a marker for cellular activation, revealed an activation of orexin-containing neurons by hypercapnia and by intermittent hypoxia.
Conclusion: Orexin coordinates respiratory regulation with sleep/wake regulation. Deficiency of orexin may have some impact on etiologies of SIDS. Possibly relevant other neurotransmitter, such as serotonin, will also be discussed.

ABUSES: MUNCHAUSEN SYNDROME BY PROXY

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(2) Tokyo University of Social Welfare

Background: Recently in Tokyo there has been a rise in the number of Munchausen by Proxy cases experienced, and of these, since there were cases involving the father, together with conducting a literary investigation, we will clarify the distinctiveness of such cases.
Method: Cases relevant to the keyword 'Munchausen by Proxy' were extracted from the PubMed database and the handling of those involving the father was clarified. Concurrently, possibility of the father as the abuser was investigated for Munchausen by Proxy. Since in a recent case of Munchausen by Proxy by the father experienced in Tokyo the reason for abuse was clearly for economic gain, we applied to our investigation the hypothesis that pursuit for economic gain is characteristic in cases involving the father.
Results: With Munchausen by Proxy as the key word, 634 documented cases were extracted from PubMed, and of those 22 documented cases were extracted having the same keyword of father in common. However, after actually examining these 634 documents, only 17 documents dealt with the father being involved with some degree of significance in the abuse process. There were 2 documents of instances where only the father was involved in the abuse process and one of these documents stated the possibility of conspiracy. Fifteen documents treated the father as the abuser, 5 documents were for passive involvement (4 of these stated the possibility of conspiracy), 7 documents stated the father as an active abuser (of these 3 were case reports), 2 documents were for only the possibility of abuse (of these 1 document stated the father as suffering from schizothymia), and 1 document stated form of involvement as unclear.

Amongst these, for the 15 families on which Professor Meadow reports there are details included in the document stating the father as an active abuser for Munchausen by Proxy, however the existence of these within the 17 documented reports as well is specific. On the contrary, in an investigation involving Munchausen by Proxy using central venous catheter (CVC), all those relevant of the 16 cases were by the mother. As such, although documentation does exist confirming the role of the father as the abuser in cases of Munchausen by Proxy, cases of proactive involvement in the abuse are few, and no reports of the main goal being that of economic benefit exist, and thus the hypothesis was rejected.

SIDS AND OTHER SUDDEN CHILD DEATH: COMMUNICATION BETWEEN THE PEDIATRICIAN AND THE FORENSIC PATHOLOGIST

Côté Aurore, McGill University, Montreal, Canada

Background: Investigations into the cause of death are very important, for a significant proportion of these sudden deaths can be explained only after a thorough investigation. The pediatrician can provide information that is crucial on the past history of the child and family; the pediatrician has also a major role after the investigation.
Method: We reviewed our experience with sudden unexpected death in infancy in the province of Quebec, Canada, in the past 20 years (756 cases), and our experience with sudden unexpected death in older children as well (172 cases). In our region, death review committee review cases after the investigation and are mostly oriented to identify child abuse.
Results: A cause of death was found in less than one third of these cases of sudden totally unexpected death. There was more likelihood of finding a cause with older than younger infants and children (18 % vs. 40 %, chi-square, $p<0.005$). When a cause was causes identified, infection is the most frequent cause; metabolic disorders and cardiovascular diseases play a role as well, although the proportion of cases is much smaller. The review of the antecedents of the child with death review committees that occurred after the investigation revealed many elements that could have been important to know by the forensic pathologist, and perhaps crucial for the identification of a cause of death. The investigation, in those years of the studies, did not entail looking for cardiac channelopathy.
Conclusions: The pediatrician's role, as primary care physician and specialist of infancy and childhood diseases, is critical in the investigation of sudden unexpected death and good communication with the forensic pathologist is mandatory. The pediatrician's role

continues after the investigation in ensuring that families understand the results of the investigation into their child's death. In summary, it is important that everything be done to identify the cause of death so that no such tragedy recurs in the same family. With more readily available genetic testing, it is hoped that more causes will be identified in future and, possibly, more deaths prevented.

SCIENTIFIC SESSION 7: EVALUATION OF DOMESTIC VIOLENCE

FORENSIC ASPECTS OF INTIMATE PARTNER VIOLENCE

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The scope of this presentation is limited; to touch milestones of the definitions of **"Violence Against Women"** (VAW), to summary magnitude of the problem in the world and Turkey, forensic responses and some suggestions for the future forensic daily practice.

VAW has recently attracted political and academic attention, was not entered the world stage before the 1970s. The researches on VAW have undergone swift development over the past 40 years. Ironically, achievements lead to unbelievable appearances for the definition of the situation in States' Law languages but not satisfied the real life demands yet.

"VAW is defined as a violation of human rights and a form of discrimination against women and mean all acts of gender-based violence that result in, or are likely to result in, physical, sexual, psychological or economic harm or suffering to women, including threats of such acts, coercion or arbitrary deprivation of liberty, whether occurring in public or in private life." The definition is taking part in the latest treaty of Council of Europe, "*Convention on preventing and combating violence against women and domestic violence*" (CETS - No. 210), which was opened for signature in Istanbul on 11th May 2011. The treaty also defines intimate partner violence (IPV) as any behavior within an intimate relationship that causes physical, psychological or sexual harm to those in the relationship.

IPV have been recognized as major global public health problem and serious human rights abuses, its impact on acute and long-term health and well-being has been also documented in publications such as WHO's World report on violence and health.

IPV is highly prevalent and mostly affects women with negative consequences for their physical and mental health, has also negative consequences for their children well-being too. The studies from various countries indicate that between 10 % and 69 % of women report that an intimate partner has physically abused them at least once in their lifetime, but less than 10 % of IPV cases are ever prosecuted. Besides these, data of the criminal justice systems are far from to disclose the real problem. Although, legal help-seeking strategies are more helpful than various individual attempts to manage abuse, women rarely engage the criminal justice system as one strategy to help them control the abuse and protect themselves and their children. It is partly attributed to gender blind values, victim blaming and disparaging attitudes from service providers, which may improve our proper professional efforts.

DOMESTIC VIOLENCE AGAINST CHILDREN

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Background: Cultural aspects surrounding domestic violence (DV) against children make it still a commonly tolerated behaviour, namely when talking about physical punishment and exposure to intimate partner violence. Such a fact often impairs the timely detection and report of these cases, and consequently the diagnosis and protection of the victims, which may sometimes lead to a fatal outcome.
Suspecting and reporting domestic violence: The awareness of professionals who work with children, as well as their knowledge of factors that must raise suspicion, risk factors and indicators of abuse, are fundamental to the detection of such cases. Generally, an isolated factor or indicator is merely a warning of the possibility of facing a DV situation. However, whenever present, it should alert to a possible risk of abuse and for the need of further investigation. If some of the following suspicion factors are present, the case should be reported for medical diagnosis: (1) the explanation provided does not suit the characteristics of the injury; (2) injuries located in non-accidental typical areas; (3) patterned injuries; (4) injuries in different stages of healing; (5) a delay between the time of injury and the seeking of health care.
Diagnosing domestic violence: Due to the complexity of the diagnosis (based on physical and psychological indicators, as well as evidence) it is fundamental that it be made by a forensic doctor with experience in DV cases. Findings have different indicative values (diagnostic, highly suggestive, suggestive or unspecific), so the final conclusions may be presented only in terms of probability and must always be discussed. Even if the findings are highly suggestive of DV, one must always have in mind the necessary differential diagnosis between abuse and other circumstances, to guarantee a reliable conclusion. In addition to the abusive aetiology, the following hypothesis must also be taken into consideration: (1) accidents; (2) certain pathologies ; (3) iatrogenic injuries, namely resulting from integrative medicine or post-operative procedures; (4) malformations; (5) certain morphological conditions; (6) self-inflicted injuries; and (7) simulation.
Conclusions: The timely diagnosis of DV and the protection of the victim depend on the detection and report of the case; thus, the multidisciplinarity and articulation between different professionals who work with children is fundamental. Rarely can the diagnosis be based on a single finding, so it is crucial to assure the combination of indicators and evidence. Also, findings must be valued according to the concrete context of each case.

GERIATRIC ASPECTS OF DOMESTIC VIOLENCE

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Domestic violence has been increasingly recognised as part of the spectrum of protection of human rights. Such protection involves an understanding of what constitutes such violence, its detection, its medical and forensic assessment and the implementation of any necessary legal provisions by the State to ensure such protection and vindication of individual rights. In the EU27 in 2007, 16.9 % of the population were over 65 years, most of whom continued in independent living. Old age dependency ratio in the EU27 is currently 25.2 but is projected to be 34.2 by 2025 and 50.4 by 2050. Life expectancy at 65 years in the EU27 is 16.8 years for males and 20.5 years for females. Elder abuse is defined as a single or repeated act or lack of appropriate action in a relationship of trust which causes harm or distress to an older person or violates their human and civil rights. Recognised forms of elder abuse including: physical, sexual, psychological, financial or material and discriminatory abuse and also neglect and acts of omission in relation to medical or physical care needs. The healthcare, social and legal structures of the particular society or jurisdiction determine how such domestic violence is addressed. Training of forensic physicians and nurses is required for the recognition of potential signs of geriatric abuse. Two aspects of current work will be presented. Firstly, regarding research and understanding of geriatric abuse, the National Centre for the Protection of Older People (NCPOP)

was set up in Ireland in October 2008. It focuses on a programme of research examining elder abuse with development of policy and practice by drawing on international research and developments in the field. NCPOP is a primary resource for those working with, or having contact with, older people in areas of health and social care, law services and financial services. Secondly, regarding forensic death investigation, if a death of a geriatric person occurs and the possibility of domestic violence arises, there is a commonality of investigative systems with the reporting of the death to a judicial officer responsible for further forensic and medico-legal inquiry with or without post mortem examination and public judicial enquiry, as appropriate. This presentation will include analyses of 1,180 residential home deaths reported to the Coroner in County Kildare, Ireland during the period April 2005 through July 2011 with a summary of clinical conditions and of the post mortem examination findings in 111 cases.

FORENSIC CASE MANAGEMENT IN DOMESTIC VIOLENCE: ROLE OF THE FORENSIC NURSE EXAMINER

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Forensic biomarkers of relationship violence, also known as domestic, family or interpersonal violence, require recognition through universal screening, forensic assessment and intervention in order to reduce and prevent further injury or death. Various considerations integral to the holistic care of victims of relationship violence are essential in all hospital emergency departments (ED), community clinics and public health nursing education programs. Because this category of clinical forensic victims do not generally identify themselves as crime victims upon admission in the ED, community or residential setting, the healthcare professional who is first to come in contact with these patients must assume the responsibility to evaluate the patients statements versus the observation of injury. If the physical evidence is not consistent with the patient's statements regarding how the injuries occurred, documentation and reporting become critical to risk reduction. Victims of domestic violence commonly possess mental, emotional, or situational factors that increase the likelihood of developing and continuing high risk behavior patterns.

Forensic nurse examiners (FNE) possess the unique training and opportunity to assess and care for women, men and children of domestic violence. All nurses must learn basic risk assessment tools to reduce and prevent violence, to promote good physical and mental health, and to decrease morbidity and mortality among those affected by domestic violence. FNEs serve as clinical instructors to educate and promote forensic assessment and recognition of forensic biomarkers indicative of domestic violence to all clinical employees. The FNE should be available to respond to any department when a forensic consult is required. Nurses can learn how to identify victims of domestic violence, focus on objective evidence, provide referrals for identified victims and assist them with managing commonly associated adverse health problems including emotional, physical, or sexual intimate partner violence and child abuse, chronic pelvic pain, irritable bowel syndrome and ulcers, acid reflux, chronic headaches, sexually transmitted diseases, depression, sleep disorders, anxiety, post-traumatic stress disorder, and high risk behaviors such as unprotected sex, drug and alcohol use, or deliberate self-harm. In order to ensure optimum management of these victims, practice guidelines will be addressed. A model domestic violence program employing forensic nurse examiners established in Lausanne, Switzerland will be discussed as one point of initiating forensic nursing services within a medical facility.

SCIENTIFIC SESSION 8: EFFECTIVE TEACHING AND LEARNING IN FORENSIC MEDICINE

FORENSIC MEDICINE EDUCATION: EFFECTIVE PEDAGOGIES FROM A TO Z

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Forensic medicine is a field of multiple professions, knowledge-base, and skills. Hence, education decisions relating to this field may not be as obvious and straightforward as other single-disciplinary fields. Effective teaching and learning in forensic medicine demand challenging curricular and pedagogical decisions.

Problem-based learning (PBL) has perhaps been over-emphasized in forensic medicine as the "magic solution" to all educational challenges and as being the explicit promoter of effective teaching and learning. Whilst PBL is a very effective pedagogical approach, it constitutes only the one letter in the A-Z list of effective teaching and learning strategies that can be adopted in forensic medicine. Lecture-based learning and practice-based learning are other broad pedagogical approaches that can compete with PBL in forensic medicine. In between these three broad pedagogical approaches, there exist clusters and clusters of "mini-pedagogies" that can make teaching and learning in forensic medicine more student-centred rather than content-driven and can generate both generic and transferable skills and dispositions and the necessary expertise for the profession.

From a social-education lens, choice of the pedagogy is strongly correlated with the curricular approach adopted. Curricula with strong classification between the disciplines may be more correlated with lecture-based pedagogies. On the other hand, curricula where boundaries between disciplines are blurred (weak classification) may more easily be associated with PBL.

This paper argues that an effective teaching and learning approach in forensic medicine reflects the nature of the adopted curriculum. Such approach should not be "dogmatically" tied to the one pedagogy but to a continuum of teaching and learning strategies which promotes excellence, innovation, students' ownership, engagement, and participation.

IMPLEMENTING COMPETENCY-BASED LEARNING IN FORENSIC MEDICINE

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Forensic medical education is facing a new challenge in the beginning of this century. Realizing education in the field of forensic medicine is on the brink of a major paradigm shift from structure- to competency-based education and outcomes assessment. Accountability to the public competency of practicing forensic medical specialists/experts is becoming a driving force to implement competency-based training.

The competency-based approach consists of functional analysis of occupational roles, translation of these roles into outcomes and assessment of trainees progress on the basis of their demonstrated performance of these outcomes. Curricula and methods should consequently promote active learning, making the process learner-centered. A competent expert is supposed to use a complex set of integrated components of knowledge, skills and attitudes in order to manage properly a forensic medical issue.

Designing a competency-based curriculum includes four steps: (1) defining competency on the basis of professional needs, (2) determining competency components, (3) establishing performance levels describing the outcome expectancy of competency, (4) identifying success criteria and assessment methods specifically matched to the

competency to effectively evaluate outcomes. These four steps should be completed by an overall evaluation of the process.

Successful implementation of competency-based learning requires an internalization of this new paradigm both by trainers and by learners. Ensuring faculty development programs for educators in forensic medicine remains a great challenge.

SEARCHING FOR THE ACCEPTABLE SPECIALTY TRAINING

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High standard of expertise in forensic specialties is vital for the support of law enforcement and the administration of justice. Substandard performance can become costly to society, not only in terms of money but also in loss of confidence as to the rule of law.

Forensic medicine exists as a medical specialty in many countries but there are differences as to the length and contents of the training. In some countries the main emphasis is in autopsy pathology, whereas in others the main workload consists of work in clinical forensic medicine. Although it exists, *de facto,* in the majority of the European Union countries, due to the bureaucratic process of the mutual recognition of medical specialties, it hasn't, as yet, been included in the list of those specialties that allow free movement of labour from one member country to another. In the United States it exists as one of the three specialty areas recognized by the American Osteopathic Board of Pathology or as a subspecialty certification within Anatomical Pathology or Clinical Pathology, or Combined Anatomic Pathology and Clinical Pathology, which are the primary specialties recognized by the American Board of Pathology.

Forensic pathology is typically a specialty where one learns by doing and the learning process and the end result depends and is influenced by the spectrum of cases, which the trainee sees in the course of the curriculum. Unlike most medical specialties, where the training is based largely on the prevailing scientific concepts of the pathophysiology and therapeutic possibilities of the diseases related to a given specialty, the training in forensic medicine / forensic pathology also depends on the structure of the medico-legal system in the country in question. The system usually dictates what types of cases are prioritized in investigation, as in some jurisdictions, where forensic pathologists investigate only deaths that are suspected to be crime-related. This can narrow down the types and number of cases that the trainee is able to see during the training and influence the comprehension and in the worst situation predispose to miscalculation.

One important element is further the environment of the specialty training, *i.e.* whether the training takes place in an academic environment associated with teaching, research, and practical casework or in another type of training centre lacking one or two of those essential elements.

SCIENTIFIC SESSION 9

NEW TECHNOLOGIES AND DEVELOPMENTS IN TOXICOLOGY

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Harris County Institute of Forensic Science, Houston, Texas, USA

The goal of this session is to provide attendees with an overview of the technological advances in the field of toxicology, and the impact those advances have had and continue to have on the manner in which toxicological analyses are performed. After attending this workshop, attendees will be familiar with the newest advances ion analytical toxicology.

This session will impact the forensic science community by introducing new ideas and techniques to practicing toxicologists, allowing them to modernize and innovate in their laboratories, providing faster, more efficient and more comprehensive toxicological analyses.

For most of the past three decades, forensic toxicologists have relied on a standard set of analytical procedures: single-drug-class immunoassay, extraction, derivatization, gas or liquid chromatography (GC or LC), and mass spectrometry (MS). Recent technological advances have made it possible to streamline the way analyses are performed, by either making existing processes more efficient or eliminating some procedures altogether.

Single-drug-class immunoassays can be improved by using biochip systems that allow multiple drug classes to be detected in a single analytical run. Many immunoassays systems are capable of directly analyzing multiple sample types, including oral fluid, blood, serum and urine. In many cases, both liquid-liquid and solid phase extraction can be eliminated by performing direct analysis of body fluids by LC/MS. The derivatization step, which traditionally has improved mass spectrometric identification by providing richer mass spectra for many compounds, can be eliminated by using LC/MS/MS systems. By looking at secondary fragmentation of certain target ions, the identification ability provided by LC/MS/MS equals or exceeds that of derivatized specimens.

The interpretation of alcohol levels has been improved by programs such as BAC-Tracker by expanding the traditional Widmark rules to include absorption kinetics, uncertainty of measurement and computerized generation of metabolic profiles. Additional programs are available to assist in the interpretation of levels of other drugs.

Finally, research in the field of pharmacogenomics is changing the manner in which toxicologists interpret drug levels. As this research proceeds, major changes will no doubt take place in the way toxicologists look at potential drug involvement in behavior and death.

By using newer, more efficient technologies, laboratories cut costs, reduce waste streams, become more environmentally friendly and provide faster, better results to their clients.

MAFS SYMPOSIUM - PESTICIDE HAZARDS IN THE MEDITERRANEAN AREA: FORENSIC ASPECTS

PESTICIDES AND THEIR DAILY INFLUENCE IN THE BALKAN REGION

Naim UKA, Department of Forensic Medicine—Kosovo

Agriculture as necessary filed of production daily foods is studied in several ways. Some of the death cases caused by intoxication by pesticides were as topic of many studies in our areas. Balkan countries after armed conflicts have been under so many toxicological studies due to intoxication of the earth too.

Pesticides and their products are out of legal observation in many cases. Strong agricultural companies are going to growth up very fast doing business in countries without legal observation and lack of law in this direction.

Death cases and health damaged caused by intoxication of pesticides are still out of data's in our region. These cases yearly are going to growth up and because of global changes in the earth.

This presentation will try to show some of the pesticides influence in our daily work.

EAFMS SCIENTIFIC SESSION

ORGANIZATION AND DEVELOPMENT OF FORENSIC MEDICINE IN ALBANIA

Prof. Dr. Bardhyl Çipi

In this communication the author presents some data of the Forensic Medicine Organization at the service of justice in Albania. In the

difficult period of transition, after the defeat of the communism in Albania, also associated with a general recrudescence of the criminality, efforts are made for some changes of the Forensic Medicine System, in conformity with the requests of the modern state that is building. At first in the paper is presented from historical point of view the development of Albanian Forensic Medicine. Later on the author describes the organized structure and scientific activity of the field of Forensic Medicine. In conclusion, it is stressed that the Albanian Forensic Medicine with a good organization must establish a close collaboration with the Forensic Medicine of other Eurasian country, also in the framework of EAFMS.

KEYNOTE LECTURE 3:

MEDICO-LEGAL RECONSTRUCTION OF FATAL ROAD TRAFFIC ACCIDENTS

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The presentation will give an overview to the typical examinations of legal medicine in the context of road traffic accidents. One of the most frequent events is the contact between a car and a pedestrian. Legal medicine has to answer whether the pedestrian came from the right or the left side (if the person was walking/running at all), the position of the person when it was hit, and the point of primary contact to the body. With car occupants the question often is concerning the identification of the driver. Also it has to be answered whether the driver was fit to drive or whether a collapse due to natural reasons caused the accident. Due to insurance reasons it has to be find out whether the car occupants had their seat belts fastened. In addition it has to be examined by forensic toxicologists whether the persons involved were under the influence of alcohol, pharmaceuticals, or drugs.

KEYNOTE LECTURE 4:

TARGETED CT ANGIOGRAPHY SYSTEM

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Three methods of post-mortem computed tomography angiography (PMCT-A) have been described within the literature. Two of the methods involve the injection of positive contrast medium and its circulation throughout the whole body by means of the creation of vascular circulation at the time of or after death. The third method does not require the creation of a circulation and utilises both negative and positive contrast medium and is designed to specifically target the coronary arteries to assist in the consideration of pathology that, within the United Kingdom, accounts for the majority of natural unexpected death, i.e. coronary artery atheroma and its complications.

Targeted PMCT-A was first described by Saunders et al and involves the insertion of a catheter via the left carotid artery into the ascending aorta where it is secured by its balloon. Three boluses of 300 ml of air (negative contrast)are injected over 30 to 40 s in the supine and lateral position followed by 300 ml of Urografin (150, diluted to 15 mg Iodine/ml, Bayer Heathcare), as 2 boluses of 150 ml over 50 s in the lateral then supine position. Prior to injections the catheter position is checked using our standard PMCT protocol with a Toshiba Aquilion 64 slice scanner (120 kVp, 300 mA and 64×0.5 mm slice thickness, matrix 512×512) reconstructed to either 1 or 2 mm thick slices. After each bolus injection cardiac images are performed with a narrow field of view covering the heart and aortic arch with 1 mm slice reconstructions.

We have undertaken over 200 research scans to date as part of an on going grant funded research program. Each case has a full autopsy performed on the following day. To date we have identified the importance of air as a contrast medium in targeted cardiac PMCT-A and how, when used in conjunction with positive medium, diagnostically significant coronary artery pathology can be determined to the same if not better level compared to traditional autopsy examination. Dominance, ostia and vessel patency, stents, branch distribution, bridging, distribution of calcification as well as stenosis and thrombosis can all be visualised by the method.

This talk will introduce the audience to the method, both manual and automated, and demonstrate the pathologies that targeted PMCT-A can and cannot identify including the manner in which the coronary arteries are assessed both longitudinally and transversely to replicate traditional autopsy examination of the vessels.

KEYNOTE LECTURE 5:

AUTOPSIES – WHY DO WE STILL NEED THEM?

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The autopsy—defined as the standardised dissection of a human body—has in the history of medicine three tools:

- the study of the structure and function of the human body (anatomic autopsy)
- the study of the site and origin of diseases (clinical autopsy)
- the study of the cause and manner of death (forensic autopsy).

The anatomic autopsy flourished already in the 16th and 17th century (e.g. Andreas Vesalius), the clinical autopsy in the 17th and 19th century (e.g. Giovanni Battista Morgagni, Marie Xavier Bichat, Carl von Rokitansky, Rudolph Virchow), the forensic autopsy in the 19th century (e.g. Johann Ludwig Casper).

The autopsy was one of the main research methods of medicine in the 19th and beginning of the 20th century. There was a high quality control by autopsy regulations and national and international recommendations. Due to national legal regulations the autopsy rate—both the clinical and forensic—differ from country to country. While some countries—e.g. Finland, Lithuania, UK, Austria—still have a high autopsy rate, in other countries the autopsy rate is very low.

In most countries a declining autopsy rate could be observed in the last years, especially the non forensic autopsy is vanishing more and more (e.g. in Germany below 2 %). This is especially surprising since class I errors (major errors that had they been detected during life, would possibly have effected patient prognosis or outcome, at a minimum discharge from the hospital alive) are still observed in about 10 % of cases. Of special interest is that the rate of discrepancies between ante mortem and post mortem diagnosis concerning the cause of death has not decreased with technical improvements. Also post mortem imaging can not replace the traditional dissection of the body concerning verification of cause and manner of death. Even in cases of high technical medicine low technical autopsies have the following tasks:

- clarification of cause of death
- qualification of manner of death
- comparison between pre mortem and post mortem findings
- benefits for a valid cause of death statistics
- monitoring of public health

- quality control of clinical medicine
- education of students and doctors
- identification of new diseases and changing pattern of diseases
- evaluation of therapeutic efficiency of new medicine, surgical methods etc.
- benefits to the family of the deceased
- benefits to public health
- benefits to law enforcement and jurisprudence.

The reasons for the decline of the autopsy are manifold: clinicians think that with their diagnostic procedure the case is clear; pathologists lost interest in autopsy with increasing biopsy pathology; consent for autopsy is necessary; inadequate financing; fear of being sued for medical malpractice.

However, it has to be kept in mind that without autopsy doctors are often "walking in the fog" concerning cause and manner of death.

KEYNOTE LECTURE 6:

EARLY MARKERS OF MYOCARDIAL ISCHEMIA RELEVANT TO FORENSIC PATHOLOGY: AN IMMUNOHISTOCHEMICAL AND GENE-EXPRESSION STUDY

Sara Sabatasso[1], Patrice Mangin[1], Tony Fracasso[1] and Valentin Djonov[2]
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Background: Post-mortem diagnosis of acute myocardial ischemia represents a current challenge for forensic pathologists, especially when death occurs within a short period of time (minutes to a few hours) after the onset of the ischemic injury.

Recent works have investigated, at the immunohistochemical level, some markers that accumulate in or leak from the human cardiomyocyte after the ischemic event. Nevertheless, these markers are not detectable in the very early phase of myocardial ischemia. Besides, the role of cardiomyocyte apoptosis as a diagnostic tool in cases of early myocardial injury has been investigated by TUNEL assay, which has shown good sensitivity, but a controversial specificity.

In this investigation we wanted to test, under experimental conditions, the diagnostic potential of some immunohistochemical markers, as well as of the TUNEL assay, in the detection of early myocardial ischemia. Among the immunohistochemical markers we have investigated: troponin I and T, myoglobin, fibronectin (total and tissular), tenascin C, C5b-9, connexin 43, Jun B. The same and additional markers (as HIF-1 alpha, caspase 3, 8 and 9) have been studied at gene-expression level as well, using the NanoString nCounter gene-expression system.

Materials and methods: A rat model of myocardial ischemia (ligation of left anterior descending coronary artery, LAD) was used. The immunohistochemical and gene-expression investigations were performed on the ischemic myocardium at different time points after LAD ligation, ranging from 5 min to 2 weeks. As comparison, hearts from control and sham operated groups were investigated by the same methods.

Results: The earliest expressions following myocardial ischemia were observed for JunB (15 min) as well as for apoptosis and hypoxia markers (15–30 min), followed by total fibronectin (≤ 1 h), C5b-9 (≤ 1 h), myoglobin (≤ 1 h), troponins I and T (≤ 1 h). The latest markers, expressed only in the healing phase of myocardial infarction, were tissular fibronectin and tenascin C.

Conclusions: We have identified, by immunohistochemical and gene-expression investigations performed on a pure experimental model of myocardial ischemia, early markers of ischemic injury as JunB and apoptosis effectors, expressed as early as 15 min after coronary artery ligation in rats. Moreover, we have confirmed the early expression of total fibronectin, C5b-9, myoglobin and troponins (≤ 1 h). We have therefore identified a panel of markers to further apply to the routine forensic practice in order to improve the diagnosis in the challenging cases of sudden cardiac death.

KEYNOTE LECTURE 8:

NASAL CILIARY MOTILITY: NEW SUPRAVITAL REACTION FOR ESTIMATING THE TIME OF DEATH

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Section of Legal Medicine, University of Bari, Italy

Background: Post-mortem interval (PMI) estimation is one of the most difficult issues in forensic medicine. Apart from body cooling, which is commonly used in the early PMI, supravital reactions are the most interesting postmortem changes for time of death estimation.

The irreversible circulatory arrest is the starting point for a period of survival of some tissues under a condition of global ischemia. The basis of such phenomenon is the anaerobic glycolytic metabolism, which tends to decrease inconstantly in each individual in the first 24 h. For practical purposes in forensic medicine, most investigations on supravitality have been carried out on different morphological and functional levels.

The aim of this study is to evaluate the diagnostic usefulness of ciliary motility as a potential tool in estimating the time of death.

Method: We prospectively studied more than 100 patients who died at University Hospital of Bari. All premortem information about the cause of death, including the medical treatments performed, were available in the Hospital file. The time elapsed since death was known in all cases.

A specimen of ciliated epithelium was obtained by scraping from the middle third of the inferior turbinate with a spoon-shaped nasal probe (Rhinoprobe). An in vitro evaluation of ciliary movement was performed. Ciliary beat frequency (CBF) was analyzed by phase-contrast microscopy. Three different samples at different post-mortem intervals were carried out: between 4 and 6 h (T1), between 10 and 12 h (T2) and after 16 h (T3). Then CBF (beat number/second) was classified in: present (3–4/sec), hypo-valid (1–2/sec) and absent.

Results: The progressive observation of ciliary motility after death is indicative for a "natural" decrement of ciliary activity with 3–4/s CBF higher at T1 than at T2/T3; 0/s beat frequency rises with growing postmortem interval. The results demonstrated that a statistical significant decrease of ciliary motility comparing with time elapsed since death exists. No statistical significant correlation between sex and age were evaluated; a possible role of infections and chemotherapy in ciliary movement impairment was strongly suggested by this observation.

Conclusions: Our data support the idea that ciliary motility analysis may be a useful tool in evaluating the time of death in the early postmortem period. This method is non invasive, inexpensive and with a basic microscope it is possible to observe the supravital reaction shortly after scraping. Currently we are better defining the relationship between cause of death and time-lag presence of nasociliary motility.

KEYNOTE LECTURE 10:

CHANGES IN GENE EXPRESSION ON THE BORDER OF LIFE AND DEATH

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(2) Dept. of Legal Medicine, Tokyo Women's Medical University

Background: In the fields of thanatology and postmortem phenomena, through the accumulation of research to the present, on the border of life and death and particularly during the postmortem period, it is possible to infer that there are genes for which expression increases postmortem, however such has never been made clear using today's molecular biological methods. Today it is thought that the existence of such genes can be applied to decisions on the efficacy of regenerative transplant materials.
Method: For 3 mice (C57BL/6, 6 week-old males) in one group deceased due to cervical dislocation, brain, heart, liver and kidneys were sampled chronologically within 24 h post-mortem, mRNA expression of 45,101 genes was evaluated using microarray (Affymetric Mouse Genome 4302.2 Array), those for which fluctuation in expression amount was more than double after animal death were extracted, those for which increase was particularly prominent were amplified using a RT-PCR, and the increase in expression was confirmed.
Results: In mice brains 12 h postmortem, out of approximately 45,000 strains of mRNA, 6000 strains had expression decreased to less than half, and 250 strains more than doubled. Of the genes that increased, several included transporters such as G protein coupled receptors and oxygen, however of genes that decreased, none of these had a particular role. For the heart, increased gene expression occurred in 6 genes postmortem, and for the liver there was increased postmortem gene expression in 4 genes. Common to the 3 mouse organs of brain, heart and liver, there were 16 genes for which an increase in gene expression occurred.

KEYNOTE LECTURE 12:

THE SCIENCE AND POLITICS IN THE DIAGNOSIS AND IMPACT OF PTSD

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The first half of the Twentieth Century saw two world wars, indiscriminate aerial bombing of civilians, the dropping of the atomic bomb and the holocaust all of which created intense trauma for soldiers and civilians. Yet it was not until the American intervention in a post colonial civil war in Southeast Asia that the psychiatric community in the 1970s formally described what we call today Post Traumatic Stress Disorder (PTSD). In this paper we will review the factors which led to the codification during the American involvement in a civil war in Viet Nam of the symptoms and behaviors which today constitute the disorder which we now call PTSD. We will also examine the factors which delayed the process of identifying this disorder to well after the major global upheavals of the first half of the 20th century. The uniqueness of this disorder creates special issues in determining the responsibility of an individual for destructive behaviors. In individuals who have either been diagnosed with PTSD or claim that they have it may use the diagnosis of PTSD to mitigate their responsibility for their behavior. The implications of these issues will be explored from both legal and medical perspectives.

KEYNOTE LECTURE 13:

HUMAN RIGHTS VIOLATION IN USING X-RAY UNITS AS SECURITY ITEMS?

Hermann Vogel, Institute for Forensic Medicine, University of Hamburg

Background: Explosives kill civilians and troops; they destroy airplanes, and turn vehicles into bombs. The public demands security, politicians act and the industry proposes solutions. These solutions include X-rays. Using them means that privacy becomes open to inspection. This raises the question, whether Human Rights are or could be violated.
Method: The security technologies employing X-rays have been analysed. Their possibilities have been evaluated. Exposure doses have been measured. The arguments concerning security versus privacy has been followed.
Results: X-rays are used to search humans, luggage, shipped goods and vehicles, which means that the search includes the search for men. The main imaging methods are transmission imaging and backscatter imaging, furthermore computed tomography is applied. Furthermore, secret services employ radioactive substances to mark persons, manuscripts, cars and money; killing with radiation is possible. Backscatter imaging show the controlled person practically naked, the quality of the display is near to that of photographs. Mammoplasty and an anus praeter are visible. Furthermore, the individual is exposed to (potentially) dangerous X-rays. Transmission imaging shows metal in the body; examples are hip prostheses or genital piercing. On the other hand, explosives can be hidden in the genital region. Human rights violation is used as argument against employing such units. It is evident that privacy becomes open to inspection. This may be considered a human right violation; however corporal search, which includes to be touched in the genital region, is the alternative. The (calculated) risk of radiation exposure in airport control is minor than the risk of death or disease of traffic accidents during the way to the airport, and minor than the risk of radiation exposure due to cosmic radiation during the flight is more important than that due to the control. After the fall of the Wall in 1989, the use of radioactive substances for pursuit by secret services became known. The killing of Litvinenko with radioactive polonium has occurred.
Conclusion: In singular cases, human rights violation has occurred. New imaging technologies avoid displaying the human body. Unfortunately, explosives hidden in the genital region and or in the body will escape detection. A manual scan seems to be safer. A majority of searched persons prefer being controlled with X-rays instead with manual touch. The X-ray exposure is minor and can be considered negligible. Employing X-rays for pursuing humans fulfils the criteria of bodily harm. Killing with radiation is a crime.

KEYNOTE LECTURE 14:

JUDGES, SCIENTISTS AND LAWYERS AS STORM RIDERS OF EVIDENCE: CAN THERE BE SMOOTH SAILING FOR HAGUE CHILD ABDUCTION CASES WHEN A GLOBAL STORM OF CONTROVERSY EXISTS AS TO WHETHER PARENTAL ALIENATION SYNDROME SHOULD BE ADMITTED AS RELIABLE SCIENTIFIC EVIDENCE IN OUR COURTROOMS?

Serdar Kelahmet, Attorney at Law, MBA, Iskenderun, Turkey
Stephanie Domitrovich, Judge, Ph.D., Erie, USA
Mete Gülmen, Prof. Dr. MD., Ph.D., Adana, Turkey
Gökçe Kelahmet, Attorney at Law, LLM, Istanbul, Turkey

The principal purpose of the Hague Abduction Convention is to cause the prompt return of a child to his or her "habitual residence." The Court normally exercises its discretion and returns the child to his or her "habitual residence." However, in certain exceptional cases under Article 13b, the judge or administrative authority of the requested State is not bound to order the return of a child if a grave risk exists and exposes that child to physical or psychological harm. Many States use Article 13b to request psychological profiles, detailed evaluations of

parental fitness, evidence concerning the nature and quality of lifestyles and relationships. Amongst these issues is a controversial psychiatric diagnoses known as Parental Alienation Syndrome (hereinafter PAS) which is under consideration for inclusion in the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5).

Why is PAS so controversial? PAS, it is argued, lacks an empirical basis as a psychiatric diagnosis. However, Dr. Gardner, the first expert to acknowledge parental alienation as a syndrome in 1985, used the term "empirical" to mean direct patient observation only. Although he used no scientific experimentation, Dr. Gardner claimed he had ample "empirical" evidence to support PAS as a psychiatric syndrome to which he applied a statistical analysis methodology. Other scientists disagree with Dr. Gardner as to whether PAS should be classified as a syndrome and question whether PAS has been subject to peer review; whether PAS is generally acceptability in the field of psychiatry or psychology; and whether PAS has scientific empirical validity as to falsifiability, error rates, etc. Judges across the globe have struggled as gatekeepers of relevant and reliable scientific evidence to admit or exclude PAS evidence in their courtrooms. Attorney Serdar Kelahmet of Turkey and Judge Stephanie Domitrovich of the United States offer diverse and enlightening insights into this controversial issue of the Court's admission or exclusion of PAS evidence and offer recommendations as to how the Courts and lawyers should handle cases involving PAS evidence in light of the numerous children involved at international and local levels in these child custody cases.