

The 11th Indo Pacific Association of Law, Medicine and Science (INPALMS) Congress 2013, was held at the Shangri-La Hotel, Kuala Lumpur on 7-10 October, 2013. The abstracts of papers presented are as follows:

PARALLEL SESSIONS; Day 1: 7 October 2013 (Monday)

TRACK: LAW (CRIMINAL JUSTICE, COURTS SYSTEM & HUMAN RIGHTS)

Oral: 2213. Forensic Medical and Scientific Evidence for the Judiciary

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The Courts are becoming increasingly reliant on the evidence of forensic medical and scientific experts. If the evidence of these experts is unreliable through ignorance, negligence, bias, arrogance or just plain dishonesty; innocent people can be convicted. There is nothing more calculated to reduce confidence in the criminal law, and hence the rule of law, than wrongful convictions. This paper examines examples from the USA, Canada, the United Kingdom and Australia where forensic evidence proved to be a potent recipe for injustice. It argues that the aim of the expert witness should be to discover and reveal the truth of the matter under investigation wherever that truth may lead. Further, Courts must be vigilant to ensure the competence of expert witnesses and that their evidence does not extend beyond their areas of expertise.

Oral: 1773. The influence of psychological traits on choice of weapon among Malaysian male murderers

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Introduction: The horrific nature of murder using different types of weapons has been an important focal point of many violence related studies. Weapons that are used in murders seem to provide important clues in determining the type of murderer. The established factors for choice of weapons include environmental context, demography, and availability. However, there is insufficient research attention on the psychological functioning of the murderers for particular weapon usage. **Objective:** The current study seeks to narrow this gap of information by identifying the influence of psychological traits on weapon usage among Malaysian murderers. **Methods:** The present observational cross-sectional study was conducted among 71 male murderers incarcerated in 11 Malaysian prisons. The selection of the participants was based on predetermined selection criteria using purposive sampling method. A guided self-administered questionnaire containing four validated Malay versions psychometric instruments: Zuckerman-Kuhlman Personality Questionnaire-40-Cross-Culture (ZKPQ-M-40-CC), Self-control Scale (SCS-M), Aggression Questionnaire (AQ-M-12), and How I Think Questionnaire (HIT-M); was used. In addition, information on type of weapons that was used to kill the victim was also obtained from the participants. The descriptive statistics were generated to summarise the information on sociodemography and choice of weapon. Independent sample t-test was performed to establish the mean score difference of psychological traits between the murderers who used single and multiple weapons. Following this, kruskal-wallis tests were carried out to ascertain the differences between the specific types of weapons used among the murderers. **Results:** Specific psychological traits influenced the number and type of weapon used in committing murder. The results of this study add substantial knowledge to the field of criminology. The findings were discussed in relation to the context of murder.

Oral: 1436. Forensic evidence in Malaysia: How the courts determine its reliability?

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The use of forensic science in solving a crime is not a new phenomenon. Forensic science is used to convict the guilty and protect or exonerate the innocent. The evidence derived from the techniques of forensic science is called forensic evidence. This evidence is presented in the courtroom through the testimony of forensic experts. Generally, the forensic experts are giving evidence in the form of opinion. Before a court admits the opinion of forensic experts, it must be proved as relevant to the case. This paper addresses, from the perspective of Malaysia, the primary issue of relevancy of forensic evidence as an expert opinion in the Evidence Act 1950. This paper further emphasizes on the issue of admissibility of such evidence in the courtroom to prove or disprove the fact in issue in the criminal trial. This paper suggests that the Malaysian courts shall have a proper guideline to determine the reliability of forensic evidence proffered by the experts in the criminal cases as their testimony has a great influence in the outcome of a case.

Oral: 1476. An analysis and reporting of custodial related deaths of 13 years in Delhi, India (1999-2011)

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Introduction: Custody related deaths are not uncommon in India. When death occurs in custody of police or jail, there is always a suspicion of ill treatment or torture by the police authorities. It raises interest in the public and the media. In India a custodial death cases are investigated by a magistrate and a copy of the report also goes to the national human rights commission. A meticulous autopsy becomes a necessary part of the investigation. **Objectives:** To study the incidence and demography of custodial related deaths in Delhi, India. **Methods:** The autopsy reports of 13 years (1999-2011) were analysed retrospectively whose autopsies were conducted at AIIMS mortuary, New Delhi. The data were analysed for demography, cause of death, manner of death and place of death. **Observation:** There were total 15 cases of custodial related deaths. All cases were male and majority were in the age group of 25-35 years (8 cases). 9 cases belonged to Hindu and 6 cases belong to muslim. 10 cases died due to natural disease and 3 cases due to unnatural causes. 10 cases died in the hospital and 5 cases in the custody. Among the 3 unnatural deaths: 1 died due to hanging, 1 fall from height and 1 from blunt injuries. In 2 cases no exact cause of death could be determined. **Conclusion:** In India there has been overcrowding of prisoners in the jail. In spite of medical screening of the prisoners the infectious disease like TB is very prevalent in the jails. Unnatural deaths are commonly due to hanging. The national human rights commission is taking up the issues for jail reformation to improve the jail conditions in India.

Oral: 1639. Human Rights and Criminal Justice

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Introduction: The Human Rights have assumed the character of a new benchmark of the present civilization. The aim of this dissertation which is based on a research involving analyzing a range of books, journals, articles, government publications is to critically examine the position of victim in the Criminal Justice System. Criminal Law typically views victims as witnesses to a crime against the State, thus shutting them out of the criminal justice system and only allowing them when they are needed to be testified. This is a major source of dissatisfaction of the victims. In this paper it is mainly, therefore, viewed the victim's rights as human rights. **Objectives:** Victims are also human beings with their respective rights and liabilities. Crime constitutes violation of their rights as well as against society or the state in wider aspect. While Human Rights instrument, the Universal Declaration of Human Rights do not mention victims of crime specifically but a number of rights are identified which can be viewed from the victim's perspective. **Conclusion:** This paper looks at the role of political interest in establishing "victim focused policies" and the direction towards their placement at the heart of the justice system. At all points to the political rhetoric around the centeredness of the victim, the view of traditional justice is accounted for in order to get a grasp of many underlying factors that can be attributed to the so called re-birth and consequent concentration on the victim.

Oral: 1685. No guarantee that judges are better than jurors: experience of the judicial understanding of DNA evidence in Malaysia's trial by judge alone system

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Introduction: In jurisdictions that use the jury trial system, emphasis has been given to enhance juror understanding of DNA evidence, as many studies indicated that jurors have difficulties in understanding and evaluating DNA evidence. However, a judge-alone trial system does not guarantee that similar problems will not occur. The position in Malaysia indicates that judges in judge alone trials are facing similar problems to those experienced by the jurors in other jurisdictions. Further, the lack of understanding amongst judges of DNA evidence also casts doubt on their ability to decide on the admissibility of DNA evidence in trials. **Method:** This research undertakes a comparative analysis of the problems faced by jurors in jury trial system and the approaches taken by the Malaysian courts in several decided cases when dealing with DNA evidence. **Discussion:** Like jurors, judges also have the tendency to be overwhelmed by DNA evidence, particularly on the statistical method used to explain the evidence. Judicial understanding of DNA evidence in Malaysia depends greatly on the expert evidence presented during trial. If expert evidence produced by the prosecution is not substantively challenged, judges tend to accept the evidence in its entirety, even if it is tainted with many fallacies. **Conclusion:** Understanding DNA evidence is the key to ensure the correct application of DNA evidence in the criminal justice system and to avoid miscarriages of justice from its use. In jurisdictions that practice trial by a judge alone, the wrong approach taken by the courts especially those at top high of the hierarchy will establish a poor precedent regarding DNA evidence for the lower courts.

TRACK: FORENSIC PATHOLOGY

Oral: 2212. Updates in Forensic Pathology of neck injuries

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Fatal neck injury is seen commonly by pathologists but it can also be missed or misinterpreted. The aim of this presentation is to give a brief review of the type of neck trauma seen at autopsy and discuss new developments in the investigation of such injuries, particularly taking into account modern methods of imaging to facilitate the detection of such trauma. The possibility of misinterpretation in certain types of cases may occur both from naked eye observation of marks which may have been produced, for example, from medical intervention or by the production of post-mortem artefacts resembling ante-mortem injuries from the employment of inappropriate and clumsy handling and dissection techniques. The speaker will give examples of such misinterpretation and discuss techniques employed to facilitate the correct diagnosis of neck trauma and heighten awareness of the situations where artefactual damage may occur.

Oral: 1984. Teaching ethics in undergraduate medical education in South East Asia

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People expect doctors to be professionally sound with necessary clinical & other competencies. They also expect our doctors ethically practicing their profession while aware of their professional obligations. Doctors are to take health care management decisions not always only on the basis of their clinical knowledge & skill but on occasions on ethical grounds. Hence there is a need that we train our students to recognize the importance of sensitive & ethical issues which they will face in their future practice of medicine & effectively address the ethical problems. We also need to train doctors so that they are quite aware & capable of analyzing ethical issues which they very often encounter in their day to day practice. They should also be able to practice medicine abiding the statutory obligations & codes of conducts. In the presentation the author will speak on importance of medical ethics in teaching undergraduate medical students. The presentation will also cover what should be the core topics as content in ethics curriculum in the context of South East & South Asia perspective. How to organize & manage the training program with right teaching methods & how to assess learning outcomes. Do we need to set clear specific learning objectives & have a guide line with a module for teaching ethics? If so how to have a curriculum guide line developed for our regional institutes.? Once developed what should be the implementation strategy? All these will be shared in this presentation.

Oral: 2215. Diagnosis of Drowning – 2013 Update

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Drowning is one of major causes in unnatural death. However, its definite diagnosis has been very difficult for forensic pathologists. In general, diagnosis of drowning has been established by detection of diatom in the body, especially lungs, liver, kidneys, and so on. For several years, a number of new methods have been reported. Detection of plankton DNA in the lung and other organs was developed from enzymatic detection of diatom. On the other hand, the lungs and pleural effusion/spleen weight ratio may be a useful index to accurately diagnose death by drowning, which is one of a pathological diagnosis. Crystal formation in the pleural cavity could be believed as death of drowning, especially by seawater. Recently, electrolyte concentration in pleural cavity and cardiac blood would be forensically useful for differentiation between fresh water drowning and seawater drowning. We found that brain AQP4 can be a strong tool for diagnosis of fresh water drowning. I focus on update on 2013 for diagnosis of drowning.

Oral: 1981. Role of forensic histopathology in developing countries; a vision towards the 21st centuryP Paraniathan¹, S.R Sanjaya Hulathduwa²¹Dept. of Forensic Medicine, Faculty of Medicine, University of Kelaniya, Sri Lanka; ²Dept. of Forensic Medicine, Faculty of Medicine, University of Sri Jayawardenepura, Nugegoda, Sri Lanka

Introduction: The field of Forensic Medicine is evolving to meet the demands of the 21st century. Yet it is not as expected in comparison to the other branches of medicine. Forensic Medicine has several subspecialties and in most of the developed countries a qualified pathologist by training and certification further delve into the super subspecialty of Forensic Pathology to practice as Forensic Pathologists. However, the pathology training may not fully gear to provide an ideal forensic background as during the pathology training the complex medico-legal cases may not be encountered as a long term training if at all in a short term basis. The scenario is somewhat different in some of the fast developing countries including Sri Lanka where solid histopathology training is not initiated as a prelude before one starts to practice as a Forensic Pathologist. Unlike their colleagues in the developed countries, the forensic practitioners in the fast developing countries may have adequate exposure to complex forensic case work but with less emphasis on forensic histopathology. In both situations there is less importance given to Forensic Histopathology. **Discussion:** The authors would like to propose a system of developing Forensic Histopathology certification as a prerequisite before anyone embarks on subspecialty training in Forensic Pathology or Forensic Medicine leading to a specialist certification. This new thought would give recognition to Forensic Histopathology as a newly identified content area which needs advanced training and exposure of each individual to forensically significant cases at the initial stages of their training. A sound curriculum with expert inputs and study materials including textbooks may be a way forward towards the 21st century for the fast developing countries. The final expected output in future years would be a competent forensic specialist with a sound background in Forensic Histopathology.

Oral: 2209. Faculty Development Training Workshops in Forensic Medicine and Toxicology

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Skill-based forensic training has become necessity of the world to increase evidence based forensic practice. There is an urgent need of this programme in developing and middle-east countries due to increase in crime graphs in every sphere of life. Unfortunately, many criminals are let off due to improper reporting of findings and defective workout of cases at their first contact in the hospitals and autopsy centers. In India, there are about 358 medical colleges and their training standards are different. This has created gap in forensic knowledge and practice due to variety of reasons such as conflicting resource material, teaching methods, faculty resource development training, unplanned training of faculty, arbitrariness in subject coverage, pattern of assessment of PG, working stations and infrastructure available. To combat this deficiency a small step is being taken by us to train forensic professionals. This program has been termed as "Faculty Development Training Workshops on Standard Operative Procedures (SOP) for Medico-Legal Work and Modular Teaching in Forensic Medicine and Toxicology". This will help forensic practitioners in recording objective findings and observations in more transparent and authentic manner. Thus, this practice will indirectly help administrative and judicial outcomes in criminal cases where forensic evidence matters. This is one of the prime responsibilities of training institutions to start such programme so that efficient cadre of forensic service providers is created to help the society and justice system. We started this training in 2012 in phase manner. This training and Forensic faculty development is aimed to add more skills among professionals to meet expectations of society and law. This faculty development programme covers professional, technical, personal and social aspects of faculty growth. Such programs are likely to produce quality forensic services. To meet these challenges team of trained professionals are being created through these training workshops. This will be achieved through multiple training workshops on modular teaching and Standard Operative Procedures with the help of National resource faculty pooled from different medical colleges. We have already conducted two workshops and third one is scheduled in May, 2013. These workshops advocate directed self learning (DSL) on a given course, outlines of course and workouts are given in advance so that candidates are already sensitized on the issues. These workshops have Leading -presentations, key-demonstrations, group discussion, hands-on exercises and sharing of experiences. The programmes are video graphed for review and modification. During training workshops key presentations followed by key demonstration and hands-on experience are conducted in well planned manner. Candidates are given assessment exercises at the beginning and end. This facilitates active adult learning with enthusiastic participation of participants. A total number of 62 modules are identified and these will be developed in multiple phases. In India, Forensic Medicine MD course of three years constitutes of six semesters. In course, candidate is given one research topic for thesis and has to appear in final examination. Final examination has four theory papers and followed by two days practical assessment by external and internal panel of experts. Here, in modular teaching, one semester will have 10 modules which will have internal assessment and rest of the examination system will remain same. This teaching will be student centric and will instil more practical skills among them. There is overall shortage of trained professionals in this region so opportunities to obtain training at low cost in home country are created through training workshops, conferences and sharing experiences. This training will help them to provide quality services and teaching. We intend to make these modules available to different institutions on non-commercial basis.

Oral: 2211. Digital Autopsy Interactive & Integrated Visual Report: A New Dimension in Medico legal Reporting

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The inception of Post Mortem imaging technology into the forensic field has revolutionized the way in which the post mortems are conducted especially in a minimally invasive manner. Modern cross-sectional imaging techniques can complement traditional/classical forensic autopsy. In post mortem imaging, the 3D reconstruction & visual representation of the body is highly recommended in forensic practice to determine the forensically significant external & internal findings such as lacerations; track of the stab wounds/bullet trajectories, identification of the in-situ metal/bullets/splinters; internal hemorrhage volume measurement; fractures & dislocations. These have to be visualized in form of a digital body truly representing the real body of the particular case. Correlation has to be done with the crime scene evidences & external examination of the body to reach medico-legal conclusions about manner, cause of death. Presently there is no such comprehensive/integrated /visual PM report for the practicing pathologist. To solve this problem faced by Pathologists the forensic specific 3D application with Forensic Information System will be a preferable & acceptable solution. The findings of the digital autopsy is provided to the court of law/ coroner/IO in the form of Digital Autopsy Report (DAR) that will have images, analysis & semantically related findings packaged into a final report acceptable & credible. The DAR contains snapshots & videos of all the significant findings in 3D, MPR & 2D with co-related description. The report is available for print in reader friendly format in lines with the standard PM report. The coroner/Medico legal authority will have the authorized access to the reports in a secured manner with audit trail. This eventually will be superior compared to existing print/hand written format of PM report which has only textual information in a subjective manner which is usually disconnected from (minimal) print photographs and (occasional) videos (in external CDs) having the autopsy findings. This paper focuses on the Digital Autopsy

TRACK: FORENSIC MEDICINE

Oral: 1806. A wave of methyl alcohol poisoning in Bihor County, Romania: Forensic study of the phenomenon

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Introduction: Methyl alcohol poisonings are relatively rare in Romania. Victims originate mainly from chronic alcohol consumers. They steal the methyl alcohol, especially from coaches or tanks and consume it without realizing that it is not alcohol. The poisonings are often lethal. **Objective:** To identify what was the alcoholic beverage that contained a high concentration of methyl alcohol, beverage which led to the death of at least 25 people in a short period of time (2 months) and on a limited area. Another objective was to specify with certainty the cause of death of patients who had signs of acute methyl alcohol poisoning but, at the time of their death, the certainty proof was missing, which is the toxicological exam. **Method:** All cases that showed signs of acute poisoning leading to death were autopsied; the study began by analyzing the medical documents highlighting the symptoms. The items checked were: the age, sex, social status, social and medical history, symptoms at onset, patients' condition at admission. In all the cases the toxicological examination result was positive for methyl alcohol. **Results and Discussions:** Starting from some common elements found in all the autopsied cases and foremost from the fact that all the patients were alcohol consumers, some of them homeless persons who drank rubbing alcohol containing just alcohol, we concluded that the victims must have been used another product of external use which, although having the features of rubbing alcohol, it could have contained methyl alcohol. Such, we identified a product called Alcofarm, for external use; in the composition of this product, the manufacturer had fraudulently introduced methyl alcohol. **Conclusions:** some products for external use are consumed by chronic alcoholics and when these products contain methyl alcohol, they may cause chain deaths to an impressively large number of cases.

Oral: 1983. A study on non-fatal injuries conducted at the National Hospital of Sri Lanka

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Introduction: Although injury and violence are being extensively assessed in the developed world, it is still a fairly neglected area in the developing countries like Sri Lanka. The World Health Organization has drawn attention and guidelines on conducting trauma-related research as better understanding on patterns of injury lead to effective preventive strategies. **Objective:** To assess the magnitude of different types of non-fatal injuries among hospitalized patients. **Method:** Cross sectional descriptive study was carried out among 100 patients in the Accident Service Unit of the National Hospital of Sri Lanka using an interviewer-administered questionnaire. **Results:** Among the injured, 64% were males and the majority was in the 20-25yr. age group. Circumstances were accidents in 90%, assaults in 9% and rest were intentional harms. Upper limb injuries (40%) were the commonest followed by lower limb (37%) and head injuries (30%) respectively. 53% of patients

sustained bruises, 32% abrasions and 20% lacerations. Mechanisms were fall in 30%, road traffic accidents in 23% and assaults in 20%. Most of them got mild injuries (59%) while 13% got severe injuries. **Discussion:** Most injuries resulting in hospitalization involve the extremities though the severity is mild in the majority. The young and working population is most frequently affected, representing increased exposure of risks and burden for the country and family. **Conclusions:** Focused attention should be given to identify causation of nonfatal injuries to make further remedies to minimize its occurrence and impact on the individual and the society.

Oral: 2187. Coronary artery calcium scoring on post mortem computed tomography is strongly associated with coronary atherosclerotic plaque stability

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Introduction: Plaque stability is associated with coronary events and is crucial to be determined. Characteristics of unstable plaques include thin fibrous cap, large lipid core and enhanced inflammation. Post Mortem Computed Tomography (PMCT) is a modality used to detect the presence of coronary artery calcification. However, data on the association between PMCT calcium score and histopathological evaluation of coronary artery atherosclerotic plaque stability is scarce. **Objective:** To study the association between PMCT calcium score and coronary artery plaque stability. **Method:** A total of 50 autopsy cases (Age mean±SD years: 36.4±12.4, 14 with Coronary Artery Disease [CAD] and 36 Non-CAD; 47 males and 3 females) were recruited. This was a cross sectional study of P61 autopsy cases with defined inclusion criteria. The left anterior descending, left circumflex and right coronary arteries were sampled at proximal, middle and distal segments for both histology and PMCT calcium scoring. The CT images of the heart were acquired using a multislice CT machine (Toshiba Aquilion 64 TSX-101A, Japan) and the total calcium score (TCS) was measured using the Cardio Scoring software (CSCS -001A-Agatson's, Korea) on the Infinitt Monitor (PACS version 3091, Korea). Plaque stability was determined by calculating the fibrous cap thickness: stable (>65µm) and unstable (<65 µm and/or ruptured plaques (AHA, 1999). **Results:** In total, 405 distinct locations of coronary arteries were sampled. 28.6% (n=116/405) of the coronary arteries showed presence of atherosclerotic plaque and 15.1% (n=61/405) showed calcium deposition. There was higher calcium score for stable (58.6%, 68/116) compared to unstable (41.4%, 48/116) plaques (13.6±19.9 vs 165.7±210.1 respectively, p<0.001). There was an association between types of plaque stability and calcium score (p<0.001). **Conclusion:** PMCT TCS is higher in unstable compared to stable plaques, suggesting its potential use in predicting plaque stability and risk of coronary events.

Oral: 2131. Assessment of ancestral relationships of ethnic groups in Sri Lanka through craniometric data: A preliminary study

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Introduction: Craniometric data has been used widely to predict ancestry of various population groups since the advent of last century. Most of these studies have been carried out by European anthropologists. Sri Lanka is presently recognized as a country of multiple ethnicities and hence becomes an optimal source to assess ancestral roots of various ethnic groups inhabited the country through scientific means such as craniometric analyses in anthropological studies. The craniometric analyses also provide opportunity to establish identification through skeletal data. **Objectives:** To determine ancestral relationship of Sinhalese population by analysing craniometric data through the freeware program CRANID which allows to do a linear discriminant analysis and a nearest neighbour discriminant analysis with 29 measurements on an individual cranium. It assumes that the individual cranium is within the range of variation of modern Homo sapiens. **Materials:** We have examined 114 intact crania of known individuals from coronial autopsy cases referred to the Medico-Legal Unit of Galle Sri Lanka. A wider distribution of population sample is anticipated at the second phase of the study by incorporating crania of known individuals retained by university anatomy departments. Formal ethical clearance for the study was obtained from the Ethics committee of the University of Melbourne. **Method:** Prescribed anthropometric measurements were obtained from provenanced intact crania as initial part of the study by a physical anthropologist and the principal researcher using pre-tested anthropometric equipment. The analysis of data was done in United Kingdom and the University of Melbourne, Australia using the CR5Ind.ZIP programme. **Results and Conclusions:** Provisional craniometric assessment of predominantly Sinhalese skulls for bio-distance has provided data of wider separation from that of Indian skulls studied previously. Modern Sri Lankans may still be identified socially as Sinhalese, but nevertheless have a more recent component of their ancestry that is mixed. **Key words:** craniometry, ancestry, CRANID, anthropology, Sri Lanka

Oral: 1838. Application of PMCT and PMCTA in cases of homicidal stab wounds: Own experiences

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Introduction/ objective: To present the objectified features and visualize injury tracks in homicidal cases referring to stab wounds. Such pieces of evidence are crucial in forensic medical reconstruction of the critical event. **Methods:** Post-mortem computed tomography (PMCT) as routine introduction to conventional forensic autopsy is performed at the Chair and Department of Forensic Medicine of Jagiellonian University Medical College in Krakow: CT acquisition with 16“ layered Siemens Emotion 2012, in all homicidal cases including stabbings“ the multiphase post-mortem CT angiography (PMCTA) was performed as a part of the international scientific project TWGPAM (Technical Working Group Postmortem Angiography Methods). The protocol consists of three phases: 1. arterial, 2. venous and 3. dynamic; with the “native” CT acquisition preceding administration of hydrophobic contrast agent. The PMCTA was applied after external and before internal examination of the conventional CT scanner. Reconstructions with slice thickness 1.5 mm and 0.75 mm. Evaluation of the results was conducted with a computer program OsiriX (Pixmeo). Since the year forensic autopsy in total of 74 different cases, including 27 cases of sharp force injuries. **Results and discussion:** The authors present findings which give important information of a person position during the stab, estimation of parameters of the injury track, some with the weapon of crime left inside the body. Finally, results of PMCT and PMCTA may be important for the ultimate conclusion referring to the question about the most fatal injury as well as to the cause of death which could be impossible to be proven by conventional methods: tension pneumothorax. **Conclusions:** Presented results of PMCT and PMCTA prove that these methods are potentially very important tools in homicidal cases and should be considered as a necessary complementation of standard forensic autopsy.

SCIENCE (DRUGS AND TOXICOLOGY)**Oral: 1693. Estimating the street level relationships of heroin samples using major components and trace elements**

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Chemists may be asked to relate heroin samples seized from two different places in order to establish whether they are from a similar batch at the street level. Such a decision may help the judge in the court of law to associate the criminal who possesses a heroin sample with another heroin sample that is found in the premise where the criminal is present. To estimate the relationships between samples, six major components (caffeine, codeine, morphine, acetylcodeine, monoacetylmorphines and heroin) commonly found in Malaysian heroin were used. A gas chromatographic (GC) method was optimized to determine the % content of the target compounds in 9:1 chloroform: methanol. A total of 36 post cut heroin samples were prepared to optimize a statistical technique (e.g. hierarchical cluster analysis) using the six major components. Subsequently, 15 heroin samples in pink were statistically analyzed with the post cut samples. The resulting dendrogram depicts different zones that help the chemist to define similar and dissimilar samples. The findings drawn from the major components were triangulated with that from 16 trace elements analyzed with inductively coupled plasma-mass spectrometer (ICP-MS). Two sets of chemical data showed highly consistent results for the street level relationships of the 15 heroin case samples. Therefore, the major components and trace elements could be useful in determining the relationships between street heroin samples.

Oral: 1281. Investigation of precursor source, synthetic routes and regiospecificity of methamphetamine samples using isotope ratio mass spectrometry (IRMS) analysis

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Repetitive batches of methylamphetamine were synthesized using the Moscow and Hypophosphorous (Hypo) synthetic routes following clandestine and published literature. The precursor in each case was pseudoephedrine hydrochloride extracted from cold medication sourced from two different regions (United Kingdom and Malaysia) using variety of different solvents. Red phosphorous (Red P) and iodine were extracted from matchboxes and tinctures respectively. The same synthesis was performed respectively using laboratory grade starting compounds as control samples. 24 samples were prepared by each synthetic route, 18 of which were produced by precursor extracted from cold medication purchased from Glasgow, United Kingdom. A further 5 batches of methamphetamine samples were synthesized from pseudoephedrine hydrochloride from cold medication sourced from Kuala Lumpur, Malaysia. The resultant IRMS data from all 53 prepared samples suggests some underlying trends in the identification of the synthetic route which may aid in the interpretation of IRMS data derived from clandestine samples

Oral: 1729. The Determination of Metachlorophenylpiperazine (mCPP) and Parachlorophenylpiperazine (pCPP) by GC/MS and HPLCOmer Akyol¹, Dilbahar Akcal², Mustafa Dalgic³, Sumeyya Akyol⁴, Fatma Ucar⁵, Mustafa Karapirli²

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Introduction: Meta chlorophenylpiperazine (MCP) and para chlorophenyl piperazine (PCPP) are psychoactive drugs accepted as members of phenylpiperazine class. MCP is banned in Turkey and most of the European countries because of its depressive and anxiogenic effects, so, it is illegal in these countries. However it has been known that it is legal in United States of America. Even though PCPP resembles to MCP structurally, it is legal because of the effects on human being unlike MCP. It is very important to differ these two very similar molecule upon the application of prosecutors, police departments and courts to the forensic medicine laboratories for testing the biological or regular specimens because of the above mentioned subjects. Because of the same molecular weight and the same daughter ions, GC/MS and LC/MS/MS instruments can not differ MCP and PCPP easily. According to our preliminary studies, we confirmed that HPLC can easily detect the molecules and differs each other easily and absolutely. **Objectives:** In this study, we aimed to share our preliminary results with others that HPLC is superior to GC/MS in case of the differ MCP and PCPP. **Methods:** The conditions and the test results of GC/MS was as follows. Instrument: Agilent 7890A GC System/5975C VL MSD with Trip-Axis Detector. Column: Agilent J&W GC columns; Catalog:19091S-43M3 (30m* 0,250mm* 0,25um). Oven: 50C, 1 min, Rate 15C/dk to 290C hold 7 min. The conditions and the test results of HPLC were as follows. Instrument: Agilent 1200 series. Column: Chrom system column no: 49100. Liquit phase: Chrome system mobil phase no: 49001. Method: Isochromatic \hat{A} flow \hat{A} 0.3 ml/min. **Results and Discussion:** For GC/MS instrument, the retention times and ions were as follows. MCP: RT 11.172. Ions: 154, 196, 138, 111, 75, 56. PCPP: RT 11.215. Ions: 154, 196, 138, 111, 75, 56. For HPLC instrument, the retention times were as follows. MCP: RT 6.026. PCPP: RT 6.098 **Conclusion:** Confirmation of the results by different separation methods, especially for MCP and PCPP, may minimize the risk of erroneous results.

Oral: 1860. Simultaneous determination of tryptamine analogues in designer drugs using gas chromatography-mass spectrometry and liquid chromatography-mass spectrometry

Hiroyuki Inoue

National Research Institute of Police Science, Japan

Objective: In recent years, many psychotropic substances, so-called “designer drugs”, have been sold widely as “research chemicals” or “bath salts” on the street and/or via the internet. In the present study, we report simple and specific methods for the simultaneous analysis of tryptamine analogues using gas chromatography-mass spectrometry (GC-MS) and liquid chromatography-mass spectrometry (LC-MS). **Methods:** Fourteen tryptamine analogues, A-methyltryptamine (AMT), N-methyl-N-isopropyltryptamine (MIPT), N-ethyl-N-isopropyltryptamine (EIPT), N,N-dipropyltryptamine (DPT), N,N-diisopropyltryptamine (DIPT), 4-hydroxy-DIPT (4-OH-DIPT), 5-methoxy-AMT (5-MeO-AMT), 5-MeO-N,N-dimethyltryptamine (5-MeO-DMT), 5-MeO-N,N-diethyltryptamine (5-MeO-DET), 5-MeO-MIPT, 5-MeO-EIPT 5-MeO-N,N-diallyltryptamine (5-MeO-DALT), 5-MeO-DPT and 5-MeO-DIPT were used for this study. GC-MS analysis was performed with a DB-1ms, DB-5ms or DB-17ms capillary column (30 m— 0.25 mm I.D., 0.25 μ m). The oven temperature was held at 80°C for 1 min following injection and increased to 320°C at a rate of 15°C/min. The flow rate of the carrier gas (helium) was set at 1.0 mL/min. LC-MS analysis was performed using a Hypersil GOLD C18 column (150— 2.1 mm, 3 μ m). The mobile phase was 10 mM ammonium formate (pH 3.5) and acetonitrile (80:20), and the flow rate was 0.2 mL/min. **Results and Discussion:** Trimethylsilyl (TMS) derivatives of the analytes were separated on the DB-1ms column by GC-MS within 15 min. The structural isomers could be differentiated by their electron ionization mass spectra. LC-MS could separate structural isomers of tryptamines except for a combination of 5-MeO-DET and 5-MeO-MIPT. Higher collision energy gave different product ion spectra between the structural isomers. **Conclusions:** The results indicate that GC-MS is the first choice for identification of tryptamines, preferably after TMS derivatization, and LC-MS can be used as a complementary approach for the unequivocal differentiation of tryptamine isomers.

Oral: 2090. Facilitating testing of amphetamines and opiates through the use of immunoassay kits with broad specificity profile incorporating liquid assay components applicable to a variety of automated systems

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Introduction: Laboratory automation facilitates the efficiency, productivity and result quality of testing laboratories when managed by qualified laboratory professionals. The screening of drugs of abuse by using tests incorporating reagents applicable to a variety of automated analysers increases the screening capacity of the automated system. This study reports the analytical performance of immunoassays with broad specificity profile for the detection of amphetamines and opiates in urine using liquid ready to use reagents applicable to a variety of automated systems. This facilitates the testing process as only positive results require confirmation with confirmatory methods such as gas chromatography/mass spectrometry (GC/MS). **Methods:** Two immunoassay kits containing liquid assay components were used. The assays are based on competition between drug-labelled with the enzyme glucose-6-phosphate dehydrogenase (G6PDH) for a fixed amount of antibody on the reagent. The antibody would bind to free drug if present in the sample, the unbound drug-labelled G6PDH then exhibits its maximal enzyme activity. Conversion of NAD to NADH is measured at 340nm. The absorbance is directly proportional to the amount of drug in the sample. The assays were applied to the automated analyser RX imola but are also applicable to other automated systems. **Results:** The amphetamines assay was standardised to d-methamphetamine and also detected d-amphetamine, (+/-)amphetamine, MDA, d,l methamphetamine, MDMA, MBDB (%cross-reactivity range: >110% - >27%). The opiates assay was standardised to morphine and also detected 6-acetylmorphine, codeine, ethylmorphine, dihydrocodone, heroin and hydrocodone (%cross-reactivity range:>100% - >21%). The assays comparison versus GC/MS for more than 90 urine samples showed >85% agreement. **Conclusions:** Data shows broad specificity profile of the two assay kits for the detection of amphetamines and opiates with favourably agreement with GC/MS. The combination of automation and the use of liquid reagents applicable to a wide range of analysers facilitates the screening of these drugs in testing settings.

CRIMINALISTIC**Oral: 1710. Proposal for teleforensic investigations based on a look back to a project with Polis Diraja Malaysia (PDRM) in forensic 3D-laserscanning**Georg Sasse¹, Benno Sauter²¹Kantonsspital Aarau, Switzerland; ²Institute of Digital Crime Scene Reconstruction, DCSR(M) Malaysia

When Digital Crime Scene Reconstruction (DCSR) started its activities in Malaysia in 2006, 3D-laserscanning was new to the forensic world. In a real high profile case DCSR could show the advantages of this technology. Within a project to implement 3D-laserscanning into PDRM started three years ago, DCSR could bring PDRM to the knowledge and benefit of this technology by providing an integrated 3D-laserscanning system and teaching. However, it is a way to go to a sustained benefit from new technologies. There must be a possibility to stay in touch with the international 3D-laserscanning community and specialists via teleforensic network. Within this network, teleforensic investigation becomes reality. When based on realistic 3D-models made by 3D-laserscanning technology, all the necessary ingredients are available to work on cases across borders and institutions. Based on these findings, experiences and conclusions, we propose a concept for this teleforensic investigation network - nationally, internationally and globally.

Oral: 2116. Single particle of smokeless powder analysis by solid phase microextraction-gas chromatographic technique

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Smokeless powders are low explosives, which vary in compositions depending on the intended use of the powders. They were being reported as potential ingredients for improvised explosive devices, and those powders from a fresh cartridge or remained unburned provide useful information for forensic investigation. This work describes a solid phase microextraction technique using a 85 µm polyacrylate fibre. The extraction procedure was carried out on single particle as well as 10 mg of smokeless powders with 2 min incubation time and 21 min extraction time at 66 °C, followed by gas chromatography-flame ionisation detection. Upon analysis, single particle of powder samples gave similar chromatographic profiles as compared to the extraction of 10 mg of smokeless powders despite the relative lower abundance of volatile compounds in the headspace. This technique has successfully detected the headspace compounds of single particle of smokeless powders from different ammunition types of 9 mm caliber and allowed for their differentiation, and is therefore applicable for the detection of smokeless powders found in cartridges and/or improvised explosive devices especially during pre-blast investigation or illegal ammunition manufacturing.

Oral: 1701. An assessment of gunpowder from different types of 9MM ammunitions

Saiful Fazamil Mohd Ali

Member of Forensic Science Society Malaysia (FSSM)

Introduction: Gunshot residue (GSR) found on a victim's clothing in a shooting case usually contains unburnt or partially burnt particles because not all powder grains will be completely consumed when a cartridge is fired. Examination of morphological characteristics (shape, colour and size) of the propellant grains before and after a shot may make it possible to determine the type of ammunition used. In this study, optical examination will be utilised to investigate the potential of identifying, or narrowing down the list of 9 mm ammunition types by studying the unburnt and partially burnt propellant particles. However, factors such as weapon type, nature of target, distance and contamination from previously discharged cartridge can limit the optical examination findings. **Objective:** The purpose of this study is to see how worthy this technique is by assessing how much the powder grains are affected when fired by firearms with different barrel lengths, nature of target (cotton cloth), distances and contamination from previously discharged ammunition. GSR patterns of shots fired from different barrel length and different type of ammunition were also examined. **Results:** This study has shown that unburnt and partially burnt gunpowder are always present when a firearm is discharged, which allows the observation of the 9 mm ammunition gunpowder's morphological characteristics.

Oral: 1782. Analysis of paint fragments from tools used in simulated house break-inUmi Kalthom Ahmad¹, Muniyeki George Gitonga¹, Selven A/L Tharmalingam²

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Introduction: Paint is one of the most common items of evidence brought into the crime laboratory for forensic analysis. Paint evidence is prevalent in hit and run cases and also house break-in cases. In such cases, paint transfer is experienced where paint is transferred from one surface onto another. It is imperative that forensic scientist compares two or more paints to deduce their origins. Such a comparison may link an individual or weapon to a common origin. **Objective:** This study was therefore undertaken to compare paint fragments found on various tools used for house break-ins with the original painted surfaces. **Methods:** The paint transfer was affected via a simulation of a house break-in using tools that included hammer, crowbar, spanner and chisel. Twenty water-based paints were used for the simulation. A 16 x 16 cm piece of plywood was placed vertically and painted with three layers of paint. After the paint had sufficiently dried, the wooden surface was hit with each tool in order to simulate a break-in. **Results:** The amount of paint transferred to the tools were found to be in the milligram scale hence the only analyses that could be done were microscopic analysis and Fourier transformed infrared (FTIR) analysis. Microscopic analysis was done to examine the paint layer structure. The paint transferred was then analysed using FTIR to compare with the paint from the original cans. The force applied by the weapons was found to correlate well with the amount of paint transferred. In most cases, the crowbar had the largest amount of paint transferred while the spanner had the least amount. For further confirmation, the tool marks on the wooden surface gave a good match with the tools that made the mark. Hence, analysis of the paint fragments combined with the tool marks provided a good link between the tool and the paint fragments transferred.

Oral: 2026. Ion chromatography for the chemical composition profile of improvised explosives

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Homemade explosive devices or improvised explosive devices are frequently used in terrorist attacks. These types of explosive devices are fabricated in an improvised manner incorporating military or commercial as well as homemade explosives. Homemade explosive devices used by terrorists are usually based on inorganic salts or peroxides since these materials are readily available in low cost. This study was therefore undertaken to obtain chemical profiles of pyrotechnics used as improvised explosives. Pipe bombs made up from four different types of low-explosive pyrotechnic materials were exploded during a sampling exercise performed in collaboration with Royal Malaysia Police. Cotton swabbing applied as a sample preparation technique was found to be fast and reliable. Ion chromatography was used to separate inorganic anions and cations found in the post-blast residues. The ionic analytes used for identification of explosives in this study comprised of selected anions (F⁻, Cl⁻, NO₂⁻, ClO₃⁻, SO₄²⁻, PO₄³⁻, ClO₄⁻) and cations (Li⁺, Na⁺, NH₄⁺, K⁺, Ca²⁺, Mg²⁺). Composition profiles of low explosive compounds have been successfully determined by using ion chromatography. All target anions were successfully separated within 60 minutes using Metrosep A Supp 5 column with of 1.0 mmol/L of NaHCO₃ and 3.2 mmol/L of Na₂CO₃ as the eluent. Linear calibration graphs were obtained with good correlation coefficients (0.985-0.999) and low limit of detection (0.1-0.9 mg/L). For cation analysis, all cations were successfully separated within 20 minutes by using Metrosep C4 as column and mixtures of 1.7 mmol/L nitric acid and 0.7 mmol/L dipicolinic acid as eluent. Good correlation coefficients (0.997-0.999) and low limit of detection (0.1-0.2 mg/L) were also obtained. Results of the study revealed that each type of pipe bomb showed different composition profile of ionic analytes.

PARALLEL SESSIONS; Day 2: 8 October 2013 (Tuesday)

TRACK 1: LAW (MEDICO & SOCIO LEGAL, PUBLIC HEALTH LAW)

Oral: 2180. How to manage forensic autopsy in the majority Islamic community: Indonesian experience

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In Islamic religion, death person should be buried by the family or relatives within 24 hours. In case of the death is due to unnatural causes, in order to find the cause and mechanisms of death forensic autopsy should be performed. In the reality, in the Islamic community the tendency of family refusal on autopsy is high due to the reason of Islamic burial. Indonesia is the biggest percentage Muslim country in the world, in which 85 % of its population is Muslim. Since the Al Qurâ'an and Sunnah have no regulation on this matter, in 1955 Indonesian experts of Islamic Law (Ulamma) from Ministry of Health had already analyzed whether autopsy is allowed or not according to Islamic law, and they decided to release approval (Fatwa), saying according to Islamic Law, forensic autopsy is allowed (mubah). This statement was strengthened by Indonesian Council of Ulamma (MUI), who approved Fatwa No. 6/2009 on Autopsy. This Fatwa said that forensic autopsy and clinical autopsy for investigation, research and education are allowed according to Islamic law, as far as it is performed based on the order of the authority. By this 2 Fatwa, In Indonesia there is no reason for the family or relatives to refuse forensic autopsy.

Oral: 2186. Approach to setting minimum standards for Forensic Medicine practice in Africa by the African Society of Forensic Medicine (ASFM)

Uwom Eze¹, Panzira-Mabaka K²

²*Consultant Forensic Pathologist, Botswana Police and Vice Chairperson of the ASFM;* ²*Consultant Forensic Pathologist, University College Hospital, Ibadan, Nigeria & Head of Secretariat of the ASFM*

Objective: To illustrate the evolution of the African Society of Forensic Medicine as a pan-African network of forensic medicine practitioners, and to enumerate the approach by the Society in setting minimum standards for forensic medicine practice in Africa. **Methods:** Four minimum standards committees were formed and headed by appointed Team Leaders who coordinated activities in of the respective committees. Four areas were in focus: 1. Autopsy Practice, 2. Mortuary Management, 3. Disaster Victim Identification (DVI) and 4. Management of Sexual Violence. Members contributed by making online submissions to each of the committees for a period of over 6 months leading up to a three day conference where an intensive deliberation and harmonization of the various inputs were made under the guidance of Team Mentors who were renowned international forensic medicine practitioners. **Results:** Four draft documents on Autopsy Practice, Mortuary Management, Disaster victim Identification (DVI) and Management of Sexual Violence were presented by the respective minimum standards committees at plenary on the last day of conference deliberation. Additional inputs on each item under consideration in the minimum standards documents were received from members. **Conclusion:** The challenges of forensic medicine practice in Africa are peculiar and it is imperative for practitioners to articulate minimum standards that will take cognizance of the prevailing situation. The achievements and future aspirations of the ASFM are highlighted with a call for collaboration with similar regional or international bodies on improving and sustaining forensic medicine practice in Africa. Key words: Africa, Forensic Medicine Practice, Minimum Standards.

Oral: 1680. Autopsy: Legal and cultural issues (the conflict of law and religion)

Avantika Sarkar

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Introduction: Pathologists involved in the performance of autopsies must have thorough knowledge and acute faculty of observation of the different legal, cultural and religious beliefs likely to be encountered surrounding death and how those views influence decisions about autopsy. **Objective:** The aim of the paper is to highlight that Cultural values are intimately related to our sense of identity. Challenges to our culture thus become challenges to the integrity of each of us as a person and to the values that are closest to our hearts. They threaten our understanding of ourselves and of our world. Religious objections to autopsy pose a particular dilemma for medical examiners or coroners and such objections can be in conflict with laws to investigate circumstances for certain classes of deaths. As a result of such conflict, some states have enacted legislation that restricts the power of the state to demand an autopsy, often requiring the courts to intervene in the decision to proceed. Traditional anthropology conditions the relationship to death. However, no main religion practiced in the regions where autopsies are performed, forbids it definitely. Judaism and Islam accept it as far as its usefulness is demonstrated. Christianity encourages the generosity of organ donation, Hinduism accepts it completely and Buddhism, which developed a denial of appearances, is finding ways to dialogue with the need of medical practices in the western world. **Conclusion:** The repulsion induced by the exploration of a corpse takes origin far above dogma and belief, which formulate acceptable limits within a given culture. Because autopsy remains useful, laic or secular society must take into account not only the beliefs of humans, but also their fundamental need of sublimation in front of death.

FORENSIC PATHOLOGY

Oral: 1784. Objecting to autopsies: Experience from a hospital in Hong Kong

Philip Beh

Department of Pathology, University of Hong Kong

The autopsy rate in Hong Kong has gradually declined to around 40% of all reportable deaths. The legislation in Hong Kong mandates reporting deaths under twenty circumstances of death; yet despite reportable deaths accounting for almost 24% of all deaths in Hong Kong, the autopsy rates have shown a steady decline. This paper will present the reasons recorded in applications made by family members to the Coroner in raising their objection to an autopsy of a reportable death case. It will also look at the clinical information available and explore the need for a change in reporting practices.

Oral: 1973. A descriptive study on homicides in Galle, Sri LankaPradeep Rohan Ruwanpura¹, Ajith Rathnaweera², Janaki Warusahennadi³*¹Teaching Hospital, Karapitiya, Galle, Sri Lanka; ²Faculty of Medicine, University of Ruhuna*

Introduction: The intentional killing of a human being by another is the ultimate crime. Its indisputable physical consequences manifested in the form of a dead body also make it the most categorical and calculable. **Objective:** To find out epidemiological, socio-economic and postmortem data on homicides and compare them with the findings of previous studies. **Methods:** A retrospective study was carried out at the Teaching hospital, Karapitiya during the year 2011. All the potential homicide cases referred during the study period were analyzed. **Results:** Forty (34 males) homicides were studied. The majority (62.5%) was in the 21-40 age group and 85% of them were married. Most of the homicides were reported from the Meetiyyagoda (20%), Elpitiya(15%) and Karandeniya(15%). A sharp force was the commonest method (n = 18; 45%). The number of homicides by fire arm and blunt force were 13 (30%) and 9 (25%) respectively. In studies done in the year 2006 and 2008, firearm was the commonest method used. All assailant unknown (20%) cases were firearm deaths. Knife was the commonest weapon used (50%) in sharp force trauma followed by swords (44%). Chest remains the commonest site of injury in both sharp force (16) and firearm (entry wound 14, exit wound 09) deaths. In blunt force trauma, head and face remains the targeted sites (100%). **Conclusions:** Majority were young married males. Sharp cutting weapons have become more popular. Swords are being used as often as the knives. There is a definite change in the method used for homicides in the war era and post-war era. Firearms are being used in cases where the assailant is unidentified.

Oral: 2208. Importance of scene investigation for death in custody: Penang Experience

Bhupinder Singh

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Crime scene investigation is an integral part of any criminal or medico legal investigation. Incidents involving custodial suicides, homicides, accidents, fatal pursuits, or police shootings are what we hear and see these days'. The deaths occurring maybe sudden within minutes or after hours of contact. The death of an individual at the time of arrest or in police custody has the potential for generation of civil litigation, criminal charges against law enforcement personnel, and, on occasion, riots. If an investigation into the death does not satisfy their initial assumptions, they often claim conspiracy or "cover-up." And this has become a norm these days as some segments of our society are distrustful of the police. On occasion, this distrust is justified. The situation is often aggravated by the news media, which seems to be sensation-driven. The manner of death is an opinion based on the known facts concerning the circumstances leading up to and surrounding the death in conjunction with the findings at autopsy and the laboratory tests. I present to you such a case of death in custody where scene investigation was vital in coming to a conclusion as to the manner of death.

Oral: 1774. An alarm of how important autopsy is (an exhumation case)

Nola Gunawan

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Autopsy, without any doubt, at the moment is still considered to be the most reliable tool to determine cause of death and mechanism of death. Its role in investigation process is also undeniable. However, in many countries especially in Asia and Africa (also in Indonesia), autopsy is still a taboo for many cultures. Last year, we received a corpse of nineteen years old female with imprint abrasion in form of single line on her neck. No other violence sign was found. We suggested performing an autopsy but her family refused. Police investigators, as the decision maker whether or not autopsy to be performed, did not counter her family wish as no violence sign found and the crime scene did not show any damage or sign of defense. Three months after her burial, her father came to the investigators with belief that her daughter was murdered. Thus, he

withdrew his autopsy refusal and requested for an exhumation. Exhumation is performed ten months after the burial. The autopsy shows a linear bruise on her neck skin and blood seepage on neck muscle and thyroid cartilage. Hyoid cartilage is intact. Toxicological qualitative examination shows cyanide poison on her stomach. The autopsy and toxicological finding triggered a debate between the forensic laboratory and us. This case catches public attention since her father talking to the media about her death and his effort to seek justice. This conflict is avoidable if only autopsy was performed.

FORENSIC MEDICINE

Oral: 2200. The importance of making objective diagnoses in forensic medicine – A search for a new approach

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In order to promote social justice, forensic pathologists should make every effort to collect reliable evidence derived from “scientifically accurate analysis,” based on “sufficient observation.” A diagnosis supported only by the “abundant” experience of a God-like pathologist is not scientific enough to exclude a risk of falling into misdiagnosis, or into intentionally partial or even emotional diagnosis. In this lecture, I would like to introduce some of our research conducted in search of a new approach to objective forensic diagnosis:

Postmortem biochemistry of C-reactive protein (CRP). Our research has revealed that CRP is slightly elevated even in some cases of acute death caused by very severe injury. However, CRP is almost normal when the death is instantaneous unless there is an underlying disease or antecedent injury before the fatal impact. This method can be applied to the double collision accidents.

Biophysical analysis of fall victims. This contributes to the verification of consistency between the severity of injury and the possible height of fall. I have developed an index, which I term the Fall Injury Severity Score (F-ISS); it is the sum of AIS2 (head/face), AIS2 (thorax), AIS2 (abdomen) and AIS2 (extremities), and it is highly correlated with the height of fall. (AIS: Abbreviated Injury Scale.) Modified from well-known “clinical severity” index, ISS (Injury Severity Score), the F-ISS, on the other hand, describes the “severity of destruction” of the body.

Molecular biological determination of gastric content. We have reported a forensic application of plant molecular biology to determine the species of digested vegetables, by using the primers of chloroplast DNA described by Taberlet et al. (1991). Although some intricacies of this method need to be improved, this method enables discrimination of digested vegetables of similar appearance, such as lettuce and cabbage. Finally, I also would like to emphasize the importance of objective presentation of evidence, which is as important as well as obtaining objective evidence.

Oral: 2210. A review on medical aspect of maid abuse

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Maid Abuse is an important global issue of concern. Domestic maid violence is an assault and coercive behaviour, which mainly includes physical, psychological and at times sexual too, by employer or household members of employer against a person hired as a domestic help. The maid servants are mainly derived either within the country from rural and slum suburban areas of city; or from one country to another. In cities, if they are coming from suburban areas then most of them are part-time workers hired for cleaning house, dusting furniture, cooking, rearing child, and washing utensils. These are contractual works assigned on monthly basis and are paid in cash. Another form is contractual domestic workers, employed on full time basis and resides with the family. Hostility arises when; there are is mistrust and abuse in the process either by employer or by worker. Some of the problems identified with both group are as: **Problems of maids**: 1. Employment, 2. Demand of excess money/ black mailing, 3. Family circumstances, 4. Family pressure, 5. Social Exploitation, 6. No money but pleasure, 7. False promises of more money and facilitates, 8. Immature, 9. Hiring agency problems, 10. Indebtness of family, 11. Bondage worker culture, 12. Casual attitude of worker. **Problems of employer**: 1. Time constraints of couples, 2. Pressure of child rearing, 3. Large family, and heavy domestic work, 4. House hold working and sharing, 5. Working Family, 6. Low income group, 7. Variable and unstable income, 8. Dependent parents, 9. Disabled member, 10. Over expectation on both sides, 11. Tragedy in family, 12. Employment tragedy. The role of doctors, social workers, government is important and sensitization of all concerned has to be carried out in a systematic manner. Medical examination should be carried in detail after full written consent. It should include full description of injuries with their length, breadth, depth and location. It is essential to take photographs of injuries and major findings of abuse and neglect. Specific injuries of repeated physical abuse should be recorded in detail. X-ray should be taken to document fractures. Over activities and exaggeration of minor issues will widen gap and enhance hostility. Both parties have to co-exist and more so demand is increasing with time on both sides. We have to look the reasonable and workable modalities solutions as how to make it a happy partnership. All issues of maid abuse in social, medical, governmental perspective will be covered in this panel discussion. Key words: Maid Abuse; domestic worker violence; female violence.

Oral: 2216. Sudden Adult Death Syndrome (SADS) Due To Brugada Syndrome: A Case Report Demonstrating The Need For Greater Awareness When A Structurally Normal Heart Is Observed At AutopsyM. Narayanasamy¹, P. Vanezis¹, M N Sheppard²

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Sudden adult death syndrome (SADS) is sudden cardiac death with a morphologically normal heart and negative toxicology results. SADS is predominant in young males. In the United Kingdom, SADS is estimated to inflict 11 per 100,000 per year in healthy people between the ages of 16 to 64. SADS families carry genetic cardiac disease which places them at risk of further sudden deaths. Inherited ion channel diseases are often implicated as the cause of SADS, which include long and short QT syndromes, Brugada syndrome, Lev-Lenegre disease and catecholaminergic polymorphic ventricular tachycardia. We describe a case of a previously well 53-year old Caucasian male with multiple unremarkable past investigations into coronary artery disease including two negative angiograms. He had collapsed shortly after experiencing severe chest pains at home and survived for a further 7 days before expiring. At autopsy, the only gross pathological findings were that of moderate atheroma of the right coronary and left anterior descending coronary arteries. Microscopic examination of the heart shows widespread infarction mainly in the subendocardium of the interventricular septum and anterior left ventricle in keeping with survival following cardiac arrest. These findings prompted specialised cardiological screening of the decedents' family, which uncovered Brugada syndrome in his son. This case serves to highlight the importance of histological examination of macroscopically normal hearts at autopsy and the pivotal role of screening of families of people who die of SADS.

Oral: 2214. Pharmacokinetics of alcohol - our extrapolation of drinking from post-mortem levels

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Alcohol consumption causes many organ damages such as alcoholic liver disease and alcoholism. Alcohol-related death was estimated to be 3.5% of all the death in U.S.A. Therefore, forensic pathologists need to evaluate effect of postmortem blood ethanol on the cause of death, and especially to estimate alcohol consumption volume by the postmortem level. However, it has been established any method of extrapolation of drinking from postmortem ethanol levels. Widmark's formula, which has been used in forensic medicine, is single-order to cause over- or underestimation of alcohol consumption. In 1999, Matsumoto et al. reported the 2CAM equation on Biochem Pharmacol. The good fit of 2CAM-simulated curves to the published blood data sets proves that EtOH elimination in various species can be predicted quantitatively. 2CAM equations are functions of body weight and dosage. Therefore, if body weight and intravenous dosage in a species are known, we can predict the EtOH elimination time course of the animal by 2CAM.

Oral: 1920. Preliminary findings on inherited metabolic disease in children with sudden deathAnasufiza Habib¹, Sheue Feng Siew², Nor Azimah Azize³, Zabedah Md Yunus¹

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Introduction: Inherited metabolic disorders account for a small but significant number of sudden unexplained death in children. It has been proven that certain metabolic disorders especially fatty acid oxidation disorders and organic acidemias contribute to unexpected early childhood deaths. Diagnosis of fatty acid oxidation disorder most of the time were retrospective by studying the fatty acid oxidation by skin fibroblasts. The application of electrospray ionization tandem mass spectrometry offers the biochemical analysis in low volume sample of blood. Although most studies showed a small incidence rate, the detection of inherited metabolic disease is important in the medicolegal aspect as well as in the screening and prevention of morbidity and mortality which has an impact on the socioeconomic burden for the country. Accuracy in diagnosis of children with sudden death have a significant public health and medicolegal consequences. **Objective:** To exclude inherited metabolic disease as a cause of sudden death among children less than 5 years. **Methods:** Cross sectional study conducted at Institute for Medical Research, Kuala Lumpur and National Institute of Forensic Medicine, Kuala Lumpur with Forensic Department in five major regions in Malaysia for a two year period from December 2012. Dried post-mortem blood on filter paper and other relevant pathological specimens were sent to Biochemistry Unit at Institute for Medical Research for metabolic screening following an autopsy. **Results and Discussion:** We have received 62 samples and 14 samples were found to have exceeded the laboratory cut-off. The presumptive positive cases are currently awaiting molecular confirmation. Based on the developed cut-off; nine cases were classified under fatty acid oxidation disorder whereas five cases were classified under amino acid disorder. We found a significant correlation between the sampling interval and concentration in only few analytes; C4, C4OH, C5OH, C18. However there were no significant correlation of age and the concentration of analytes. We did not find a significant difference between gender for all analytes. The median age for all samples were 2 months old.

Conclusion: Tandem mass spectrometry provide a good screening platform for the detection of inherited metabolic disease in cases of sudden unexplained death in children. In combination with molecular genetics, accurate post-mortem diagnosis for inherited metabolic disease in particular for the amino acid and fatty acid oxidation disorder can be made.

Oral: 1787. A study into pedestrian fatalities presented to a tertiary care hospital in Sri Lanka

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Introduction/objectives: Road traffic fatalities have been increasing all over the world and it is expected to be in vulnerable road users (VRU) of low income countries. Sri Lanka recorded 2721 deaths in 2011 and pedestrians accounted for one third of fatalities. Road traffic fatalities are preventable. Therefore, identifying common trends in pedestrian fatalities will help to suggest preventing strategies for the future. **Methods:** A retrospective descriptive study based on case records of VRU fatalities from 2005-2012 referred for a tertiary care unit for post-mortem examination was conducted. A pro-forma was developed to extract data from the post-mortem reports and toxicology reports. Data was analysed using SPSS version 16. **Results:** Out 157 pedestrians studied two third were above 40 years while 43% were above 60. Male to female ratio was 4:1. 52% of accidents occurred during traffic hours. The offending vehicle was a light-vehicle (car/van) in 36% of cases while in 34% and 17% it was a heavy vehicle and a motorcycle. 61% of pedestrians were crossing but few were using the pedestrian crossing. Although 70% of pedestrians reached hospital within half an hour, more than half were dead while 10% died after receiving surgical intervention. 19 (12%) cases had issues of identification. Head injuries accounted for 51% of deaths while multiple injuries caused death in 36%. 33% had run-over injuries. Out of 39 pedestrians underwent blood alcohol analysis, 25 reported above 80mg/dl while 8 recorded zero alcohol level. **Conclusions and recommendation:** Elderly male pedestrian while crossing the road subjected to head or multiple injuries was the commonest presentation. Alcohol intoxication was a significant problem in pedestrians. Toxicological screening of all road traffic deaths is important. Stricter policing during all hours is needed if we are to prevent pedestrian deaths.

FORENSIC SCIENCE (DRUGS AND TOXICOLOGY)

Oral: 1662. Discrimination batches of methylamphetamine synthesise via non-metal reductions method: The most common method used in clandestine drugs laboratory in Malaysia

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The clandestine manufacture of methylamphetamine has recently expanded around the world, particularly in East and Southeast Asia. Compared to such plant-based drugs as heroin, cocaine and cannabis, methylamphetamine is relatively easy to manufacture in clandestine laboratories from commonly available chemicals. Synthesis methods for methylamphetamine can be categorized according to the starting material used. Two major synthetic groups can be distinguished: (a) synthesis starting from 1-phenyl-2-propanone (P2P), which yields racemic methylamphetamine and (b) synthesis using 1-ephedrine or d-pseudoephedrine as starting materials, which yields d-methylamphetamine that is more potent for the central nervous system than the racemic form. Routes most commonly used in Malaysia is a non-metal reductions method such as the Nagai, Moscow and Hypo and all the three routes require ephedrine or pseudoephedrine as starting material. Each route results in an organic impurity profile that is influenced by the precursors, reagents, and synthetic method used for production. An important goal of this research is the identification of route specific impurities for each of the common methods, in this case, of methylamphetamine manufacture. Route specific impurities are those which, when present in an illicit substance, indicate the use of a particular synthetic pathway. Therefore the impurity profile technique has the potential to be a useful tool for law enforcement authorities for both evidential and intelligence purposes. This research involves repetitive synthesis of methylamphetamine using the three methods most accessible to clandestine chemists in Malaysia. Basic impurities were extracted separately and analysed by gas chromatograph mass spectrometry (GCMS) using DB-5 columns. The GCMS method was able to discriminate all the three routes based on the target route specific impurities. Results indicate that organic impurities allow discrimination by synthetic pathway. Pattern recognition techniques were applied to the GCMS data. Hierarchical cluster analysis, principal component analysis and discriminant analysis provided meaningful discrimination of the batches, demonstrating that methylamphetamine profiling to link samples by starting material and/or synthetic route is achievable.

Oral: 1549. Challenges in forensic toxicology

Heesun Chung

International Association of Forensic Sciences

Forensic toxicology is dependent on the application of analytical techniques and interpretation of analytical results. This means that, if forensic toxicology is to develop, it is necessary to introduce these techniques, as well as to improve general understanding of the field. The disturbing trend of increasing crimes and deaths related to drugs and other toxic materials, as well as drug abuse and misuse, makes its further development essential. There are limitations and problems to toxicology: It is not possible to detect all substances and there are also limitations in assay and availability of specimens. Like any other fields of forensic sciences, the results given by the forensic toxicologist are expected to be as accurate and correct as possible with a very fast turnaround time. Challenges that Forensic toxicologists face are the use of alternate biological specimens, the identification of emerging new drugs, the accreditation of laboratory, the implementation of quality assurance program and the interpretation of the enhanced detection limit. In addition there are difficulties in providing the same quality of service and maintaining the good quality assurance system between labs around the world. For the future forensic toxicology, a high-throughput screening system in the postmortem toxicology and the interpretation of enhanced detection limit should be mentioned, as should a systematic approach for the identification of new drugs and their metabolites. Above all, sharing information and knowledge between toxicologists is vital for the development of Forensic toxicology through International Associations.

Oral: 1429. An efficient method for detection of opiate in dried urine specimens among opioid users

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Introduction: Drug testing in body fluids is an important approach for validating self-reported drug use, in both clinical and medico-legal settings. The storage and transportation of urine specimens is a major concern for remote areas which lack the facilities for drug testing. **Objective:** The aim of the present pilot study was to develop an efficient method for testing opiate in urine specimens, dried on filter paper, and to compare the drug detection in urine samples collected by conventional method vis-a-vis using filter paper in a clinical setting. **Methods:** This involved optimization of conditions for extraction, recovery, short and long term stability (room temperature, 4°C-20°C) for detection of opiate from dried urine (urine spotted on Whatman 903 filter paper). Further, the extraction efficiency from dried urine stains was compared with the conventional drug testing methodology. ELISA was employed for screening whereas confirmation was achieved by Gas Chromatography equipped with NPD detector. Primary screening was achieved by 2 punches taken from a 20 µl (diameter 1.3 cm) spotted urine samples, whereas confirmation was achieved by 2 complete circles each of 20 µl sample volume. **Results and Discussion:** Water was found to be a suitable extracting solvent as compared to carbonate-bicarbonate buffer (pH 9.2) and saline. The recovery was found to be 99.41% in water. The optimal conditions for extraction involved 37°C with 24 Hours shaking. The stability was found to be best at -20°C for long duration. **Conclusion:** In the study dried urine specimens on filter paper achieved the same level of precision and reproducibility as that of standard methods. Hence, this approach appears to have potential to detect opiates in those setting, where logistics of collection and transportation of urine sample are a concern. **Acknowledgement:** This study is supported by Indian Council of Medical Research, Govt. of India.

Oral: 2019. Determination of thirteen sedative/hypnotics in human hair by micropulverized extraction and liquid chromatography/quadrupole-orbitrap mass spectrometry

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Introduction: There is a high demand for the analysis of sedative/hypnotics in hair because they were frequently involved in sexual crimes. We have already published a rapid sample-preparation method for zolpidem in hair utilizing micropulverized extraction, based on the evaluation of extraction efficiency of seven psychoactive drugs from an incurred human hair specimen (J Chromatogr A 1293, 28 (2013)). In this study, we applied the method to the quantification of 13 major sedative/hypnotics in hair utilizing a Q Exactive hybrid mass spectrometer. **Methods:** A hair sample (5 mg) was micropulverized intermittently for 10 min at 42 Hz with 0.2 mL of 45% (w/v) aqueous ammonium phosphate (pH 8.4). Liquid-liquid extraction was carried out using acetonitrile twice, and the organic layer was concentrated, reconstituted with 50 mL of 0.1% formic acid in 10% acetonitrile and filtered. The filtrate (10 mL) was analyzed. **Results and Discussion:** By using the multiplexed SIM mode, the quadrupole filter of the Q Exactive was successfully eliminated huge interference ions which shut out tiny peaks by the limitation of intra-scan dynamic range, prior to high-resolution mass spectrometry. Lowest ranges of quantification (LLOQ) were 1 pg/mg for brotizolam, diazepam, desmethyldiazepam, estazolam, flunitrazepam, nitrazepam, triazolam, ramelteon and zolpidem, and 4 pg/mg for alprazolam, desmethylfludiazepam, etizolam and zopiclone. Accuracy and precision, intraday and interday, of all the analytes met the FDA guideline according to the analysis of spiked samples at three concentrations

(LLOQ, 100 pg/mg and 2 ng/mg). The developed method was applied to three actual samples. Daily use of brotizolam (8.8 pg/mg), ethyl loflazepate (443 pg/mg as desmethylfludiazepam), flunitrazepam (46.0 pg/mg) and zolpidem (10.2 ng/mg) were detected from donor A. Occasional use of etizolam (1.2 pg/mg) and zolpidem (60.0 pg/mg) were detected from donor B. Occasional use of etizolam (4.9 pg/mg) was detected from donor C.

Oral: 1979. Development of a new screening method for the simultaneous detection of opioids in body fluids and tissues using Liquid Chromatography-Tandem-Mass-spectrometry

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Introduction: Opioids are widespread therapeutics for treatment of pain, especially chronic pain syndromes and are also frequently abused. Besides the broad variety of medical preparations an increasing number of new synthetic derivatives appear on the illicit drug market. Therefore the aim of the presented study was to develop an analytical method which enables the detection of a large number of opioids simultaneously. The method should also detect phase II metabolites just as glucuronides as well as new designer drugs. **Methods:** A validated method for the simultaneous determination of opioids in serum and post-mortem sample material is presented. Solid phase extraction (C18 columns) was used for sample purification. The extracts were analyzed by liquid chromatography-tandem mass spectrometry (Agilent UPLC 1290 Infinity and Agilent 6490 Triple Quad) in positive multiple reaction monitoring mode for 35 opioids and their metabolites. The method was validated according to current standards of the German Society of Toxicological and Forensic Chemistry using the Microsoft Excel-based program Valistat. **Results and Discussion:** The limits of detection for all compounds ranged from 0.02 - 0.6 ng/mL. The lower limits of quantification were 0.1 - 1 ng/mL. The recovery rate was above 30% for all substances except alfentanil, buprenorphine and bismortilidene. The recoveries were below 18.7%. The accuracy was in the range from -12.5 to 6.4%. The method was applied to samples of patients of an intensive care unit who were treated with sufentanil, fentanyl and piritramide. Moreover, the method was used for investigations of a fatal poisoning with sufentanil for analyses of post mortem body fluids and tissues. **Conclusion:** The presented method enables the simultaneous and sensitive detection of a large number of analgesics in serum and especially in post-mortem material. The method exhibits a high sensitivity and specificity for the detection of 35 opioids and metabolites as well as new designer drugs.

Oral: 1291. Differential pulse adsorptive stripping voltammetry (DPASV) determination of mercury (Hg) in blood using gold rotating disc electrode (RDE)

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Introduction: The salts of mercury are of great toxicological importance and can cause poisoning. Therefore quantitative determination of traces of mercury in blood is very essential. Routinely, inductive coupled plasma, atomic absorption spectrometry, graphite furnace atomic absorption spectrometry were used for analysis. An attempt has been made to develop a new method for determination of traces of mercury in blood using differential-pulse adsorptive stripping voltammetry. The analysis utilizes three electrode system, Rotating Disc Electrode (RDE) as a working electrode, Ag/AgCl (filled with ammonium buffer) as a reference electrode and glassy carbon electrode as an auxiliary electrode. Blood was processed by closed digestion method using 34.5% Nitric acid (HNO₃). Determination of mercury was made by primary solution with a sweep rate of 20 mV/s and pulse amplitude 50 mV by standard addition method. The solution was purged with nitrogen gas and cleaning was done at 1300 mV for 30 sec. and the potential was scanned from 500 mV to 850 mV on RDE with stirrer speed 2000 rpm. The mercury ions were deposited by adsorption at 370 mV for 60 sec. The deposited metal was stripped by scanning the potential from 500 mV to 850 mV using adsorptive stripping mode. The stripping current arising was correlated with the concentration of the metal in the sample. The peak potential for mercury is 640 mV. The detection limit of mercury by this method was 1.0 µg/L. **Keywords:** Adsorptive stripping voltammetry, RDE, Mercury, Blood, Heavy metal.

FORENSIC SCIENCE (FORENSIC DNA AND BIOLOGY)

Oral: 2007. Evaluation and the development of a direct PCR multiplex

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The aim of this research was to evaluate the use of direct PCR with different types of biological samples and to develop a direct PCR multiplex. Direct PCR is a technique in which DNA samples are subjected to PCR without having to first undergo extraction and quantification. With different extraction techniques, there is an associated loss of DNA which is caused by extraction inefficiencies. The multiple tube changes during extraction could also introduce the opportunity for

contamination and handling errors. With Direct PCR, better DNA profiles could be obtained faster and cheaper as there is no loss of DNA associated with extraction steps and does not use expensive commercial extraction and quantification kits. In this study, genomic DNA preparations and buccal cell counts of various concentrations were deposited on commonly encountered substrates, recovered and amplified using direct PCR before subjecting them to capillary electrophoresis. The electropherograms obtained were compared to those obtained using the standard DNA profiling protocol which involves extraction and amplification prior to fragment analysis. Supplementary tests were carried out to compare the efficiency of the swabbing technique utilised throughout this study and the effect different substrates had on DNA recovery. The results obtained from this experiment indicated that the substrate DNA is deposited on plays an important role in determining the amount of DNA retrieved and subsequently the resulting DNA profiles. Several commercial multiplexes were used to amplify these samples using direct PCR and it was found that some of these multiplexes were more suitable than others for amplifying using direct PCR and several pitfalls were identified. With this in mind, a novel multiplex consisting of five autosomal and two Y-chromosomal STRs which also provides the inhibitor status of the sample was developed and validated with direct PCR samples. This multiplex also addresses the issues concerning sensitivity and robustness that was encountered with the commercial multiplexes tested. Allelic ladder, panels and bins were created to be used with this multiplex to aid in sample designation when subjected to capillary electrophoresis.

Oral: 2163. Efficient Y-STR profiling in populations of reduced diversity

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Introduction: In Finland, the efficient evaluation of new DNA-markers for forensic purposes has been complicated by issues of low diversity and geographic subdivision, especially in the case of Y-chromosomal profiling. To potentially alleviate these issues, we have analyzed the resolution of a variety of polymorphic loci within the Finnish population. **Methods:** In order to increase discrimination power, a panel of seven polymorphic Y-chromosomal short tandem repeat (STR) loci (DYS449, DYS460, DYS505, DYS522, DYS576, DYS612, and DYS627) was developed and their diversity was examined among 255 Finnish males. **Results:** These loci, simultaneously amplifiable in one multiplex reaction, revealed levels of diversity that exceeded that of a commercial 17-locus multiplex kit, with a resolution further increasing when data was pooled to create a 24-locus panel. **Conclusions:** This set of loci offers an informative, cost-effective, and easy-to-use supplementary for commercial Y-STR kits. In addition to Y-STR markers, the analysis of insertion-deletion polymorphisms and single-nucleotide polymorphisms (SNPs) from a forensic perspective has increased the number of markers available for future criminal investigations in Finland. Data gathered on Finnish population diversity can help to understand the processes affecting other small and isolated populations, thus increasing the scope to a global scale.

Oral: 2020. Rapid DNA analysis system for STR typing of low DNA content samples for anti-terrorism applications

Melissa May

NetBio, US

Introduction: NetBio has developed a fully automated Rapid DNA Analysis System that produces STR profiles from buccal and blood samples for human identification in 84 minutes. To expand the applications of the system, we have modified the system to process low DNA content samples. Low DNA content samples (sometimes referred to as touch samples) include those that result from objects coming in contact with an individual, including cigarette butts, drinking glasses, bottles, cans, firearms, clothing, and fingerprints. The variety of these sample types is reflected in the wide range of their DNA content, generally ranging from less than 0.1 to 100 ng. **Methods:** With the goal of maximizing the DNA content for downstream processing, several purification steps were optimized and high-efficiency DNA capture features were incorporated. Cell lysis, wash, and elution steps of the DNA purification protocol were optimized and several DNA purification filter types and sizes were evaluated for improved binding capacity and elution efficiency. These modifications were incorporated into the BioChipSet cassette. **Results and Discussion:** Optimization of purification protocols, filter type, and filter size resulted in DNA recovery of >90% with 50 ng input DNA and near 100% with 1 ng DNA. The results of these modifications have achieved near 100% recovery of input sample DNA. The system allows fully-automated generation of STR profiles from a variety of touch sample types. The system can be operated by a non-technical user. **Conclusions:** Rapid DNA Analysis can be applied in a wide range of out-of-laboratory settings, including police stations, borders and ports, military checkpoints, and the battlefield. The expansion of sample types amenable to Rapid DNA Analysis to include those with low DNA content has utility in anti-terrorism applications and crime scene analysis.

Oral: 2201. Application of 52 autosomal SNPs (SNPforID) to forensic casework in MalaysiaS. Alimat^{1,2}, S. Hadi¹, W. Goodwin¹*¹School of Forensic and Investigative Sciences, Faculty of Science and Technology, University of Central Lancashire, Preston, United Kingdom; ²Forensic Division, Department of Chemistry Malaysia (KIMIA), Ministry of Science and Technology, Malaysia*

The analysis of degraded DNA is one of the biggest challenges in forensic casework. Recent advances in the identification and analysis of single nucleotide polymorphisms (SNPs) have demonstrated the advantage of these markers over short tandem repeats (STR), that they only require small amplicons. We selected the 52 SNPforID markers, with amplicons that ranged in size from 59 bp to 115 bp, and applied them to the profiling of casework samples from Malaysia, where DNA degradation is a common problem due to the high temperatures and levels of humidity. To carry out the study we modified these 52 SNPforID markers into four 13-plex SNaPshot assays to enable easier interpretation of profiles on the ABI PRISM® 310 and 3500. The sensitivity and reproducibility of these multiplex assays were studied using both genetic analyzers. The allele frequency databases from 325 samples of three Malaysian major ethnic groups (Malay, Chinese and Indian) were also developed. Fifty-one crime samples comprising bloodstains on cloths, swabs, and a mat and 2 swabs of trace DNA from 10 crime scenes in Malaysia were profiled after extraction of DNA using a phenol-chloroform method. The samples were also subjected to STR analysis using the Powerplex® 16 system (Promega), which resulted in only 17 full profiles. Using SNPs, 19 full profiles could be analyzed successfully from 34 samples that gave no or partial profiles with STR analysis.

Oral: 1805. Complications in DNA based identity testing of small tribal populations; the Veddas of Sri Lanka

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In DNA based forensic identification, the finding that two human biological samples differ in their DNA profiles lead to the conclusion that the two came from different persons. However, if the two are indistinguishable two possibilities exist: Samples came from the same person (or from identical twins) or they came from different persons whose DNA profiles are the same. To provide information for weighing the two possibilities to the Courts of Law, it necessitates an estimation of probability that a person picked at random would have the same DNA profile as of the biological evidence. This statistic known as the Random Match Probability (RMP) is calculated using allelic or haplotype frequencies of genetic loci of the respective population. Allelic and haplotype frequency databases for autosomal Short Tandem Repeats (STR), Y-chromosomal STR and mitochondrial HVS1 for the four Sri Lankan ethnic populations and aboriginal tribal group, the Veddas of Sri Lanka were established. Characteristic alleles and haplotypes that were observed in high prevalence among Veddas indicate their divergent genetic markup from others, suggesting genetic drift due to isolation and inbreeding. Genetic drifts are quite common in small tribal populations due to periodic reduction in population size (population bottleneck) caused by environmental and other hardships. Their cryptic population structure as revealed by the present study and comparatively high RMPs (Autosomal STR- 3.4 × 10⁻¹⁰, Y chromosomal STRs- 7.26 × 10⁻², Mitochondrial HVS1- 1.5 × 10⁻¹) would make significant implications when deriving conclusions in criminal and parentage DNA testing. This implies that the chance of having a stochastic DNA match between two maternally or paternally related individuals is high in small isolated populations like Veddas. Therefore when conveying a significance of a DNA match involving Veddas it should be done with great caution with the caveat of increased possibility of having false inclusions.

Oral: 2185. Processing 1 million DNA Samples: lessons learned from a decade of offender databasing

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Introduction: After attending this presentation, attendees will learn (1) a variety of tools and methods that can be implemented to improve the efficiency and quality of offender databasing processing, (2) the importance and impact of selecting the most appropriate procedures and technical specifications, and (3) how to recognize factors that significantly affect turn-around time, cost, efficiency, and overall productivity within their own forensic DNA laboratories. This presentation will impact the forensic science community as it discusses methods that DNA databasing laboratories can use to increase productivity, improve quality, and decrease costs in order to effectively manage and reduce offender DNA sample backlogs. As a result of expanding offender collection legislation and demands to reduce DNA backlogs across the country, laboratories are continually confronted with meeting the challenges of an increased workload while following strict budgetary constraints. Additionally, with the increase in arrestee legislation, there is a higher demand to process DNA reference samples in much shorter turn-around-times, which can often lead to inefficiencies within the laboratory. Through the processing of more than 1 million DNA database samples for the U.S. national database (CODIS) and more than 10 years of experience in high throughput DNA database sample processing and analysis, Bode Technology has identified a variety of methods described in this presentation that other laboratories can use to eliminate time-consuming and costly inefficiencies to increase throughput and reduce DNA backlogs. **Discussion:** Maximizing the first pass success rate allows the laboratory to minimize re-testing, re-amplifications,

re-injections, and ultimately simplifies data review. The selection of appropriate technical specifications is critical and has a direct impact on first pass success rates. Specifications such as imbalance ratios, minimum relative fluorescent unit (RFU) values, and ceiling thresholds should be carefully considered. These factors can be key drivers of first pass success rates and dramatically influence reprocessing rates and cost. In addition, the importance of implementing a Laboratory Information Management System (LIMS) program that has been specifically designed for high-throughput processing of databasing samples is explained. Factors such as collection rates, batching, turn-around-times, and staffing should be carefully considered when determining the appropriate batch size both for in-house processing and for outsourcing.

FORENSIC SCIENCE (CRIMINALISTICS)

Oral: 1783. Developing leadership in forensics: The key attributes of top-performing forensic practitioners, what they are, and enhancing them through focused leadership strategies

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When people think of leadership they think of senior managers of forensic facilities/institutes. However, developing leadership in all forensic practitioners, regardless of rank/level is advantageous at the organisational level and for forensic practitioners. For example, processing a crime scene, analysing forensic traces, or employing forensic intelligence techniques to map serial crime incidents are some of the most crucial aspects of effective investigations and crime prevention. Yet, inadequately managed crime scenes or poor analytical practices lead to poor quality forensic evidence being relied upon by police and lawyers in their decision-making. Inaccurate decisions based upon poor forensic evidence increases the risk of ineffective investigations or wrongful convictions, such as in the cases of Graham Stafford and Farah Jama (Australia) and Guy Paul Moran (Canada). If collecting and analysing high-quality and accurate traces/information is so vital for reducing the risk of miscarriages of justice, what are the leadership attributes of top-performing field forensic scientists that can assist in this aim? Through a series of job-analytical techniques we interviewed 74 senior police detectives, forensic scientists, police supervisors, arson investigators, and 18 top-performing field forensic scientists from five police jurisdictions across Australia. We analysed the data using content analysis and rep-grids to identify the cognitive, social and leadership (CSL) attributes underpinning top-performance in field forensic science. The CSL skills clustered into seven categories. Five of these directly relate to leadership in forensic practice, namely: holistic justice knowledge, cognitive abilities, work orientation, professional communication, professional demeanour and resilience. In this presentation the CSL attributes underpinning leadership in forensic practice will be presented as well as a discussion of the seminal work being carried out at the Tasmanian Institute of Law Enforcement to develop a focused leadership development and career pathway for forensic scientists using the CSL attributes from recruitment to senior practitioner level.

Oral: 2225. Application of Attenuated Total Reflectance Fourier Transform Infrared Spectroscopy (ATR-FTIR) in questioned documents

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Micro ATR FTIR spectroscopy can be directly utilized in monitoring and differentiation of the forensic evidences without pre-treatment and destruction of samples. This spectroscopy has been used in various forensic fields; 1) discrimination of questioned documents through analysis of the components of red seal inks, 2) examination of signatures written with ballpoint pen inks, 3) determination for the sequence of heterogeneous line intersection from a personal seal and a ballpoint pen. 4) determination for the sequence of homogeneous line intersection from ballpoint pens. 5) identification of counterfeit bills, bank checks and gift certificates. Also, ATR FTIR spectra for forensic evidences can be constructed as a database, and this database can be applied to analyze any other forensic evidences in the future.

Oral: 1345. A study to investigate the feasibility of micro-attenuated total reflectance fourier transform infrared spectroscopy for nondestructive forensic analysis of writing inks in questioned documents

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Introduction: Recently, micro-attenuated total reflectance (micro-ATR), one of the simplest nondestructive sampling techniques for Fourier transform infrared (FTIR) spectroscopy, being explored continuously for its forensic applications to examination of pen inks. **Objectives:** To explore the utility of micro-ATR/FTIR for distinguishing among the models produced by a specific manufacturer (brand). A total of 14 black ballpoint pen varieties representing three separate brands were collected

and analyzed using micro-ATR/FTIR spectroscopy. IR spectra were compared using a Pearson correlation coefficient after standardization. After then, a modified correlation coefficients was calculated to assist in evaluation of variations observed between models from a selected brand. **Results:** Variations between models within a particular brand were varied according to brand. In addition, inter-batch variations were found insignificant. Subsequently, few measures have been suggested to increase the discrimination power of the technique to differentiate between models of the same brand. In **Conclusion:** Micro-ATR FTIR spectroscopy is reproducible and could achieve discrimination power as high as those obtained via destructive techniques if the measures suggested in this study were applied in analysis.

Oral: 1523. Ultra-violet and visible (UV-Vis) spectroscopy and chemometrics techniques in forensic ball point pen analysis: A preliminary studies

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Ink analysis is one of the areas in forensic questioned document (QD) aims at identifying and characterising ink obtained from writing instrument used to write on a document. Ink from a writing instrument becomes an important forensic evidence when it is written on a document suspected to be associated with criminal activities such as threatening letters, insurance frauds and etc. Despite the popular use of photocopiers and printers, writing instruments particularly ballpoint pens are still the method of choice to write on documents. Current practise in forensic science in identification and characterisation of ballpoint pen inks involves both chromatographic and spectroscopic techniques. The latter either employs direct in-situ analysis using highly expensive Surface Enhanced Resonance Raman Spectroscopy (SERRS) or the more conventional, low-cost ultra-violet and visible (UV-Vis) spectroscopy. Both techniques produce qualitative and quantitative information where the former is in the form of spectra whilst the latter showing absorbance ranging over few hundred of wavenumbers. Presenting the qualitative information seem to be the common practise in the court of law. The problem associated with qualitative information is that it is subjective and the success of presenting such information is entirely depend on the experience and the extent of knowledge of the forensic scientist. This preliminary study introduces effective technique that can objectively identify and characterise ballpoint pen inks of different colours and brands. The analytical technique used was the UV-Vis spectroscopy. The resultant UV-Vis spectra generated were subjected to chemometrics techniques of principal component analysis (PCA) and hierarchical cluster analysis (HCA). The results found from this study indicates that chemometrics techniques can be successfully employed to objectively identify and characterise ballpoint pen inks of different colours and brands. It also indicates that conventional and low cost instrumental technique when coupled with chemometrics techniques can become a powerful analytical tool.

Oral: 1321. Examination of Tool Marks on Bone Preserved in Microbicidal Solutions

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Objective: The purpose of this study was to identify an effective microbicidal solution for the storage of bone sections with tool marks. Various implements can leave tool marks on bone in dismemberment cases and the long-term storage of bones is prone to shrinkage that may distort the tool marks. In this study, porcine bone was used as a human simulant for the tool marks. Micrographs were made of the tool marks on the bone sections before storage in microbicidal solutions. One bone section was fixed in 10% formalin for 12 days and then transferred to ethyl alcohol. The other bone sections were stored individually in the following solutions: buffered 10% formalin, 5% acidic acid, 70% isopropyl alcohol, 93% ethyl alcohol, 5% iodide solution, 10% iodide solution, 6% sodium hypochlorite, 10% sodium chloride with iodine, 10% sodium chloride with no iodine, 20% sodium chloride with iodine, 20% sodium chloride with no iodine, 26.4% sodium chloride with iodine and 26.4% sodium chloride with no iodine. After being stored for 6 months, the tool marks were examined and micrographs taken for comparison. The micrographs were evaluated using a scale of +1 to +3 depending on the quality of striations. A +1 evaluation indicated poor quality or no striations present, +2 indicated some striations but not enough for a positive identification and +3 evaluation indicated there were sufficient striations for a match. Of 14 tool mark samples, 2 (14%) yielded +1 data and 12 (86%) had +3 tool marks. **Conclusion:** After a 6-month period of storage, 5 of the 14 solutions tested were evaluated as effective microbicidal solutions. The solutions evaluated as ineffective included: 6 solutions with filamentous fungi and bacteria, 1 solution with crystals on bone and 2 solutions due to the quality of the tool mark striations.

Oral: 2160. Development of latent fingerprints on wet surfaces; multiple methods

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Introduction: In forensic science, one of the major problems is trying to reveal the presence of fingerprints on wet surfaces. Although some people believe that items recovered underwater will have no forensic value, this research shows that identifiable fingerprints may still be recovered. **Objective:** To investigate whether certain fingerprint methods can recover latent fingerprints submerged in water. **Methods:** Donors intentionally deposited fingerprints approximately 500 g of force on paper and glass surfaces. The surfaces to be examined were then immersed in tap water for different periods (1 to 24 hours). Wet fingerprints then recovered using selected methods and each resultant print was evaluated for its visibility quality based on a scoring system. **Results:** Thermal development, ninhydrin, Sudan Black B, zinc oxide and henna extract techniques were performed to detect latent fingerprints left on wet porous surface (paper). The best results were achieved with Sudan Black B. While for non-porous surface, wet fingerprint were recovered with cyanoacrylate fuming, Sudan Black B, zinc oxide (solution and powder) technique and best results were achieved with cyanoacrylate fuming. **Conclusion:** The results of this study demonstrate that the duration of exposure to the water and the methods selected for enhancement have an influence on the quality of detected fingerprints.

Oral: 1816. Method development for the extraction and analysis of body odor using Gas Chromatography Mass SpectrometryRevathi Rajan¹, Nik Fakhruddin Nik Hassan¹, Mohammed Nasimul Islam²¹*School of Health Science, Universiti Sains Malaysia;* ²*Universiti Teknologi MARA*

Chemical fingerprinting of the human body odor using Gas Chromatography Mass Spectrometer (GCMS) can be used for the purpose of identification of an individual. Three methods were chosen and compared for this purpose. Static headspace analysis without extraction, extraction by using steam distillation followed by liquid-liquid extraction (LLE) and the static headspace solid phase micro-extraction (SHS-SPME) were compared in their effectiveness in the extraction and identification of the volatile organic compounds (VOCs) from body odor. The SHS-SPME method was proved to provide the best result for obtaining complete detection of all the compounds present in an odor profile. The sample for the analysis was collected using chemically and biologically sterile gauze (3x3) kept in contact with the arm skin of the individual for a period of forty five minutes. The gauze is wrapped using a plastic wrap to avoid contamination from environment and after collection deposited into a 20mL crimp capped headspace vial and kept at 4°C until further analysis. The static headspace method did not yield any results. Even with the addition of solvent to improve the co-efficient partition between the headspace of the vial and the concentration of analyte in the gauze, the analyte concentration in headspace was too low to be detected by the GCMS. Although the steam distillation method is not an exhaustive sampling method, it involves higher risk of contamination and loss of analyte occurs during the LLE. The chemical breakdown of analyte which has very low boiling point also occurs during the steam distillation process altering the chemical fingerprint of an individual. Thus SHS-SPME extraction and subsequent analysis using GCMS was proven as the best analytical method for analysis of VOCs originating from body odor of an individual.

PARALLEL SESSIONS; Day 4: 10 October 2013 (Thursday)**FORENSIC SCIENCE (FORENSIC DNA AND BIOLOGY)****Oral: 1804. Criminal DNA database was established for Sri Lanka**Ruwan Illeperuma¹, Eranga Herath², Suraj Goonawardhana¹, Parami Wakista¹, Sharani Jayasekara¹, Elenahai Vimalawaran¹¹*Genetech, No. 54, Kithulwatte Road, Colombo 08 Sri Lanka;* ²*School of Computing, University of Colombo, Colombo 07, Sri Lanka*

Applying Deoxyribonucleic acid (DNA) based techniques for forensic identification of individuals who are suspected of committing crime is one of the major advances in tackling crime since chiral fingerprinting. This technique for criminal investigation in Sri Lanka has proven undoubtedly to be highly beneficial, providing evidence that can help to convict the guilty and exonerate the innocent. Since 2002, Sri Lanka has applied this technology in more than 2800 criminal cases generating approximately 13000 DNA profiles of crime scene biological evidence and nearly 3500 DNA profiles of convicted and arrested individuals. These profiles were compiled into two DNA databases as forensic and arrestee which are integrated and operated by standalone computer software. The Databases were created with the intention of developing into a fully functional National DNA Database. The advantage of such a National Database in linking crimes and nominating possible suspects has prompted more than 60 countries worldwide to establish their own databases. Since the profiles were generated by typing a panel of 10 autosomal Short Tandem Repeat loci of human genome; 06 out of which is included in the CODIS, meets the requirements for entry into the INTERPOL DNA database permitting DNA data sharing across borders with

minimal oversight. The database has the capability to sort out matches between crime scene evidence and known individuals who have previously been recorded (cold-hits) and to perform speculative searches in order to look for matches from all past unresolved crime. It also performs familial searching to trace close family relationships of a query DNA profile. Proper standards and guidelines are strictly adhered in retaining profiles in the database, such as quality assurance of data by ISO 15189, inclusion of profiles only upon having written consent, unlinking personal information from profiles etc.

Oral: 1698. Evaluation of stochastic variations in low-template STR profiles for forensic casework applications

Seah Lay Hong

Department of Chemistry Malaysia

The increasing sensitivity of STR typing kits to detect low levels of DNA has led to an increasing number of partial DNA profiles and accompanying stochastic variations characterized by heterozygote imbalance and allele dropout. Using the AmpF/STR® Identifiler® Plus amplification kit, the STR profiles (carried out in duplicates and by two analysts) for DNA templates ranging between 500 pg to 1.9 pg (from an individual heterozygous at all AmpF/STR® Identifiler® loci) were examined. Heterozygote imbalance with heterozygote ratios < 0.6 began to be observed from 250 pg and less of DNA templates. Allele drop-out was first detectable at 125 pg DNA templates and locus drop-out appeared at 31.25 pg and less of DNA templates. Genotyping completely failed with 1.95 pg and less of DNA templates. No drop-ins were observed in any of the low-template STR profiles. Among the allele drop-outs observed, the maximum observed peak height for the surviving allele is 148 rfu at locus D18S51. Based on the findings of this study, a number of guidelines have been recommended for purposes of casework with low template DNA.

Oral: 1827. Distribution of Killer Cell Immunoglobulin-like receptors genotypes among Malay and Orang Asli in Peninsular Malaysia

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The killer immunoglobulin-like receptors (KIR) family varies in gene content and sequence polymorphism which is suitable to distinguish individuals and populations. The polymorphism present in the KIR cluster indicates its role in the adaptation of the immune system in response to a continuously challenging environment. In the present study, we have investigated the presence or absence of 16 KIR genes and pseudogenes in 150 unrelated Malays and 59 unrelated Orang Asli of Peninsular Malaysia using a polymerase chain reaction based sequence-specific primer (PCR-SSP) method. KIR haplotypes were determined by segregation analysis. A total of 38 different KIR genotypes were observed in Malay populations and 19 KIR genotypes in Orang Asli population. Genotype AA1 was the most common among Malay (30%) and Orang Asli (36%) populations. Two new genotypes were found in Malay population which have never been reported in the Allele Frequencies KIR database. The distribution of genotypes, in terms of combination of haplotypes for Malay population, was AA (36.7%), AB (33.3%), and BB (30.0%), while for Orang Asli population was AA (30.5%), AB (40.7%), BB (28.8%). The A:B haplotype ratio for both Malay and Orang Asli population were almost 1:1, which is similar to other South East Asia populations. Population studies of KIR allow the understanding of forensic genetic diversity and its association among different geographical populations, elucidating the evolutionary history population and developing engendering program for endangered population.

Oral: 1643. Modification of conventional anti-formin solution in human bone maceration technique

Sin Leng Chong

National Institute of Forensic Medicine, Hospital Kuala Lumpur

Anti-formin solution was one of the very first solutions used in human bone cleaning, preparing by heating sodium carbonate (NaCO₃) and bleaching powder with of water. The solution is then filtered and added with sodium hydroxide. In this preparation process, heating and filtering procedures are found to be impractical, the sodium carbonate aggregated easily in ambient humidity and the bleaching powder is recognized to pose hazardous to the users. Hence, a modification solution was created and started to be used as human bone cleaning solution in Department of Forensic Medicine Hospital Tengku Ampuan Afzan Kuantan, Pahang. In this modified solution, sodium bicarbonate (NaHCO₃) that is more stable in ambient temperature is replacing with sodium carbonate and a safe powerful oxidizer, i.e. 37% hydrogen peroxide is used instead of the bleaching powder and no heating is involved. In the modified method, 1 part of sodium bicarbonate is mixed with 3 parts of hydrogen peroxide (H₂O₂) and diluted with 6 parts of water. This amount is adequate to immerse a skull, the amount of chemicals can multiply from 2 to 6 depending the total bones to be cleaned. This modified anti-formin solution is found to be efficiently clear off the soft tissue especially for bones still attaching with adipose tissues. The bones from this maceration are found to be clean and clear, returning the bones to its natural color. This is because the properties of sodium bicarbonate as neutralizer, deodorizer and anti- calculus. Moreover, hydrogen peroxide is an effective surface sanitizer to be used in high-level disinfection and sterilization. Utmost importance, this solution will not destroy the DNA of the bone. After maceration, the bone is still can be used for DNA analysis. Hence, the modified anti-formin solution is thought to be one of the most economical, safest and efficient bone cleaning solutions.

Oral: 2168. Mapping facial expressions to develop novel facial image identification techniques for border security applications and biometric systems

Joanna Spasojevic, Meiya Sutisno

Forensic Face and Body Mapping Unit, Center for Forensic Science, School of Medical and Molecular Biosciences, Faculty of Science, University of Technology, Sydney

Objective: to morphologically examine facial images portraying neutral and smiling expression in order to identify permanent and transient facial peculiarities and classify them as unique or distinct identifiers for use in forensic identification. **Methods:** Images of 100 subjects (56 females and 44 males) portraying neutral and smiling expression were morphologically assessed for the presence of “expected” and “unexpected” permanent and transient features. The data collected were statistically assessed to examine the morphological variance of features: [1] between each subject, [2] between the different smile phases and, [3] between the left and right sides of the face. A database of the observed features was created and a case study was performed to assess the practicality of the technique developed in the research. **Results:** A total of 35 expected and 95 unexpected features were observed and categorised further into 156 classifications and over 300 sub classification of which 47 were found to be distinct transient features. The statistical analysis of the data showed significant morphological variance of features between each subject, the different smile phases and the left and right sides of the face. In order to describe features as unique as a larger database is required. The case study highlighted the applicability of the technique developed in this research in practical field applications. **Conclusions:** In this research transient facial peculiarities produced by smiling were successfully identified and categorised and distinct identifying features were observed. The increased morphological variability observed between smiling faces (as compared to neutral) indicates its potential for application in developing a novel forensic identification technique.

FORENSIC SCIENCE (CRIMINALISTICS)

Oral: 2189. Forensic approach in an armed intrusion : The Lahad Datu experience

Soo Me Tong

Royal Malaysian Police Forensic Laboratory

On 12 Feb 2013, about 150 armed persons in army fatigues who claimed to be linked to the so-called ‘Sulu Sultanate’, intruded into Felda Sahabat in Lahad Datu, Sabah. The police cordoned off the area and directed the group to lay down arms and surrender. Rounds of negotiations were held to find the best solution without bloodshed and to leave peacefully. Following the killing of 8 police personnel and some of their bodies were found to have been brutally mutilated by the armed intruders, the Malaysian security forces launched “Ops Daulat” to end the stand-off with the terrorists in Kampung Tanduo to defend the dignity and sovereignty of the country. A total of 64 terrorists were killed and many weapons were recovered. Post mortems and the identification of the corpses were jointly done by medical and forensic teams. The main issues that the CSI team had to contend with was the safety of the team, logistical support was of paramount importance as to the best way to retrieve the bodies from deep pits where the bodies were disposed of. The CSI team was once caught in an ambush when shots were fired between the intruders and the security forces while processing the scene. Most of the bodies were in highly decomposed state which rendered identification difficult as fingerprints were absent or almost nonexistent. However samples were taken for DNA analysis and clothing/personal belongings were taken for subsequent identification. Controlled burial was initiated with proper marking and documentation to facilitate subsequent/ future claim by the next of kin.

Oral: 2219. Impact of poison intake on writings/signatures in suicide notes and their comparison with normal writings/signatures

Vikram Raj Singh Chauhan

Chief Forensic Investigator of Patiala Bureau of Identification, Patiala; President of All India Forensic Science Association (Regd.), President of North Zone Forensic Science Association (Regd.)

A person committing suicide after consuming poison suffer from acute physical, mental and biological disorders and under these circumstances the handwriting often varies from the handwriting produced under normal circumstances. When the suicide note is written after consuming poison, due to time constraints, the writer is in a hurry to communicate his or her reasons of suicide rather than concentrating on handwriting or worry about proper writing position, pivot and postures. In this hurriedness and anxiety the writing produced by these persons is executed in very clumsy and haphazardly manner and there is appearance of unusual writing features, irregular size, space, speed, slant, movement, alignment, line quality and skill. Moreover, the biological changes due to consumption of poisonous substances cause fluctuations in blood pressure, nausea, development of tremors in hand and fingers and the writer’s contact with the writing surface is not smooth causing deterioration in handwriting. Due to the deterioration in handwriting sometimes the general and individual writing characteristics are not seems to be corresponding in the suicide notes writing/signatures after consuming poison when compared with the normal executed writings/signatures by the same person. Thus a careful and exhaustive examination by considering the abnormal writing circumstances and conditions of the writer is required to establish the common authorship of the abnormal suicide notes writings/signatures after consuming poison and the previous normal/standard writings/signatures of the same person.

Oral: 1842. Analysis of power distribution boxes using infrared spectroscopy and thermo mechanical analyser

Nur Syafiqah Amira Mohd Zulkefli¹, Mohd Shahru Bahari¹, Narenasagaran Thangaveloo², Azlimin Mat Noor³

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Fire retardants are commonly used as components formulated in objects to prevent the start and the spreading of fire. Investigations related to fire cases often require the need to identify the causes of fire, which may partly be influenced by low usage of fire retardant materials in electrical power supplies. Frequent fire cases that occur in residential area may be due to the failure of power distribution boxes (DB). In this study, several DB from local brands were purchased and characterized based on their manufacturer contents and mechanical strength. The samples were cut into suitable small sizes for analysis. All samples were initially subjected to Fourier transform infrared attenuated total reflectance (FTIR-ATR) spectroscopy. The results showed that all DB samples contained components that were consistent with each other and with the presence of high percentage of acrylonitrile butadiene styrene (ABS), a thermoplastic polymer widely used in electrical appliances. Thermal mechanical analyzer (TMA) was used to obtain the physical changes of ABS at certain conditions by determining the glass transition. All the glass transition temperature (T_g) of samples analyzed were also found to be consistent within the range of ABS transition temperature that matched with ASTM standard.

Oral: 1802. A non-destructive method for the authentication of original packaging material to counterfeit pharmaceuticals

Tuhfah Zahidah Shamsuddin, Azli Sulaiman, Wan Aizan Wan Abdul Rahman

Department of Chemistry, Faculty of Science, Universiti Teknologi Malaysia

Introduction: Counterfeit drugs which are deliberately mislabelled with respect to identity and/or source have been increasing available in the market. These drugs are usually wrapped with packaging materials in which manufacturers are able to obtain them from multiple suppliers. That is the reason for the unfeasible confiscation. **Objective:** To differentiate the original and the counterfeit pharmaceutical products via the physical features on the packaging material. **Methods:** Four different product samples were obtained through purchase on over-the-counter common items, complaint or seized. Visual examination was carried out on the direct paperboard packaging by comparison; physical examination on the basic properties (dimension, mass and prints), optical character recognition (OCR) and near infrared (IR) analysis. Then, further investigation on the information printed (manufacturing date) and hologram serial number was done. Determination of the originality of the products upon procurement was done through authenticating the hologram. Multivariate statistical analysis performed on the basic properties of the packaging material indicated that there was no discriminating factor. Microscopic examination on the print quality exhibited a gravure printing for all of the fake products while the original have used other methods of printing. **Results:** On OCR, for certain parts of the prints showed no differences between the original and counterfeit. Both gave different output on the text established. IR spectra of the packaging varnishes gave similar peak profiles whereas the paperboard itself showed additional peaks in the counterfeit packaging. **Conclusion:** Genuine and fake pharmaceutical products could be easily distinguished using combined physical examination and IR analyses.

Oral: 1812. Final Exit: method of dying- suicide by asphyxia with helium and a plastic bag - case report

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Final Exit: The Practicalities of Self-Deliverance and Assisted Suicide for the Dying, published in 1991, a how-to guide for terminally ill people who wish to end their lives, is a controversial book by Derek Humphry. In 2000, a Supplement to Final Exit was published with a new chapter, describing, for the first time, a method using helium gas as an alternative not requiring controlled prescription drugs. We are presenting the case of 21 years old Romanian woman found expired in the living room of her flat, in a lying position on the couch, with a black plastic trash bag over her head, tightly secured around the neck with duct tape and a gorget made by canvas and elastic. Next to the body were found two empty helium tanks used to fill balloons for parties. Two clear vinyl plastic tubes led from inside the plastic bag to helium tank valve. No suicide note was found but "right-to-die" webpages were found on her laptop. The external exam was unremarkable. The internal exams found nonspecific macroscopic aspects. Toxicology tests performed on blood and gastric content were negative. There was no evidence of trauma, severe illness, injury or any explanation for death other than helium inhalation. The authors analyze similar cases reported in the world over time, finding that this method of suicide is undetected or hardly detected by autopsy (where findings are typically nonspecific) or toxicological analysis (because special sampling and assay methods are required) especially in cases where the helium delivery apparatus and plastic bag are removed before the death scene is examined and no other information is available implicating death by helium asphyxiation. Different aspects of medical ethics and law regarding the effect of the materials and techniques that promote suicide are being discussed.

MEDICAL IMAGING**Oral: 2205. Dual-energy CT in dental fillings for identification purposes on PMCT**

Lars Elbert

University of Zurich, Institute of Forensic Medicine, Winterthurerstrasse 190/52, CH-8057 Zurich

Different materials show different Hounsfield Units (HU) in Computed Tomography (CT) scans. However, identifying materials by their HU can be difficult, since some materials have overlapping Hounsfield values. Dual Energy Computed Tomography (DECT) is a relatively new technique that might help in solving these issues. In DECT, scans with different energy levels are performed. Discrimination of different materials can be made by exploiting the different x-ray absorption in different energy levels, compared to single energy scans. This educational presentation will elaborate, how DECT can be utilized to gain additional information in identification of foreign body materials and dental implants and how this technique can be applied to single source scanners. Additionally this presentation will introduce a forensic reference phantom, which offers a reference for the identification of foreign body materials during CT scans

Oral: 2206. Future perspectives in forensic imaging

Lars Elbert

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Imaging techniques are becoming an important part of forensic investigations. New, emerging technologies will change the way information is gathered and processed. This presentation will give a perspective into possible future developments, based on newest technological research in Zurich, Switzerland. New ways of human-computer interaction, surgical navigation, robotics and virtual crime scene inspection using virtual reality technology will be presented and discussed, giving a glimpse into the future of forensics.

Oral: 2203. Intoxication on post mortem computed tomography (PMCT)

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The purpose of this presentation is to elaborate the typical findings of intoxication on post-mortem computed tomography (PMCT). Imaging was performed on a dual-energy CT scanner (Somatom FLASH, Siemens Medical Solutions, Forchheim, Germany) including a complete whole body PMCT scan with separate scans of the head / neck and thorax / abdomen in a hard and soft kernel. Slice thickness was 2 mm for the whole body PMCT and 0.6 mm for the dedicated scans. Cases of intoxication with homicide, suicide or accidental intoxication will be shown, including a description of typical imaging findings on PMCT. These diagnostic clues are cerebral and pulmonary edema, bladder distension and suspicious stomach content, either concomitant or separate findings. This educational presentation will allow for diagnosis of typical imaging findings on PMCT in cases of suspected intoxication and facilitate further diagnostic management of the forensic caseload based on virtual autopsy.

Oral: 2188. Coronary artery calcium score and central obesity in forensic autopsyMansharan K^{2,3}, Saimin H¹, Faizuddin R¹, Norizal MN¹, Razuin R¹, Omar E^{1,4}, Kharmila A², Mahmood MS², Zaleha AM², Nawawi H¹

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Introduction: Calcium score calculates the calcium 'build-up' in coronary artery plaques and is used to detect the severity of coronary artery disease (CAD). Central obesity (COB) is a risk factor for CAD but the association between calcium score and waist circumference (WC) is unclear in post mortem subjects. The objective of this study is to compare the coronary artery calcium score in COB vs. normal lean controls (NC) and to determine its association with WC. **Method:** A total of 52 autopsy cases (20 COB, mean±SD age: 41.9±13.8 years; 32 NC: 37.1±13.8 years; 46 males and 6 females) were recruited. This was a cross sectional study of P61 autopsy cases with defined inclusion criteria. The subjects were divided into COB and NC groups, based on WC measured midway between the last rib and iliac crest, prior to autopsy. The CT images of the heart were acquired using a multislice CT machine (Toshiba Aquilion 64 TSX-101A, Japan) and total calcium score (TCS) and total calcium volume (TCV) was measured using the Cardio Scoring Software (CSCS-001A-Agatson's and Continuous

Scoring Methods, Korea) on the Infinitt (PACS version 3091, Korea). **Results:** There was no significant difference in TCS between COB and NC groups (mean±SD: 231.3±422.7 vs. 50.3±124.5, $p>0.05$). Similarly, there was no significant difference in TCv in COB and NC (183.6cc±352.2 vs. 44.7cc±108.2, $p>0.05$). There was no correlation in TCS nor TCv with WC ($p>0.05$, $r = 0.18$; $p>0.05$, $r=0.17$ respectively). There was lack of association between TCS and TCv with WC ($p>0.05$). **Conclusion:** There is lack of association of TCS and TCv with WC.

Oral: 1722. The Forensic Radiographer: A new profession with international training and acceptance

Christine Chevallier¹, Audrey Rinaldi², Alejandro Dominguez², Christine Bruguier¹, Jochen Grimm³, Patrice Mangin¹

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Introduction: Post-mortem imaging has become more and more used in the daily routine of medico-legal investigations. The performance of imaging techniques such as Post-Mortem Computed Tomography (PMCT) and Post-Mortem CT-Angiography (PMCTA) implies a close collaboration between forensic pathologists and radiologists. Many centers have also integrated radiographers in the medico-legal team. These forensic radiographers represent the missing link between legal medicine and radiology. They are confronted with different situations and questions than those observed in their daily routine in clinical practice. A special training to answer and prepare the radiographer to these issues is therefore necessary. **Methods:** International training for Forensic Radiographers has been initiated in Switzerland, in a project promoted by the School of Health Sciences and the University Center of Legal Medicine in Lausanne. Two specific programs have been set up: one educational program for students and one for graduated radiographers, both starting their first courses in 2013. **Results:** By Erasmus (European Action Scheme for the mobility of university Students), it has been possible to create an International Module Exchange in Clinical Forensic Radiography for Bachelor students. The module will last 13 weeks and the participating students will undergo theoretical courses in clinical radiography, forensic imaging and forensic sciences. A practical training will be held at the University Center of Legal Medicine in Lausanne. Additionally, a cultural program is included during their stay in Switzerland. Post graduated radiographers were offered a two-day training held in English which comprises both, a theoretical and practical part. It teaches important information about the basics of Legal Medicine and the different approaches to forensic imaging, including PMCT, PMCTA and 3D-surface scanning. **Discussion:** Different training are offered to students or graduated radiographers who intend to work in the field of Forensic Sciences as the Forensic Radiographers is now a member of a medico-legal team in most countries.

FORENSIC ANTHROPOLOGY & DVI

Oral: 2202. New trends in Forensic Anthropology

Luis Fondevbrider

The Argentine Forensic Anthropology Team (EAAF)

Forensic Anthropology is a specialty in the field of forensic sciences that during the last 20 years had been expanding and reformulating his role as a consequence of new demands and challenges. From the traditional role of analyzing skeletal remains to establish a biological profile that could match a missing person, today forensic anthropology is taking a lead role in the recovery of human remains (forensic archeology), analyzing post mortem changes in the body (forensic taphonomy), interpreting trauma in bones and the mechanisms of production of injuries, and in the identification process in complex cases (burned, dismembered, commingled remains). This presentation, will comment in this new trends and their interaction with other fields of the forensic work.

Oral: 2217. Working with relatively little: Case examples of poorly preserved human skeletal remains from Victoria, Australia

Soren Blau

Victorian Institute of Forensic Medicine / Department of Forensic Medicine, Monash University

The majority of cases examined by forensic anthropologists involve the examination and analysis of skeletal remains of complete individuals or isolated skeletal elements. In some situations, however, variables such as the mechanism of death, time, and the burial/disposal environment result in the anthropologist having to deal with incomplete and poorly preserved humans. This presentation outlines a number of cases admitted to the Victorian Institute of Forensic Medicine (VIFM) involving differentially preserved fragmentary skeletal remains. Such cases highlight the value of having a forensic anthropologist involved in the recovery and examination phases of an investigation, and emphasise the importance of forensic anthropology training programs including units on the recognition and assessment of differentially preserved human remains.

Oral: 2218. Crime scene reconstruction using 3D systems: Forensic medical investigation for a case of self-crucifixion

Nak-Eun Cheung, Sang-Beum Lim, Min-Jung Kim

Korea DVI, Division of Forensic Medicine, National Forensic Service, Seoul, South Korea

Crucifixion is one of the punishments commonly used in old ages, but it was abolished for its brutality. Even after the abolishment, however, there are still few incidents of death by crucifixion, though they are not very common. This case report presents the process of investigation and analysis of such rare case, of a man whose hands and feet were nailed on a cross at an old quarry of Dundeok mountain, Mungyeong, South Korea. Major evidences at the scene include; two smaller crosses on left and right side of the main cross on which the deceased was crucified, a mirror hung in the right cross, tools such as a hand drill and knives with a strap around its handle, hammers, spikes found on the ground, and a knife in which 'spare' was written on the handle under the left cross, a whip wrapped with a green heavy-duty tape and a red gown found around the left cross, shoes and a clock, in front of the deceased, design of the cross and a note with a sequence of events for being hanged on the cross, in a tent found approximately 50 meters away from the scene, daily necessities and tools stored in a car of the deceased, found at the entrance of the old quarry. On the basis of autopsy findings, results of various analysis, and scene investigation, a sequence of events leading up to the death of the deceased was reconstructed, and it is highly probable that the deceased meticulously planned the order of tasks to be crucified and prepared the cross and tools, took off his shoes, wore a crown of thorns, whipped himself, nailed his right foot on a pedestal of the cross, stood on it and did the same for the left foot, stabbed on his right side with the knife hanged in the small cross, punctured both his palms with the hand drill hanged in the small cross. It was presumed that a significant amount of blood loss from the stab wound of his right side and impaling of the hands and feet, rendered him unconscious, causing his body to slide downward and died of bleeding and asphyxia. The process of crucifixion causing death was indeed very complicated that we cannot exclude the possibility of the presence of helpers or bystanders. However, it is highly likely that the deceased conducted all the tasks by himself based on thorough investigations. We performed the micro-scanning on all evidences at the scene and made 3D models. We also visited the scene several times for conducting a long range-scanning and 3D modeling. The surrounding area was captured with a panorama scanner, and a comprehensive digital data-based report was completed. Afterward, an animation was created by using a motion capture technique with a video of reenactment and 3D models. We conducted this project in order to improve understanding of cases using visualization with animation, to establish a storage method of the scene and the presumed series of events, to prove that 3D digital data is a useful method that can be easily shared, and to build a foundation for "total digital documentation for crime scenes", a new technique for crime scene investigation.

Oral: 2204. Estimation of stature by using lower limb dimensions in the Malaysian populationFaridah Mohd Nor¹, Nurliza Abdullah², Al-Mizan Mustapa¹, Leong Qi Wen¹, Nurulina Aimi Faisal¹, Dayang Anis Asyikin Ahmad Nazari¹*¹Forensic Unit, Department of Pathology, Universiti Kebangsaan Malaysia Medical Centre, Kuala Lumpur; ²National Institute of Forensic Medicine, Hospital Kuala Lumpur*

Estimation of stature is an important step in developing a biological profile for human identification. It may provide a valuable indicator for an unknown individual in a population. The aim of this study was to analyse the relationship between stature and lower limb dimensions in the Malaysian population. The sample comprised 100 corpses, which included 69 males and 31 females between the age range of 20 to 90 years old. The parameters measured were stature, thigh length, lower leg length, leg length, foot length, foot height and foot breadth. Results showed that the mean values in males were significantly higher than those in females ($p < 0.05$). There were significant correlations between lower limb dimensions and stature. Cross-validation of the equation on 100 individuals showed close approximation between known stature and estimated stature. It was concluded that lower limb dimensions were useful for estimation of stature, which should be validated in future studies.

Oral: 1730. Fabricating computer aided video superimposition device in Malaysia and assessing reliability of the method using Malay male facial photographs and archived skullsRidzwan Abd Aziz bin Mohd Yusop¹, Bhupinder Singh², P.T. Jayaprakash³*¹Universiti Sains Malaysia/ Jabatan Kimia Malaysia, Terengganu; ²Forensic Department, Hospital Pulau Pinang; ³Forensic Science Program, Pusat Pengajian Sains Kesihatan, Universiti Sains Malaysia, Kubang Kerian, 16150, Kelantan, Malaysia*

Skull photo superimposition, now a video process, is a viable method to identify unidentified human remains. Nevertheless, the appropriate device for the application of superimposition method had not been available in Malaysia. In order to identify unidentified human remains and assess the reliability of the skull photo superimposition method, the first ever Computer Aided Video Superimposition Device was setup in Universiti Sains Malaysia, Kubang Kerian, Kelantan as part of this research. Three unidentified male skulls from those archived in Hospital Pulau Pinang were superimposed with the frontal and lateral

face photographs of 110 living Malay males between 20 to 55 years old for identifying the frequency of wrong matches. The fabricated device consisted of two high resolution (600 pixel) CCD video cameras (Bosch) with Fujinon TV Zoom lens (Manual 1.2/12.5-7.5), a digital video vision mixer (Panasonic-G-MX70E), a 32 inch LCD TV monitor, a remote-controlled pan and tilt device (CS Lilin, PIH-303 Model), control unit for the pan and tilt device (PIH-301-C 24VAC/240VAC), a VCR (Sony-SLV-C317PS), a 22 inch LCD computer monitor (Samsung) connected to video capture software (Pinnacle). During the skull photo superimposition, Whitnall's tubercle was used as a reference point for the life size enlargement as well as for positioning the skulls. The vertical distance between ectocanthion (angle of the eye) and tragus in facial photographs was applied to orient the skull. The match was assessed by applying the cranio-facial morphological correlations and by scoring the symmetries between the skull and the face images in life size. The decision on exclusion was made by tabulating the traits that were found non-correlating. The finding shows that the reliability of this method increased up to 100% when the Whitnall's tubercle is used as the point of anchoring in relation with the symmetrically placed ectocanthion and the ectocanthion tragus relationship is relied on for orienting the skull. This research indicates that reliance on Whitnall's tubercle as reference point generates more reliable results compared to the morphological method used by earlier researchers. The findings also endorse skull photo superimposition method as a reliable for identifying human remains in the context of criminal cases. The fabrication of the device and the establishment of the reliability of superimposition method can pave the way for identifying the unidentified remains in Malaysia that are currently buried without scientific recourse and thus may lead to further investigation of the cold cases that remain clueless.

Oral: 1728. The rational usage of chromatographic instruments in Forensic Medicine: The experience of Chemistry laboratory

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Introduction: Specialized Chemistry Department of Forensic Medicine Institution consists of two parts as Narcotics and Toxicology Laboratories. Narcotics lab determines quality, quantity, compliance with standards and whether or not the drug of the materials that incoming from the law enforcement agencies or prosecutor's office. Toxicology lab analyzes the biological materials such as blood, urine or organs and tissues. In these labs, the analyses are based on chromatographic methods. In this study, we aimed to compare HPLC, GC/MS and LC/MS/MS results of Narcotics and Toxicology lab for the same materials. **Methods:** Four narcotic samples analyzed with HPLC and GC/MS methods. In the same samples, while 15 active ingredients were determined with GC/MS method, HPLC results were 12 and six of these substances were the same with GC/MS. In this study, we also compared the results of two cases of drug poisoning. Blood, urine, bile and gastric lavage samples of these patients analyzed with HPLC, GC/MS and LC/MS/MS. **Results and discussion:** As a result of these examinations, we determined many active ingredients with different number by HPLC, GC/MS and LC/MS/MS method (7, 22, and 36 respectively). **Conclusion:** HPLC and GC/MS instruments should be used together for the analysis of narcotic samples. GC/MS and LC/MS/MS should be used together for toxicological analysis of biological materials and also if deemed necessary should be used HPLC.

FORENSIC IDENTIFICATION

Poster: 1760. Use of orthopantomogram for forensic identification in the elderly

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Introduction/Objective: It is predicted as a challenging process to identify individuals by dental means because loss of tooth is more common in the aged population. The purpose of this study was to evaluate the prospect of an individual identification in senior population based on the orthopantomogram (OPG). **Method:** One hundred eighty-six OPGs of patients who were over 55 and visited Seoul National University Dental Hospital were collected and their 5 years preceded OPGs were also collected. These OPGs were assumed as postmortem and antemortem records and analyzed. The groups were divided into the group 1 (aged 55 to 64), the group 2 (aged 65 to 74) and the group 3 (aged over 75). The whole dental arch was divided into 14 sections (7 sections for each arch) based on the morphology M3P2C1I4C1P2M3 and the natural teeth were counted. The dental characteristics were observed in each section. **Results:** The group 3 showed a statistically significant declination in the number of natural tooth when compared with the group 1 and inclination for the number of restored tooth compared with the group 2. The numbers of implant prosthesis made no significant difference in all groups. There were 171 different patterns with diversity of 92% and no natural teeth pattern was the most commonly observed in 13 out of 186 (7%).

However, 13 OPGs showing the same pattern without natural teeth demonstrated diverse patterns for identification when the dental characteristics such as restorations, implant prosthesis and other specific findings were considered simultaneously. **Conclusions:** An adequate amount of dental traits to make a forensic identification could be figured out in the OPG of the elderly. The OPG is still useful means of identification in the elderly as well as in general population.

Poster: 2064. The Internet as a tool in facial recognition research: A study of correct identification rates with increasing video footage quality

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Introduction: The use of the Internet for data collection in facial recognition and video resolution has not been studied in depth. **Objective:** This research addresses the question by studying the feasibility of the Internet, specifically the use of a web browser with flash videos to deploy facial recognition test. **Methods:** Video footage of target individuals were captured at the premises of the University of Dundee and a two week open access survey website to the general public was created with 15 videos of target individuals of varying video quality. Participants were recruited by email invitation through the University of Dundee email newsletter and through the local United Kingdom law enforcement agencies (for the laypeople and trained participant groups). Participants were tasked with identifying the target individuals from the included face array and fill in questionnaires at the end of each question. Video footage from low to high quality was shown to participants to find the lowest video quality needed to successfully identify a target individual in motion. Trained participant group consists of individuals having at least one year or more experience in facial mapping. The internet could be used for facial recognition research for ease of participation recruitment. **Results:** Results indicate that the low limit resolution for successful identification could not be determined as majority of the identification were below 50%. **Conclusion:** The results obtained were significantly lower than results obtained by previous researchers. There was some advantage shown by those trained in facial mapping at identifying faces. The increase in video resolution however does not increase the likelihood of correctly identifying target individuals.

Poster: 2065. Skeletal eye orbit expansion with age. A geometric morphometric study

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Introduction: It has also been shown through CT scans of individuals from different age groups that the orbital rim does increase in size as a person grows older. **Objective:** However, the findings have yet to be tested with geometric morphometrics (GMM). **Methods:** In order to confirm these findings, GMM analysis on 75 crania of the William Bass skeletal collection at the University of Dundee ranging between 16 and 87 years old (mean and median: 61 years old) was conducted. 3D surface scans of the crania were subjected to GMM analysis by placing landmarks on the frontal, maxilla and zygomatic bone of each cranium in IDAV Landmark software. Data acquisition from IDAV Landmark was analysed with MorphoJ software. Partial least squares (PLS) analysis based on age and sex was conducted on the data with and without allometry correction. The PLS output generated by MorphoJ was uploaded into IDAV Landmark to visualise the changes of the crania morphology based on the GMM analysis. **Results:** Results were obtained for both with and without allometry correction for comparison purposes. Visual changes of the crania after partial least squares analysis in IDAV Landmark software shows that the eye orbits of the crania becoming larger regardless of pooling the analysis based on age and sex. Allometry correction had little effect on the crania morphology. The eye orbits increases in size as a person become older is more noticeable in edentulous crania as visually, the morphed crania changes little with PLS manipulation in IDAV Landmark software. **Conclusion:** the eye orbits do becomes wider with age, though it may be due to the regression of the maxilla from teeth absence in individuals of old age.

Poster: 2094. Detection and analysis of new tetranucleotide STR locus on X-chromosome

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Introduction: The analysis of STRs (short tandem repeats) located on the X-chromosome is known to be effective in kinship testing, e.g., deficiency paternity cases. In the complex cases, high polymorphism and existence of linkage groups are useful for kinship testing. Recently, it is known that X-linkage groups are located in p22, centromere, q12, q26 and q28. **Objective:** In the present study, we report the detection of new tetranucleotide STR locus on Xq28. Informed consent was obtained and blood samples were collected from a Japanese group of 350 unrelated individuals (250 males and 100 females), 10

families and congenital hereditary diseases. **Methods:** The new STR locus was detected by using USCU Genome Browser and sequenced from 100 males and congenital hereditary diseases by using Sequencing Analysis Software 5.3.1 and the ABI 3130 Genetic Analyzer. Length polymorphism was analyzed from other samples (150 males, 100 females and 10 families) by using the Gene Mapper ID software v3.2. **Results:** We detected the new tetranucleotide STR locus located in the 151Mbp area of X-chromosome (NCBI genome view Build37.2) and this area was 100Kbp upstream from DXS10011. This locus was composed of two connected STRs, TGCC repeat and TTCC repeat. Whereas the former showed small repeats, the latter showed high polymorphism of large repeats. In addition to the structural analysis by a sequence, we also analyzed length polymorphism and confirmed that this locus had high discrimination ability despite the simple model of 4-base repeats. **Conclusion:** Applying this locus to multiplex PCR is also considered, so we think that it may be useful for personal identification or investigation of blood relationship by applying this locus to multiplex PCR.

Poster: 2097. Patients knowledge on informed consent in clinical practice, a preliminary study at North Colombo teaching hospital in Sri Lanka

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Introduction: Informed consent in medical practice refers to the idea that a person must be fully informed and understand the potential benefits and risks of their treatment before giving consent. Understanding what patients think about may help to improve the process of obtaining consent. **Objective:** To determine the patients knowledge on informed consent in clinical practice. **Methods:** Cross sectional descriptive study was carried out among 60 patients as preliminary study. Interviewer administered questionnaire was introduced to randomly selected inward adult patients. **Results:** Out of 60 patients, only 16% had higher education. 78% and 5% had only secondary and primary education respectively. 86% were aware on the concept of consent. 2/3 of patients accepted that consent is not needed in simple procedures. 100% had agreed that patients consent is needed for complicated procedure. 98% agreed that the best person to take consent is the doctor. The principle of autonomy requires informed consent for medical intervention. Lack of patients understanding of consent may undermine their autonomy. This study has exposed the inadequacies of their understanding in some of the more important aspects of consent. For instance, some think (22%) that the consent of the next-of-kin is enough even if the patient has full capacity. A majority (55%) are of the view that consent once given cannot be revoked. **Conclusion:** These findings represent adequacies and inadequacies of patients knowledge on consent process. There is still room for their education to improve the standards making the process of obtaining consent efficient and improving the safeguards of their autonomy.

Poster: 2136. Medico-legally significant structural variations of laryngeal cartilages

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Introduction: Structural abnormalities of the 13 cartilages in larynx sometimes mislead inexperienced forensic pathologists. **Methods:** Significant structural variations (abnormalities) found during my service are A-Triticiate cartilage- This is a grain like small cartilage present above the tip of thyroid horns in the posterior thyrohyoid ligament. More than half of srilankan population has Triticiate cartilage. This is commonly mistaken as a fracture of tip of the thyroid horn. True fracture of thyroid horn may be rarely ignored as a Triticiate cartilage. Tip of thyroid horn and lower end of Triticiate cartilage have rounded smooth edges. But in a fracture thyroid horn has irregular flat edges. B- Absence of thyroid horns- Unilateral or bilateral absence of thyroid horn is found in 1% of Srilankan population. When this is absent, real pressure on the neck cannot produce thyroid horn fractures. C- Long thyroid horns up to the hyoid bone- Sometimes thyroid and hyoid are joined with long thyroid horns. This is highly vulnerable for fracture during the pressure on the neck. D- Fusion of tip of thyroid and tip of hyoid bone- This creates a stronger structure less vulnerable for fractures. E- Dislocated arytenoids-After surgery, extubation resulted dyspnoea. Second Intubation was failed and patient died due to severe pulmonary edema. **Results:** Autopsy showed dislocated very large arytenoid cartilages. Dislocated arytenoid is a known cause for laryngeal obstruction following extubation and negative pressure pulmonary edema. **Conclusion:** Awareness of structural variations of laryngeal cartilages is important in interpretation of postmortem findings because Triticiate cartilages mimic injuries, absence of thyroid horns or fusion of hyoid and thyroid horns are less vulnerable for injuries from pressure on the neck and rarely dislocated arytenoids can produce fatal negative pressure pulmonary oedema following extubation.

Poster: 2138. An autopsy study of road traffic deaths in children at Hospital Tengku Ampuan Afzan, Kuantan 2009-2012

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Introduction: Deaths related to road traffic collision remain one of the most important causes of trauma deaths in Malaysia. Children are not spared from such deaths owing to multiple factors unique to this age group. **Objective:** To analyse and describe the deaths among the paediatric age group (defined as under 18 years old) such as age, gender, ethnicity, patterns of injury and cause of death in postmortem cases in Hospital Tengku Ampuan Afzan, Kuantan from January 2009 to December 2012. Design: Retrospective descriptive analysis. **Methods:** Data was collected from the death registration book and postmortem case files of the autopsy examinations carried out in Hospital Tengku Ampuan Afzan, Kuantan from the years 2009 to 2012. A total of 74 cases were available for the study. **Results:** Most of the deaths involved males (93.2%) and those from Malay ethnicity. Children from the age group between 10 and 18 years old made up 90.5% of these deaths. The rest were under the age of 10, with the youngest being a 29 day old baby. More than half of the deaths were caused by head injury alone. **Conclusion:** The results will be presented and discussed.

Poster: 2164. Admissibility of “Forensic Face and Body Mapping” evidence in the Australian Criminal Courts

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Introduction: In Australia, following the judgment passed by the NSW Criminal Court of Appeal in the Matter of Tang v Regina [2006 NSWCCA 167], the admissibility of Forensic Face Mapping evidence is limited to expert opinion of outlining the similarities and differences between a Person of Interest and a Defendant. In 2007, the High Court upheld the admissibility of Forensic Body Mapping evidence in the matter of Murdoch v The Queen [HCA Trans 321], however the limit of expert opinion still applies. To date Forensic Face and Body Mapping evidence from ID photos or CCTV surveillance images are not admissible for identification. The main criticisms were highlighted through the matter of Regina v Dastagir [2013 SASC 26] in that Forensic Face and Body Mapping protocol lack standardised methodology, supporting frequency database and population statistics. All of which are recommended to provide statistical significance for identification. The issue of identifying Persons of Interest from ID photos and CCTV surveillance images has become of great importance such that the Australian Government has specifically called for proposals and development of novel identification techniques of people (National Security Science and Innovation Strategy: Border Security Priority 2011). Research in anatomical morphometric analyses is one avenue to achieve objective standardised Forensic Face and Body Mapping protocols that would lead to identification. **Conclusion:** In this presentation, the limitation in the current protocols will be discussed using examples of trial cases. Furthermore, possible solution through ongoing research of novel identification techniques will be provided.

Poster: 2167. Forensic Mapping of habitual posture for morphometric gait analysis

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Introduction/Objective: CCTV (closed-circuit television) camera proliferation provides images of people of interest (POI) but no standardised, objective protocol for analysing images to potentially differentiate individuals and determine identity. Furthermore, CCTV images are often poor quality, with POI facial features obscured. However, gross body features are visible on poor quality CCTV cameras. This study investigated existence of habitual posture, a characteristic posture due to variation in lifestyle and biological factors, and its possible classification as a distinct or unique identifier for forensic identification from CCTV images. **Methods:** Morphometric assessment of 159 distinct/unique body peculiarities was made from body images of a total of 112 subjects. Statistical analyses were applied to display morphometric variance between: [1] pooled subjects, [2] the two sexes and, [3] the different somatotypes. Case studies using known and unknown subjects captured on CCTV images whilst standing and walking demonstrated the field application. **Results:** Statistical results show variation between individuals based on their morphometric postural profiles, supporting the existence of habitual posture and its possible classification as a distinct identifier. It does not support uniqueness, which requires using a larger population group. Anthropometric analysis showed presence of sexual dimorphism and somatotype predominance. Morphological analysis showed only the presence of sexual dimorphism. Case studies illustrated the prospective of this technique for potential identification of individuals from CCTV surveillance video. **Conclusion:** This study has successfully characterised habitual posture and its possibility to be used as a distinct identifier to discern between two or more individuals. The results could be further explored and developed into a novel technique of forensic identification.

CLINICAL FORENSIC MEDICINE

Poster: 2104. Influence of diclofenac and its metabolites on development of blowfly *Chrysomya megacephala*Siti Shamsuddin¹, Rumiza Rashid²¹Faculty of Applied Science, Universiti Teknologi MARA, Shah Alam, ²Institute of Forensic Science, Universiti Teknologi MARA

Introduction: The use of entomological evidence on estimating the post mortem interval (PMI) has been established especially in advanced decay stage. However, the estimation might be altered in the presence of drug or toxin. Diclofenac is analgesic nonsteroidal anti-inflammatory drugs (NSAID) which has been reported to be abused and encountered in drug poisoning cases. Blowfly of *Chrysomya megacephala* is among the most abundant carrion flies applied in PMI estimation. **Objective:** The aims of this study were to examine the development rate of *Chrysomya megacephala* in the influence of diclofenac and to explore the potential of blowfly larvae in determination of diclofenac and metabolites. **Methods:** Six cow livers spiking with different increment dose of diclofenac (0mg, 100mg, 300mg, 900mg, and 1400mg) were introduced to *C. megacephala* larvae. Development rate of blowfly was monitored every six hours by the measurement of length, width, and weight. **Results:** The research was found that larvae contained diclofenac at all doses were shorter compared to the control. Post hoc ANOVA via SPSS 21 revealed the mean difference is significance ($p < 0.05$) between control and diclofenac group at the early stage of development (12 hours-78 hours). Total development of control was completed within 198 hours, shorter compared to the highest dose of diclofenac (1400mg) which was delayed to 222 hours. Chemical analysis of *C. megacephala* larvae was identified the presence of diclofenac and derivatives in the sample. This study found that the presence of diclofenac delayed the *C. megacephala* development up to 24 hours, thus may give an impact in estimation of PMI. **Conclusion:** The larvae sample has potential to be used in toxicological analysis since diclofenac and its metabolites were able to be detected by Gas Chromatography Mass Spectrometer.

Poster: 2113. House robbery from the offenders perspective: A pilot study

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Introduction: A Malaysian literature search spanning thirty years resulted in very few studies on robbery. Objective: This paper attempts to identify areas where preventive and proactive practices may be effective by providing some insights into the reasons and behaviour of house robbers in Malaysia. **Methods:** Six men on remand for house robbery were voluntarily interviewed with their signed consent in local police holding rooms. They were asked to elaborate on four themes: selection of premises or targets, modus operandi, influencing factors, and skills. **Results:** From the themes, it emerged that the need for money to support higher lifestyles or to obtain drugs was the main reason for their crime involvement. Modus operandi differed, ranging from simple tools to using cons to gain entry. When either a close circuit television (CCTV) or the presence of a capable guardian was observed, theft was aborted. Target attractiveness, opportunity and accessibility to premises were important considerations for the robbery to occur. Skills were learnt from friends or acquaintances with some practicums involved. This pilot study has some investigative interest in relation to Malaysias efforts in reducing crime rates in a proactive manner that reduces the opportunity and benefits of crime involvement. **Conclusion:** The results of the pilot suggest several changes for use in the main study. In addition, multi-stage proactive prevention strategies may be utilised at many points between the intention and actual perpetration of the crime based on the information provided by the robbers themselves. Subsequently, proactive prevention strategies may reduce the risk-levels of vulnerable targets.

Poster: 2114. Motor vehicle thievery (MVT) from the offenders perspective: A pilot study

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Introduction: Among the most dominant type of crime in Malaysia is motor vehicle theft. However, there are very few studies conducted on vehicle thievery. **Objective:** This research tries to provide some information about the reasons and the behaviour of motor vehicle thieves in Malaysia so that effective preventive and proactive practices may be applied. **Methods:** Six men on remand for motor vehicle theft and twenty people detained in Prison X were voluntarily consented to be interviewed as part of a pilot study. All of them were requested to articulate on four main themes: rationale of doing it, modus operandi, skills set and target selection. **Results:** The results obtained from the four themes, indicated that the need for money to buy drugs was the major reason for their criminal involvement. Their modus operandi and equipments used were basic and minimal as they were commonly and easily found. Vehicle thievery were committed in quiet areas, without surveillance and secluded. Among the important considerations for stealing a vehicle include a demand for motor parts, insufficient safety features mounted in the vehicle and opportunity to carry out the crime. They acquire specific skill sets by learning it from a friend and then trying it themselves. **Conclusion:** This pilot study has relevance in police investigation in terms of intel and knowledge-based advantages. With some changes, the results of the study indicate that the main study

may provide precise information for use as preventive measures to reduce motor vehicle thefts proactively. Apart from the information supplied by motor vehicle thieves on rationale, modus operandi and opportunity; the knowledge can be used to disseminate actions in crime prevention.

Poster: 2115. Identification of Legal Highs in herbal products and ecstasy tablets by gas chromatography- mass spectrometry technique

Michelle Teh

Member of FSSM

Introduction: Legal highs are designer drugs that are produced by synthetic methods and used as recreational drugs. These drugs are synthesized from precursor substances that are readily available. Like amphetamine type stimulant (ATS) drugs, legal highs are psychoactive stimulants but at the same time being able to circumvent existing legislation and hence are legal to process in certain countries. It appears in various forms such as tablets, capsules and herbal products. Recent examples of legal highs include synthetic cannabinoids and synthetic cathinones. **Methods and Results:** In this study, we report the analysis of several synthetic cannabinoids in herbal products and synthetic cannabinoids with synthetic cathinones in tablets and capsules using gas chromatography-mass spectrometry (GC-MS) for identification.

Poster: 2179. Discrepancy between forensic examination by General Practitioner (GP) and Forensic Doctor and its medicolegal impact (case report)

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Introduction: Article 133(1) of Indonesian Criminal Act rules that investigator in handling the case of injury, poisoning or death suspected due to crime, can ask for help to forensic doctor, doctor, or other expert to solve the case. In the case of injury, forensic examination performed by forensic doctor has not the same quality as those by the general practitioner (GP) due to different competency. **Methods and Results:** A 30 years old man, got injured due to manslaughter. A police officer brought him to emergency room, asking for forensic report. Examination by GP in charge in ER, showed severe brain injury, with 11 blunt force injuries on the body. A forensic doctor, who is medico-legal consultant of the hospital, helped the GP making forensic report. Three days after, the victim died and the victim was sent by the police to Cipto Mangunkusumo Hospital, for autopsy. Forensic doctor who do autopsy is same forensic doctor in the first hospital and he found 18 injuries on the victim. The further investigation showed that the GP missed to notice and to note injuries. Then, description of injuries in the forensic report by the GP need to be corrected based on the post-mortem examination. **Conclusion:** To prevent the same problem in the future, photography was proposed in SOP of forensic examination in ER.

Poster: 1700. Maternal filicide in Malaysia: Motive of killing and penalty for the woman who killed her child

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Introduction: The phenomenon of maternal filicide; child murdered by mother shocks Malaysian society who demands for appropriate punishment. **Objective:** This study aims to describe the penalty and motive of killing of woman who committed filicide in this country. **Methods:** We reviewed forensic clinical records of women who attempted or committed filicide from two main forensic psychiatry wards in Malaysia and interviewed those who were incarcerated in five female divisions of prisons in Malaysia. The comparison of motive of killing and penalty received by these women were descriptively presented. **Results:** Despite considerable number of infant victims found dead of abandonment, only small proportion of women being convicted, thus study sample was rather small (n=25). Women who attempted or committed filicide, and hospitalized in forensic psychiatry wards for evaluation of their mental status or successfully plead for insanity defence, majority were initially prosecuted for more severe criminals; murder (88%) and infanticide (11%). In contrast, women who were incarcerated in prison were mainly those prosecuted for less severe criminals; concealment of dead body (42.8%) and remaining for infanticide (14.3%), culpable homicide (14.3%) and murder (25%). Former group of women varies in their motive of killing; acute psychosis (27.8%), having altruistic thought or attempted suicide (27.8%), child battering (16.7%), neonaticide (16.7%), having unwanted child (5.6%), and retaliation or revenge towards their spouse (5.6%). Whereas incarcerated women were mostly those who had motive of killing due to neonaticide (57.2%) and only small proportions, due to battering (14.3%) and acute psychosis (28.6%). **Conclusion:** Women who kill their child vary in their motive of killing and received range of mild to severe punishment upon conviction of their act. Collaboration between both medical and legal experts is warranted for further understanding of the act.

Poster: 1712. Psychological and social problems of adult female victims after sexual assault.

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Introduction/Objective: This study aimed to investigate the prevalence of psychological and social problems faced by female victims after rape and additionally the impact of also being a victim of childhood sexual abuse in a Turkish sample. **Methods:** Participants consisted of 93 female rape victims who were examined by the Turkish Council of Forensic Medicine. An interview form, which is developed in order to investigate psychological and social problems of victim, Post Traumatic Diagnostic Scale (PTSD) and Childhood Trauma Questionnaire were applied for the investigation. **Results:** 61.3 % of victims were diagnosed with post traumatic stress disorder (PTSD) and 54.8% of victims had sexual dysfunctions caused by the sexual assault. 68.8 % of victims reported that they were exposed to negative social reactions. Victims reporting negative social reactions significantly had diagnostic criteria for PTSD higher than the non exposed ones as 70.3 % to 41.4 % respectively ($X^2=7.04$, $df=1$, $p<0.01$). Self-mutilation and suicide attempts were high in victims of adult rape who were also sexually abused in childhood. **Conclusion:** Prevalence of PTSD in adult female rape victims who were exposed to negative social reactions is higher than the non exposed ones. Self-mutilation and suicide attempt were more frequent in victims of adult rape who were also sexually abused in childhood, but there was no significant relationship in PTSD prevalence.

Poster: 2075. Diabetic ketoacidosis: Two forensic autopsy cases

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Introduction: In autopsy diagnoses, systematic examinations, such as macroscopic, pathological, biochemical, and toxicological, are very important. However, it is sometimes difficult to identify and to examine any biochemical markers without clinical and pathological information. **Methods:** We report two cases of diabetic ketoacidosis (DKA). Case1: A female methamphetamine abuser in her forties was found dead lying on a hotel bed. Diagnosing her cause of death was difficult only from the macroscopic findings because of no fatal and/or serious injury or disease. **Results:** On toxicological examination, high acetone concentration was detected at 682 µg/mL in blood, and 887 µg/mL in urine by gas chromatography (GC). Using GC-mass spectrometry (GC-MS), methamphetamine was detected in the blood, urine, hair, and visceral organs but not in fatal level. GC-MS examination also revealed a high glucose peak. In the biochemical examination of urine, acetoacetic acid was 1940 µmol/L, b-hydroxybutyric acid was 14,720 µmol/L, and glucose was 4620 mg/dL. Histologically, Langerhans islets in the pancreas were fibrotic and atrophic, and no insulin-immunoreactive cells were observed. The subsequent police investigation also revealed that she had contracted diabetes mellitus type 1. Case2: A male in his fifties was found dead lying on the floor of the restroom in his house. He was diagnosed with diabetes and high blood pressure. But he had received no treatments. On toxicological examination, acetone was detected at a high concentration, 800 µg/mL in blood, and 960 µg/mL in urine using GC. Using GC-MS, high b-hydroxybutyric acid was detected in blood and urine. In the biochemical examination of urine, acetoacetic acid was 854 µmol/L, b-hydroxybutyric acid was 8144 µmol/L, and glucose was 3850 mg/dL. Hemoglobin A1c was 10.5%. DKA was attributed to their death. **Conclusion:** In this report, toxicological examinations by GC and GC-MS also gave important clues to the cause of death, DKA.

Poster: 2080. Casting of stab wounds in liver using plasticizer

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Introduction: In forensic science, the examination of stab wounds to determine the specific weapon used in a homicide is an important part of the investigative process. **Objective:** The aim of the present research is the estimation of the blade shape of a sharp instrument using plasticizers. Common kitchen knives were used as the sharp instruments. Agar molds and bovine liver were employed to simulate the injured organ. Plaster and urethane resin were applied as the plasticizers. As a preliminary experiment, we inserted the knives into the agar (1%) to create stab wounds, and then poured the plasticizer into the created cavities. After several preliminary trial runs, we performed the experiment on the bovine liver in the same way. We compared the size and shape of the obtained plasticizer casts with the form of the blade that produced the cavities. **Results and Discussion:** The preliminary experiment revealed that the low viscosity of the plaster made application easier, but the obtained cast was too fragile and broke easily. The viscosity of the urethane resin was higher and the solidification time was shorter, thus requiring a quicker application to the cavity. However, the obtained cast was stronger and more durable and could withstand twisting and vibrating without losing shape or breaking. In the trial using the bovine liver, the urethane resin hardened in about 30 minutes, and the resulting cast was an accurate representation of the form of the tip of the blade. Also, because it was made with the urethane resin, the cast was durable and did not break easily. **Conclusion:** By utilizing a urethane resin plasticizer, it was possible to quickly create a cast of a stab wound which accurately estimated the size and shape of the blade used. This method could be very useful in the forensic investigation of victims.

Poster: 2098. Toxicological aspects of non-communicable diseases in Sri Lanka: A critical review in medico-legal perspective

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Introduction: Non-communicable diseases (NCD) (Cardiovascular diseases, Cancers, Chronic kidney Disease, Diabetes, Cerebrovascular Diseases etc.) account for 70% of deaths in Sri Lanka. The etiology and circumstances of these so-called natural deaths are not properly investigated medico-legally. **Objective:** Increasing trend of NCD has been observed for decades, especially among farming communities and children. It cannot be adequately explained on traditional risk factors i.e. alcohol, smoking, consumption of excessive fatty and salty foods, and sedentary life style. **Methods:** A critical review of relevant local and global scientific materials was done to understand the problem. Grey literature related to NCDs in Sri Lanka was also taken into consideration. **Results:** Attention is now deviating towards a toxic etiology to explain this high NCD prevalence, and the relationship between NCD and human exposure of various toxins is extensively studied. Newer studies showed a statistically significant relationship between NCD and human exposure to cumulative toxins originated from pesticides and fertilizer. They include abandoned toxins as well. The exposure could be either direct or indirect (by ingestion of contaminated food and water). Therefore, farmers are running a dual risk of getting diseases, and seventy percent of SL population engages in agricultural activities. Since 1960s, SL has been gradually shifted to agrochemical based farming system instead of traditional farming system, mainly due to policy changes of governments towards the principals of Green Revolution. **Conclusion:** Despite regulations, it had resulted in contamination of the environment, food and water with heavy metals and various organic and inorganic toxins. Abnormal increase of the NCDs in SL is parallel to changing agricultural pattern. NCD should be properly investigated medico-legally with toxicological profiling to study this problem as per prevention of such diseases. **Acknowledgment:** The Founder of Helasuwaya.

Poster: 2148. Wife-battering: Risk to life, consequences and impact of the criminal justice system, based on patients reported to a Tertiary Care Hospital in Sri Lanka

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Introduction: Wife battering in Sri Lanka has not been studied in depth from a medico-legal perspective and the current study was designed to explore the various types of abuses, their consequences and the impact of the criminal justice system. **Methods:** A retrospective study of 116 Medico-Legal Examination Forms (MLEFs) of survivors of wife battering reported to a tertiary care hospital, in Sri Lanka, from Jan-2011 to Dec-2012, using a data extraction form. Judicial responses of all cases were studied from relevant police stations. **Results:** 77.6% survivors and 67.4% husbands were less than 40 years of age. 69% husbands were problem drinkers. 87% had faced 2 or more incidents. 74.5% incidents began with initial threatening. All survivors were abused verbally and psychologically. Black eye is the most common significant injury. Assaults with blunt weapons were found in 84 incidents and were 46.7% and 77% in one incident group and multiple incident group respectively ($p < 0.05$). Out of 25 risk factors only violence being increased over the past years and alcoholic or problem drinkers had a significant association with number of incidents ($p < 0.01$). There were 86.2% non-grievous and 8.6% grievous injuries. 15.5% survivors who reported directly to the hospital requested not to inform police and was statistically significant ($p < 0.01$). **Conclusions:** Income, the presence of extramarital affairs, the abusers personality etc were not significant risk factors. Assault with blunt weapons, alcohol abuse and increased violence over the past year are significant risk factors. Refusal of informing to police by the survivors was statistically significant and the survivors choice in taking legal action should be retained. It is important to establish a Health Care Provision centres/ Mithuru Piyasa in each hospital for follow up and holistic management of survivors. When providing medico-legal services, need of focusing beyond satisfying the legal requirement is reiterated.

Poster: 2158. Dual responsibility of forensic physicians in examination of torture victims: Have they failed in Sri Lanka?

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Introduction: The examination of a torture victim is always a challenging task for a government medical officer as he/she has to maintain impartiality while being an employee of the state. The world medical association resolution adopted in 2003 and amended in 2007 on the responsibility of physicians in documentation and denunciation of acts of torture and ill-treatment reiterates this fact. **Objective:** As medico-legal examination of detainees from special detention camps for alleged torture is an optimal premise to assess the dual responsibility of forensic physicians we decided to review all case records of

our department pertaining to examination of detainees. to reappraise the performance levels. **Methods:** We analysed 1319 medico-legal case records pertaining to detainees referred from Boossa detention camp to the Ruhuna Dept. of Forensic Medicine Galle during 2007-2010 time period with regard to locus of examination, facilities available at the locus, interpreter status, duration of examination and for the opinion. **Results:** It was revealed that consultant JMOs were rarely involved in examining detainees. Majority of detainees were examined by assistant JMOs without any supervision. The detainees were predominantly examined within the detention camp itself. A room within the camp was provided for examination purposes and it had no facilities required for clinical forensic examinations. The fellow detainees were used as interpreters and the officials of the detention camp were present within the locus of examination throughout the procedure. The privacy of the detainees was given minimal significance. **Conclusion:** The results clearly show that medical officers involved in examining detainees referred from Boosa detention camp have not followed the standards laid down by the Istanbul protocol for examination of torture victims. It is our conclusion that the junior forensic doctors have not done a satisfactory medico-legal examination and they were compelled to follow conditions laid down by the authorities of the detention camps.

Poster: 2165. Child protection beyond law enforcement: Sri Lankan experience in prevention of child abuse and secondary victimization

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Introduction: Child abuse (CA) in Sri Lanka was recognized by the State and responses framed through Penal code amendments of 1995. These responses were dominated by the powers of the State to detect and prosecute abusers. Less attention was given to rights of children and duties of parents and the State to ensure their recovery. Further law reforms, training and strengthening of relevant stake holders and other measures were introduced to facilitate judicial processes. Despite all those efforts, the number of reported child abuse cases was increasing. **Method:** A retrospective study of CA cases seen in Judicial Medical Unit of the main Hospital of a rural district was done. **Results:** There were 228 victims of CA presented during the 22 months from November 1999 and 203 in 2012. The majority of them were child sexual abuse (CSA). An average of 2 girl victims of sexual abuse was presented every week in 1999-2001 and 3.4 in 2012. 56% of these girls admitted eloping with boyfriends. Girls of age 14 to 16 years were the most vulnerable; being 70% of those eloped. Later years the tendency of younger girls eloping has gone up. **Conclusion:** The study showed that the Law enforcement alone cannot effectively control CSA. The need for integrated and coordinated multi disciplinary approach in management and prevention of CA is discussed.

Poster: 2166. A study of preventive risk factors in fatal road traffic injuries, with special emphasis to helmets and seatbelts

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Introduction: Every day, we read, listen or witness injuries in our day to day lives. Over time, it has moved from 5th to 3rd to 1st page of our newspapers. Some days, it is not uncommon to see the entire page filled with news about injury and violence. The 'Incredible India' is on the move and changing at a fast pace. In this changing scenario, injury and violence is a leading cause of death and disability. Road deaths and injuries are increasing at a rapid pace in Bengaluru and other parts of India and are likely to increase if systemic and scientific road safety policies and programmes do not accompany this change. **Objectives:** 1. To examine the role of helmets and Seatbelts among the two wheeler riders and motorcycle front seat occupants in fatal road traffic injuries. 2. To evaluate the extent of preventable deaths due to helmet in motorcycles and Seatbelts in motorcars. **Methods:** The present study of 238 cases has been carried out in the Department of Forensic Medicine and Toxicology, Victoria Hospital, attached to Bangalore Medical College and Research Institute, Bengaluru during the period October 2010 to September 2012. All the cases of Death due to Road Traffic Injury were selected for the study. **Results and Discussion:** A total number of 7347 autopsies were performed in the Department of Forensic Medicine and Toxicology, Victoria Hospital, Bangalore Medical College and Research Institute, Bengaluru, over a period of 24 months from October 2010 to September 2012. There were 998 cases (13.58%) of deaths due to Road traffic injuries and only 238 cases were included in our study based on the inclusion and exclusion criteria. Of the 238 cases, 94% were males and 6% were females. Age and sex wise distribution of deaths due to Road traffic injuries indicates that the highest risk was seen in the age group of 21-30years(46.2%) followed by 31-40years(21.4%), constituting around 2/3rd of the cases. Hindu religion was observed as the highest percentage with 86% of all cases. Time of injury among the cases studied showed that highest incidence being during the night times i.e. 18:01 hrs - 00:00 hrs which constitutes 44.11%. Place of injury which are more prone for road traffic injuries indicates that city/municipal roads (56.03%) and highway roads (30.25%) accounts for more than 2/3rd of the cases. Road user at the time of crash indicates that the two wheeler riders form the major contributors for road traffic injury (78.15%). In our study it is observed that most of the accidents occur in the weekends with Saturday accounting for the major part with 20.16% of all the injuries. Among the type of crash, hit from back(44.95%) and head on

collision(30.67%) accounts for majority of the type of crash. In our study, 50.90% of two wheeler rider/pillion rider were wearing helmet at the time of crash and among them, 24 persons out of 112 were wearing a full face helmet, 9 were wearing open face helmet and 79 were wearing half helmet. 15 persons out of 112 were wearing an ISI standard helmet during the time of crash. Among 15 cases who were wearing ISI standard Full helmet, none of them had head injury which reflects the protective accountability of helmets in two wheeler riders/ pillion riders. **Conclusion:** At the end it is said that use of protective equipments like helmets and seatbelts play a pivotal role in preventing fatal injuries in Road Traffic Injuries. So, along with this, a multi-disciplinary approach is required to tackle this issue and therefore proper attention towards their prevention, accurate diagnosis and satisfactory management is mandatory.

Poster 2175. Comparative Study on the declination of the burnt body temperature that could influence the time since death estimation: Burnt carcass in a pit with shaded roof top and burnt carcass on an open ground surface

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Introduction: Time since death estimation is one of the important element in forensic death investigations. In criminal activities, the aims are to destroy the identity and to vanish any physical evidences found on the deceased. Hence, fire is used to facilitate the destruction and in most of the cases found when the victims have already dead during the conflagration. **Objective:** This study was conducted to see what factors influence the decaying process on burnt carcasses which could disturb the time since death estimation. The objective is to compare the 2 burnt carcasses; that are burnt in a pit (with shaded roof top) and on an open ground surface. Two bovine head carcasses were placed in different settings; one was located in a pit with shaded roof top, whilst another carcass was on an open ground surface. **Methods:** Both carcasses were burnt to the extent of approximately 15-30 min. The daily observations for 8 days were made by measuring the carcasses core heat and surface temperature. Other factors such as the presence of foul smell, presence of ants, flies and maggots at the carcasses burning sites; have also been observed. **Results:** We had noted that (1). The core heat temperature was declined faster on the burnt carcass which was located on the open ground surface compared to the one which was in a pit. This factor may affect the time of flies landed on the carcass. (2). The foul smelling burnt carcass in the pit was detected later compared to the other carcass and this could attract flies. (3). The flies landed faster on the carcass located on the open ground surface caused the maggots emerged earlier compared to the one which was burnt in the pit. **Conclusion:** Thus we conclude that the late declination of core temperature of the burnt carcass in a pit compared to the burnt carcass on the open ground surface could affect the carcasses decaying process hence influence the time since death estimation.

Poster 2307. A study testing superimposition as the standard method for comparing frontal sinus patterns during skull individualization

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Introduction: Frontal sinus radiograph has been well known as one of the essential tools for individual identification. Since its first application by Culbert & Law (1927), researchers have attempted to standardize the method for comparing ante-mortem and post-mortem frontal sinus patterns. Besana & Rogers (2010) tested the metrical and morphological methods and reported 100% success while superimposing radiographic ante-mortem and post-mortem frontal sinus patterns on a light box. Consequently, these authors have recommended superimposition as the criterion for comparing frontal sinus patterns to meet Daubert standard. However, practitioners are seen to have relied on side by side morphological comparison. **Objective:** The present study tested the suitability of superimposition method for frontal sinus pattern comparison by superimposing frontal sinus patterns available from four sources: i) testified cases, ii) reported cases, iii) radiographing skulls in USM archive, and iv) radiographing skulls in SRM Medical College & Research Centre Tamil Nadu. **Methods:** The latter two experiments were planned as simulations of ante-mortem and post-mortem radiographs wherein the skulls were radiographed twice: first by making two exposures while the skull was fixed on the X-ray table and second also by two exposures in between which the skull was removed from the X-ray table and was repositioned for the second exposure. **Results:** Superimposition of these patterns especially in 'wipe' mode revealed lack of congruence among the patterns recorded after repositioning the skull and only those patterns recorded while the skull remained fixed demonstrated point-to-point match during superimposition in wipe mode. **Conclusion:** It is concluded that in real life situations the orientation of the skull would never remain fixed and thus superimposition cannot be recommended as the method for choice for frontal sinus pattern comparison. Side by side comparison is seen as the most preferred method for frontal sinus pattern comparison.

FORENSIC PATHOLOGY

Poster: 2308. Suicide in the elderly in Malaysia

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Introduction: From time immemorial, suicidal feeling and hopelessness have been considered as part of ageing and understandable in the context of being elderly and having physical disabilities. Older adults, being the fastest growing population segment worldwide, are at greater risk for suicide than any other age group. The elderly attempt suicide less often than younger people but are successful more often. **Objective:** The authors retrospectively reviewed all cases recorded by National Suicide Registry Malaysia (NSRM) for year 2009. The cases of suicide in victims 65 years and older totaled 23, accounting for 7.1% of all suicides. **Methods:** All the cases were autopsied. The case records were retrospectively analyzed with respect to age, gender, ethnicity and method of death. Comparisons were also made between males and females, levels of education, presence of stressor and life events antecedent to suicide. **Result:** The ages of these suicide victims ranged from 65 to 94 years old; men comprised almost 70% of the cases. The average age of the victim was 73 years. 7 victims were those of 75 years and older. Hanging was the most common method of suicide, accounting for 56.5% of the cases. Other methods included jumping from height (13.1%), exposure to unspecified chemicals (13.1%), jumping/lying before moving object (4.3%), exposure to pesticide (4.3%) and injuring oneself using sharp object (4.3%). Based on ethnicity, Chinese contributed an almost 80% of the cases (18 cases). Others were Malays (2 cases), Indian, Kadazan Dusun and Sikh contributed one case respectively. Physical illness was observed in almost 50% of the cases, making it a common antecedent to suicide. **Conclusion:** In conclusion, suicide is an avoidable act, hence, it is fundamental to educate health professionals and society in general to help recognize, prevent and treat those who are suffering in silence.

CRIMINALISTIC

Poster: 1275. Histochemical and morphological characteristics of the Hassalls corpuscles in the ectopic intra-thyroidal thymus

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Introduction: We encountered three cases of the intra-thyroidal ectopic thymus at autopsy and also performed three autopsy cases consisted of mothers and children and children with severe stress. **Methods:** The morphological and immunohistochemical characteristics of the Hassalls corpuscles were examined in those in ectopic and normal positioned thymus. **Results:** The Hassalls corpuscles obtained from ectopic and normal positioned thymus showed resemble morphology and stainability with antibodies. **Conclusion:** These results indicate the Hassalls corpuscles in the intra-thyroidal ectopic thymuses also possess the biological significance.

Poster: 1889. Stories given by children, when to take it with a pinch of salt?

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Introduction: The history given by a child is very important in a case of child abuse investigations. This is especially relevant in cases of child sexual abuse as in some forms of sexual abuse the injuries are absent. The only evidence to prove the case sometimes is the evidence given by the child. The law presumes that the statements given by the child are true. How far the doctor should and can believe a child's history? **Objective:** This case report describes a situation where a child gave a history of been kidnapped and cared for twice, by an unknown person. There was a suspicion that the child may have been sexually abused. **Methods:** The child gave a similar detailed history to the JMO, police, and the psychiatrist. Based on the information received from the child, various investigatory procedures have been initiated by the police. **Results:** Detailed examination of this victim by the child psychiatrist revealed that child was having significant and very prominent fantasy life in romantic/sexual nature. It was also detected that the child is not very bright intellectually. It appeared that a big proportion of the story given by the child is coloured by her experiences and fantasies. **Conclusion:** This case report emphasizes the importance of referring all the children with history of child abuse to a psychiatrist for detailed assessment.

Poster: 1970. Labial impressions: A tool for identificationUmesh Bindal¹, Priyadarshni Gogia Bindal², Nurul Athikha bt Ramli¹¹School of Medicine Taylors University, Selangor, Malaysia; ²Faculty of Dentistry, University of Malaya, Malaysia

Introduction: First recommendation to use lip prints as one of the tools in the court of law was done by Frances greatest criminologist Edmond Locard. **Objective:** The study was aimed to determine the differences in labial impression among races in Malaysia and to note if there is any change over a time period. **Methods:** The study recruited 60 subjects, consisted equal ratio of male and female subjects from the three main races of Malaysia. The labial impressions of an Indian subject was studied over a period of seven years. The lip prints were obtained on the strip of bond paper and was analysed using the Suzuki and Tsuchihashi classification. **Results:** It was observed that Type II (72.50%) was the predominant pattern in Indian race and the least observed pattern was type III (33.75%). Type I (71.25%) was the most common pattern observed in Malay race and the least observed pattern was type I (12.50%). Type III (87.50%) was the most common pattern observed in Chinese and the least observed was type IV (0%). There was no change in lip print pattern over a period of seven years. Apart from the features mentioned according to the classification some additional features were noticed and these features were consistently followed and there was no changes observed over a period of seven years. **Conclusion:** The lip prints have potential in determining the race and sex of an individual. Since lip prints is different in every individual, so it can be used as a method for personal identification which may give contributions in crime scene investigations.

Poster: 1975. Identification of various support services in learning disabled children having handwriting difficultiesLoveleen Chauhan¹, Vikram Chauhan²¹Kay Jay College of Education, Rasulpur, Bahadurgarh; ²Chief Forensic Investigator of Patiala Bureau of Identification, Patiala, India

Introduction: Handwriting is an applied science which constitutes: Optics-the science of sight, Physiology-the science of physique and Psychology-the science of mind & behavior and overall it includes various multiple skills such as vision, coordination of eyes, arms, hands, memory, posture and body control of holding a writing instrument and forming letters and words. In case of learning disabled children various difficulties arise while appending handwriting and there is a need of various support services for improving these difficulties. **Methods:** For the present study handwriting samples of 200 learning disabled children have been taken from various elementary schools in various districts of Punjab (India). **Results and Conclusion:** In the present paper various handwriting difficulties have been identified which include poor writing skills, spelling errors, disordered numbering and written number reversals, inconsistent letters and words, unusual grip on the writing instrument, unfinished or omitted letters or words, carefully watching the hand while writing, slow and labored strokes, irregular size, slant and alignment of letters and randomly placing of punctuation marks etc. along with the identification of various support services required for the betterment of learning disabled children which include chair suitability, manner of handling or gripping the writing instrument, clarifying various shapes of letters and words by verbal and non verbal methods, Psychological counselling, Peer relationship, Parents and Teachers Emotional and Educational support, improving Social skills and overall Medical management.

Poster: 2013. Classification of lighter fluid and association of lighter fluid residues using self organising feature map (SOFM) neural networkWan Nur Syuhaila Mat Desa¹, Dzulkiflee Ismail¹, Niamh NicDaied²¹Universiti Sains Malaysia, Kuala Lumpur, Malaysia; ²Centre for Forensic Science, Strathclyde University

Introduction: Ignitable liquid of petroleum based fuels such as petrol, lighter fluid and kerosene are commonly used by arsonist to start fire. Therefore, characterisation of petroleum based fuels is an area of continuing importance in forensic science. In the context of fire debris analysis, predominant focus is on the detection and identification of ignitable liquid residues because the identification of the accelerants and/or the source of the accelerant may be used to establish an important evidentiary link between a suspect and a crime scene. This process however can be complicated by the presence of numerous interference products from unburned background substrates, pyrolysis products and combustion products generated as a consequence of the fire. **Objective:** This work explores the objective interpretation of 35 chromatographic profiles derived from variety of lighter fluid samples from different manufacturers. **Methods:** Unevaporated and evaporated samples were analysed using gas chromatography-mass spectrometry (GC-MS) analysis. In total 51 characteristic peaks from total ion chromatographic (TICs) profiles were selected as variables and pre-processed prior to subsequent analysis using unsupervised chemometric analysis (PCA and HCA) and unsupervised artificial neural network system of Self Organising Feature Map (SOFM). Next, the effect of interference product on the association of lighter fuel residue was investigated. TICs profiles derived from various common burnt substrates in the presence of lighter fuels were investigated. Definitive links between unevaporated and gradually evaporated lighter fluid samples is achieved using mathematical approach. **Results:** The results revealed that SOFM acted as a superior means of evaluating and linking degraded lighter fluid samples data to their parent

(unevaporated liquids). **Conclusion:** The study also demonstrated feasibility of SOFM mapping to classify and discriminate lighter fluid residues from common interfering products and established successful association of the residues from burnt substrates to its source.

Poster: 2083. Characterisation of molotov cocktail using gas chromatography-mass spectrometry (GC-MS) and principal component analysis (PCA)

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Introduction: Molotov cocktail is notoriously used in riots and arson cases. The term Molotov started around 1939 during the Winter War between Soviet Union and Finland. Vyacheslav Molotov, a Soviet Foreign Affairs Commissar pretended to deliver airborne humanitarian food aid to the starving Finns but in actual fact they were dropping cluster bombs. In response to the Soviet, the Finns developed hand-held bottle firebomb and called it Molotov cocktail as drink to go with the food that they used to attack the Soviet tanks. Until now, Molotov cocktail is still a device of choice to set fire and damage to properties and harm personnel particularly during protest and riot due to its efficiency, ease of assembly and cheap. The classic and perhaps the simplest one is made up of a glass bottle filled with petrol and rag placed in the neck of the bottle. Upon lighting, the bottle is hurled towards the target and usually set fire upon impact. **Objective:** This study focuses on the feasibility of principal component analysis (PCA) to group and link petrol samples and petrol sample residues used in Molotov Cocktail to their original sources. **Methods:** Twenty nine (29) petrol samples collected from twelve (12) Shell and seventeen (17) Petronas service stations within Kota Bharu, Kelantan were used to prepare the devices. After hurling, the residue of the Molotov Cocktails was collected. All fresh and residue samples were analysed using gas chromatography-mass spectrometry (GC-MS). **Results:** Although the fresh petrol samples can be successfully grouped into two groups according to their brands using data from GC-MS and PCA, their Molotov Cocktail counterparts posed more challenges due to changes in their chromatographic profiles after severe heating. **Conclusion:** The presentation will discuss the findings from this study and make some recommendations as to the use of GC-MS and PCA to the analysis of Molotov Cocktails.

Poster: 2121. Evaluation of the incest history of judicial cases

Ozlem Erel, Fusun Callak Kalem, Mustafa Selim Ozkok, Serpil Demirag, Ahmet Bulent Ozata, Musa Dirlik, Ufuk Katkici

Aydin Adnan Menderes University, Turkey

Introduction: In this study, reports of incest examined in a period of 5 years at University of Adnan Menderes, Department of Forensic Medicine have been investigated. **Objective:** The feature of abusers and victims were evaluated. **Results:** Of the total 25 cases, only one of them was male. Abuse cases occurred mostly in July. In 32% cases, abusers were fathers and again in 32% of the cases abusers were stepfathers. Only 4% of the cases had previous sexual experiences. 84% of the cases had no anal finding and 68% of the cases had no hymeneal finding. Only 4% of the cases were married. The abusers were all male. **Conclusion:** The results are discussed with the aid of literature.

Poster: 2159. Recovery of latent fingerprints in abandoned car

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Forensic Science Programme, School of Health Sciences, Universiti Sains Malaysia

Introduction: Fingerprints are one of the most important evidence in proving a criminal case in court. Their unique characteristics make the accused bear the burden of proving his or her innocence. Hence, the investigation pertaining to the fingerprints at crime scene should be emphasized. **Objective:** The aim of this study was to recover and assess the quality of fingerprints deposited in an abandoned car in the open environment. **Methods:** The car was left all day and night under the tropical climate of Malaysia ie. in Ipoh, Perak from March to July 2013. Car gear knob was used as a material in the study as latent fingerprints are commonly found on it by crime scene investigation team in criminal cases involving vehicle. Donor thumbprints were deposited on the gear knob of Proton car and the car was then parked in open area with the windows closed and locked properly. Temperature and humidity inside and outside the car were measured daily until the final samples were successfully recovered. Latent fingerprints were developed weekly in 4 months span using powdering followed by cyanoacrylate fuming technique. The quality of the developed prints were visually assessed and also compared with MAFIS software in PDRM for an identification report. **Results:** The study showed that fingerprints of good quality and comparable characteristics can be recovered up till the 12th week upon exposure in a confined space of open environment. **Conclusion:** This finding is of paramount importance for forensic investigation as the information obtained suggests a timeline for successful recovery of latent fingerprint from car interiors.

Poster: 2162. Tuberculous pericarditis-a sudden hidden cardiac death

Ashwini Kumar, Jagadish Rao Padubidri

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Introduction: Tuberculosis (TB), caused by *Mycobacterium tuberculosis*, is a major killer in the world and pulmonary infections are well characterised. It is not widely known that TB myocarditis and pericarditis leads to sudden cardiac deaths (SCD). Tuberculous pericarditis is an important complication of tuberculosis, the diagnosis of which can be difficult resulting in late complication like constrictive pericarditis and increased mortality. Constrictive pericarditis is a chronic inflammation of the pericardium with thickening, scarring and muscle tightening. The diagnosis of constrictive pericarditis requires a high degree of clinical suspicion. Constrictive pericarditis can be life threatening if untreated. **Methods:** Case description Hereby we report a case of 45-year old male, who was admitted with history of discomfort in the chest with myalgia and died within 24 hours of hospital stay. **Results:** On autopsy, he was found to have tuberculous pericarditis with granulomatous inflammation in the mediastinal and tracheobronchial lymph nodes without gross pulmonary involvement, which has been rarely reported in forensic literature. **Conclusion:** Findings and pathophysiology will be discussed.

FORENSIC ENTOMOLOGY**Poster: 1278. Forensic Entomology**

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Introduction: Forensic entomology or cadaver entomology is the scientific study of insect fauna on the cadaver and its interpretation in the aid of justice. Forensic entomologists apply their knowledge of insects and their life cycles and behaviour to provide information for criminal investigations. Its application include identification of insects at various stages of their life cycle, such as eggs, larva, and adults, collection and preservation of insects as evidence to determine postmortem interval and cause & manner of death in certain cases. The fauna of a corpse is very versatile ranging from necrophages like blow-flies to incidental bugs. **Methods:** There are numerous methods of collection of these insects from the corpse which have been tried over the period of time, with a few considered acceptable by the fraternity. **Conclusion:** The interpretation of the findings is the most crucial aspect of forensic entomology as injuries, temperature, moisture and other environmental factors play a crucial role in altering the fauna as well as their growth rate on the corpse.

Poster: 2017. Infestation of *Chrysomya megacephala* (Fabricius) and *Chrysomya rufifacies* (Macquart) on burned rabbit carcasses in Kelantan, MalaysiaN.L. Zainol-Abidin¹, P.T. Jayaprakash¹, N.A. Mahat²*¹School of Health Sciences, Universiti Sains Malaysia Health Campus, 16150 Kubang Kerian, Kelantan; ²Jabatan Kimia, Fakulti Sains, Universiti Teknologi Malaysia, 81310 UTM Skudai, Johor Darul Ta'zim, Malaysia.*

Introduction: Postmortem interval (PMI) estimation using insects developmental data is the most significant contribution of forensic entomology in death investigation. **Objective:** Although several studies on the effect of burns in dead bodies on necrophagous insects have been reported, studies focusing on the infestation patterns of *C. megacephala* and *C. rufifacies* in the different levels of burn injury as prescribed in the Crow-Glassman Scale (CGS) remains limited. **Methods:** Three levels of CGS were studied by burning the rabbit carcasses corresponded to CGS level #1, CGS level #2 and CGS level #3 burn injuries using 0.5 L of petrol (RON 95) for one minute, 0.75 L of petrol (RON 95) for five minutes and 1.5 L of petrol (RON 95) for 33 minutes, respectively. Five replicate experiments were performed. **Results:** It was found that the initial oviposition by *C. megacephala* and *C. rufifacies* was delayed by one day in the CGS level #3 burned carcasses, while in the CGS level #1 and CGS level #2 burned carcasses the same was similar to that in control carcasses. No marked differences in the completion of Calliphoridae life cycles were observed. **Conclusion:** It can be concluded that the empirical baseline data generated here can be useful for estimating PMI in cases of burned dead bodies, especially those involving the CGS level #3 burn injuries.

Poster: 2110. A Study on socio-demographic factors and knowledge of medico-legal aspects of sexual assault among victims and assailants

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¹General Hospital Panadura; ²Department of Forensic Medicine, Faculty of Medicine, University of Peradeniya, Sri Lanka

Introduction: Sexual assault is a serious global issue. Mostly identified risk factors are young and adolescent age, poor education, low socio-economic backgrounds and lack of parental care etc. Importantly it has serious physical, psychological and emotional consequences. Authors have experienced a similar pattern in Sri Lanka and the lack of awareness regarding medico-legal aspects of sexual assault has led to commit sexual offences more frequently. However references are hardly available regarding the latter observation. **Objective:** To determine socio demographic characteristics and evaluate the knowledge on medico legal aspects of sexual assaults among the alleged victims and assailants. **Methods:** The data was obtained from alleged assailants and victims who have reported to three forensic units in Sri Lanka since 2010. **Results:** Among 135 study subjects 77.2% were females and 22.8% males. 72.2% subjects were less than 18 years of age and among them 63.2% were less than 16 years. In 95% of cases the victim knew the assailant and from them 44% had love affairs. One third of them eloped with the assailant and all of them were unaware of legal age limits for marriage. More than 70% subjects did not know the alleged sexual assault was illegal and whether there is a legal age limit to marry. More than 90% subjects were unaware of the legal age limit of a child, the legal outcome of the assailant and the importance of medico-legal examination in cases of sexual abuse. Most vulnerable group is female school going children. **Conclusion:** Low socio-economic and poor education backgrounds were seen among them and they are grossly deficient on knowledge regarding the medico-legal issues such as legal age limits, types of offences and importance of medico-legal examination. It is worth to plan awareness programs for target groups including school children and parents especially having female children.

Poster: 2111. Influence of parental decisions on case conferences in management of child abuse: An analysis of five cases

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Introduction: The case conference (CC) is a standard, legally accepted, multidisciplinary forum for making recommendations in future management of the abused child. However parental participation at CC is questionable in available literature. But according to the authors experience, especially in Sri Lanka, parental decision at CC is seen as an important element in resolving some of the conflicts that beset child protection work. Here the author presents five cases where the parental decision demonstrated a positive impact on the final management. **Objective:** To evaluate the influence of parental decisions on case conferences held for the management of child abuse (CA). **Methods:** Three females, 4 years, 13 years and 15 years and two males, 1½ and 12 years respectively, suspected of CA, were referred for forensic examination. They were suspected of being abused under categories of parental neglect, physical and sexual abuse. In all these cases home environment and lack of parental care had a significant impact on the child's condition. CCs were held with the participation of parents/guardian of the child. **Results:** In first four cases the initial decision appeared opposite to the parental decision, however children were kept under parental/guardian custody after thoroughly advising them on the gravity and consequences of the event and its legal outcome. These families were regularly subjected to repeated strict reviews by both legal and medical authorities. In the latter case, decision of both the multidisciplinary team and the mother appeared same on sending the child to a Children's Home as the environment appeared less protective for him at his grandmothers place, in spite of the grand-mothers idea to keep him. **Conclusion:** CA should be managed by a multidisciplinary approach and the case conferences where indicated. All five cases emphasized the importance of parental decision in the management of CA in countries like Sri Lanka.

Poster: 2144. The occurrence of scuttle flies (Diptera: Phoridae) on concealed animal carcasses

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Universiti Kebangsaan Malaysia

Introduction: Scuttle fly (Diptera: Phoridae) is commonly reported in forensic entomology cases but restricted to indoors and concealed environments. Its adult is known for having relatively smaller size compared to other forensically important fly. Research on scuttle fly in forensic entomology is, however, still limited and its occurrence on animal carcasses remains unexplored. **Objective:** The objectives of this study are to identify scuttle fly species associated with animal carcasses in concealed environments and to determine its succession on carrions. **Methods:** Carcasses of male New Zealand white rabbits, weighed approximately 2.07 to 2.95 kg were individually placed in an open environment (control), concealed in a black garbage bin, a used luggage and a cabin for a 40-day period at Forensic Science Simulation Site, Faculty of Health Sciences, Universti Kebangsaan Malaysia, Selangor, Malaysia. Sampling procedure was performed as prescribed. **Results:** A total of 21 scuttle fly species from 9 families were recorded from all simulated environments but only 8 species were

found associated with carcasses. Scuttle flies from control carcasses were consists of adult *Dohrniphora cornuta* (Day 3) and *Megaselia nubilifurca* (Day 4). In garbage bin, *M. scalaris* was collected (Day 5 to Day 33), followed by *Puliciphora borinquensis* (Day 6, 23 and 36), *Spiniphora* sp. (Day 7 and Day 13) and *Bothroprosopa* sp (Day 13 and Day 40). Scuttle flies from carcasses in luggage were *Bothroprosopa* sp. (Day 8 and 33), *D. cornuta* (Day 15), *Gymnoptera simplex* (Day 30 to Day 40), *P. borinquensis* (Day 10). In the cabin, *M. scalaris* was the dominant species (Day 3 to Day 38), followed by *M. spiracularis* (Day 6 and Day 31) and *D. cornuta* (Day 9 and Day 10). **Conclusion:** It is hoped these findings provide new information to the knowledge of scuttle fly bionomics in forensic entomology indoors and in concealed environments.

FORENSIC PATHOLOGY

Poster: 1279. Study of shape of external auctostic meatus in Harynavi crania

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Introduction: In spite of the similarities exhibited on superficial morphological or physical characteristics on various ethnic groups in India, considerable numbers of variations are also observed among the Indians. **Objective:** Study of shape of meatus will help in racial identification in medico-legal cases. The current investigations on the human crania that were recovered from various geographical zones of Haryana State will focus on the shape of external auditory meatus. **Methods:** 150 complete skulls (115 males, 35 females) were used. These bones were retrieved from the Department of Anatomy, Pt. B.D. Sharma PGIMS Rohtak. **Results:** Shape of external auditory meatus was oval /ellipse in most of the cases in north Indian crania specially on left side. When data of two sexes was compared it was surprising to observe that in 100 % cases in females, shape of meatus was either oval or ellipse and never round on the left side, whereas in males, shape of meatus was observed as round in only 1.89% cases. **Conclusion:** Present study has proved that in addition to Caucasoid and Negroid features, crania of present series have some resemblance with Mongoloid too.

Poster: 1280. Fabricated bone injuries:A three year study

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Introduction: We in the department of Forensic Medicine & Toxicology of G.G.S. Medical College, Faridkot conducted a retrospective study of three years from January 2010 to December 2012 regarding age and sex, in the urban and rural population, site of injuries of Fabricated Bone Injuries as well as other superficial fabricated injuries. **Results:** We could observe that maximum number of cases in the study came from age group of 21-30 years in male and 31-40 years in female. Majority of cases undergoing fabrication came from rural background in contrast to urban population. Maximum number of superficial injuries was in males and so was the case in relation to bony injuries. Fabricated injuries were commonly present on the hands and fingers (Photographs and X-rays will be presented in the conference). **Conclusion:** We will also be informing regarding the conclusions drawn in relation to the fabrication. Authors will try to highlight the importance as well as negative impact of these injuries. We also tried to ascertain the reasons for undergoing such injuries by the individual which were either self inflicted or self suffered. All these aspects vis a vis Indian Penal Code (IPC) will be presented and discussed with the gathering in the conference.

Poster: 1289. Relationship of gene polymorphisms RRM1 -756T>C and -269 C>A with breast cancer

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Introduction: Breast cancer is one of the most malignant neoplasms worldwide and is the fourth leading cause of cancer death among Taiwanese in Taiwan. Ribonucleotide reductase (RNR), nucleotide metabolism enzyme, is necessary for DNA synthesis and DNA repair and is consisted of a regulatory subunit (RRM1) and two catalytic subunits (RRM2 or p53R2). RRM1 is suggested to be contributed to the suppression of cancer cell proliferation, migration, and metastasis. **Objective:** The purpose of this study was to identify RRM1 gene polymorphisms specific to patients with breast cancer and healthy controls. **Methods:** A total of 833 subjects, including 321 healthy controls and 512 patients with breast cancer, were recruited in this study. Allelic discrimination of RRM1 -756 and RRM1 -269 gene polymorphisms were assessed with the ABI StepOne[®], Real-Time PCR System (Applied Biosystems, Foster City, CA, USA) and analyzed using SDS vers. 3.0 software (Applied Biosystems), with the TaqMan assay. **Results:** In our recruited control group, the frequencies of RRM1 polymorphisms such as RRM1 -756 (p >0.05, c2 value: 0.22) and RRM1 -269 (p >0.05, c2 value: 0.93) were in Hardy-Weinberg equilibrium, respectively. Genetic distribution of these two polymorphisms were not significantly statistical

difference between healthy controls and patients with breast cancer. Also, there was no significant association between gene polymorphism and clinicopathological parameters of breast cancer. **Conclusion:** Gene polymorphisms of RRM1 -756 and RRM1 -269 may be not play the important role for the susceptibility of breast cancer.

Poster: 1297. Observation of the vertebral artery damage using an angioscope in autopsy cases

Ayumi Motomura

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Introduction: Thrombus formed by the intimal flap, or dissection of the vertebral artery can cause brain stem infarction, and close examination inside the artery may be needed in some cases. In this study, we used an angioscope to detect the vertebral artery damage. **Methods:** Bilateral vertebral arteries in 62 autopsy cases which seemed to be subject to external forces on their necks, were observed using an angioscope system designed by Fiber Tech to observe the coronary artery, consisting of the Vecmova NEO, fiber catheter AS-003, and 3CCD imaging system FT-203. After removing soft tissues such as muscle in the neck, a 5Fr sheath was inserted into the origin of the vertebral artery and normal saline was injected from the side tube to maintain a view of the inner wall of the artery. **Results:** We successfully observed the extracranial vertebral artery with the angioscope. In cases where arterial injury was apparent, the site of injury was visualized as a fuzzy area on the arterial wall. There were intimal damages in 43 of 124 arteries (34.7%), 18 cases had damage in left side, and 25 cases did in right side. 14 cases had intimal damage in bilateral artery. **Conclusions:** We could observe the vertebral artery using the angioscope, and we found there were not a few damage inner wall of the artery. But we cannot search intracranial side of the artery, and there are still remain technical problems.

Poster: 1306. Epidemiological profile of homicidal deaths in Chandigarh Zone of India- A 10 year autopsy experience

Satinder Singh, Dalbir Singh

Post Graduate Institute of Medical Education and Research (PGIMER), Chandigarh, India

Objective: The objective of this study was to determine the characteristics and trends of fatal homicidal injuries in Chandigarh Zone of India and suggest suitable preventive measures. **Methods:** Retrospective study of all homicidal deaths that occurred over a decade (1st January 2003 to 31st December 2012) in a leading tertiary care institute of North India that caters to the health need of more than 370 million people was conducted and analyzed for age, gender, area of residence, marital status, type of weapon used and cause of death. **Results:** A total of 331 homicides occurred that constituted 3.3% of the total unnatural deaths that occurred over the study period. Male preponderance was observed and the most common affected age group was found to be 21-30 years. Socio-demographic parameters were studied and statistical correlations were observed. The findings of the study will be discussed during the presentation. **Conclusion:** This study provides reliable and accurate data which is critical to provide useful information about the burden of homicide on the society. As the study focused on various contributory factors over a long period of time, its result will be of immense help in shaping future health policies so as to bring the mortality to a minimum.

Poster: 1311. Road traffic crash fatalities in children: Results of a 40 years retrospective data from a leading tertiary care hospital of North West India

Dalbir Singh, Satinder Singh

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Introduction/Objective: To study the epidemiology of road traffic crash related deaths in children in North West India and to suggest suitable preventive measures to reduce mortality from road traffic crashes. **Methods:** This retrospective study extended over a four decade period (1973- 2012) on children (<=18 years) that became victims of road traffic crashes and subsequently died during the course of treatment in a leading tertiary care institute of North West India. The postmortem records of the victims were used to document the details regarding age, sex, area of residence, time of crash, fatal injury and other socio demographic parameters. The data thus obtained was analyzed in SPSS version 16. **Results:** These deaths constituted 10.4% of the overall deaths related to road crashes. A majority of the victims belonged to the state of Haryana (37%) followed by the state of Punjab (33%) and Chandigarh (14%). Rural population (61%) suffered greater loss of human lives than urban. Most of the fatalities occurred during the daytime (79.4%) and pedestrians (47.9%) were found to be most commonly affected. Male predominance was observed and the most common affected age group was the 16-18 years. Injury to head and neck region (82.1%) was responsible for a majority of deaths. **Conclusion:** It can be concluded from the study that the fatalities from road traffic injuries are increasing swiftly and unless immediate remedial are taken the health risk cannot be minimized.

Poster: 1553. Overtreatment of crying spells with antiepileptic drugs as a form of Munchhausen by proxy: the Albanian experienceGentian Vyshka¹, Admir Sinamati², Albert Kreci²¹Faculty of Medicine, University of Tirana; ²Institute of Legal Medicine, Rr. Dibres 371, Tirana

Introduction: Four children (aging 4-7 years, male/females 3:1) were consulted emergently due to persistent crying spells. Previously to the specialist visit, children were consulted at a primary care facility and antiepileptic treatment was started. The role of the AED treatment, the precise character of the (pseudo)seizures and the familiar setting were cautiously scrutinized. **Methods:** MRI of the head and electroencephalography were registered in all cases, together with a thorough internist visit and medical check-up. Mothers underwent a psychological interview in another centre, and their psychiatric history was documented. Data upon the dosage and length of antiepileptic therapy was collected. **Results:** No anatomic changes were registered in all cases; electroencephalography confirmed lack of epileptic activity. EEG was eventually registered anew the next month after the initial visit and lack electrical equivalents of seizures justified the AED tapering off. Six months thereafter children were free from pharmacological therapy, and counseling sessions of respective mothers with psychological assistance were under way. Precise reasons for inventing inexistent dramatic crying spells were found within the familial setting and the personality of the mothers. Psychotherapy for a probable Munchhausen by proxy syndrome was started. **Conclusion:** Abstaining from unnecessary antiepileptic treatment if no electrical proof of seizure activity, when other findings (clinical visit, MRI) are as well within normality, is an advisable and fruitful measure. Psychological assistance to the caring parent (the mother, as a rule) is indispensable.

Poster: 1554. Minor interventions with major complications: Malignant hyperthermia during cosmetic surgeryAdmir Sinamati¹, Albert Kreci¹, Gentian Vyshka²¹Institute of Legal Medicine, Rr. Dibres 371; ²Tirana Faculty of Medicine, University of Tirana

Introduction: Malignant hyperthermia (MH) is a potentially lethal complication, considered a rare disorder that is elicited mainly during anesthesia in susceptible individuals. Described initially in 1960 from Denborough, such a complication has been continuously under scrutiny, with several attempts to produce reliable tests that might forecast and prevent such an event. **Methods:** We report a fatal case of MH complicated with disseminated intravascular coagulation (DIC) during a cosmetic intervention for bilateral congenital ptosis, in a 10-year old Caucasian boy. Autoptic findings, micro and macro photos have been realized and hereby discussed. **Results:** Lethal changes have been microscopically and macroscopically found in autopsy. We discuss those changes and the cascade of events that led to this fatality. Recent and meticulous research has substantially reformulated the theoretical basis for such a complication, actually considered as a disease of calcium-regulating proteins. **Conclusion:** The use of dantrolene has considerably influenced the prognosis of such a disorder, but other appropriate symptomatic measures have to be honored, with discontinuation of offending drug, treatment of acidosis, electrolyte disbalance and heart rhythm disorders, among others. Worth mentioning is the fact that MH during anesthesia represents a relatively rare event, with an incidence estimated from a minimum of 1:10000 interventions from some sources, and a maximum of 1: 220000 in others. There is however a general accord that the disorder is more frequent during anesthesia in children.

Poster: 1563. Lightning injuries in an in-door settingAdmir Sinamati¹, Albert Kreci¹, Gentian Vyshka²¹Institute of Legal Medicine, Rr. Dibres 371; ²Tirana Faculty of Medicine, University of Tirana

Introduction: Lightning injuries are not an infrequent occurrence, but casuistics is mainly related to the outdoor environment. Lightning injuries are also becoming uncommon due to better safety measures in electrical power supplying; nevertheless we refer a very rare case of a fatality due to lightning occurring inside home. **Methods:** Full forensic expertise was made to the corpse of a Caucasian 46 year old male, who died inside his kitchen room due to electrical discharge transmitted via the chimney of the home, whose external part was shocked from a lightning. Macroscopic changes due to the electrical shock and images from the scene were registered. **Results:** Although less frequently nowadays, Albanian families nevertheless still use to some extent wood stoves for heating. Chimneys that are mainly hand-made and non-professionally mounted have been imputed for carbon monoxide intoxications, but in rare misfortunate circumstances those chimneys might serve as electrical current transmitters, thus exposing users to very high risk. Lightning injuries transmitted via a rotten chimney whose external part was shocked from electrical impulse, might quite well penetrate in their respective internal part and get transmitted to humans in an indoor setting. **Conclusion:** Particular precaution has to be made to mounting chimneys that might serve as electricity transmitters, since casualties due to lightning in these circumstances are rare, but anyhow occurring.

Poster: 1623. Sudden death in hot bath of an individual with undiagnosed multiple sclerosis

Wai-Ming Poon

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Introduction: Multiple sclerosis is a demyelination disorder that affects the central nervous system and can present with a wide array of symptoms. **Methods:** The present case involved a 43-year-old male with a 10-year history of tiredness who was given a diagnosis of Chronic Fatigue Syndrome. He died suddenly while immersed in a hot bath for not more than 15 minutes, as part of a Traditional Chinese Medicine treatment for his complaints. **Results:** Autopsy showed features of multiple sclerosis with multiple discrete demyelinating plaques at various parts of the brain including the brainstem, with inflammatory cell infiltration within the lesions on histology. The role of heat exposure in aggravating symptoms of multiple sclerosis as well as in causing sudden death in patients with multiple sclerosis was discussed. **Conclusion:** This case was reported because of the following peculiar features: (i) the occurrence of sudden death in relation to heat exposure in previous undiagnosed multiple sclerosis, (ii) its association with a form of Traditional Chinese Medicine treatment and (iii) the short duration of heat exposure with its implication on the possible mechanism/s of death.

Poster: 1644. Total Body Score: A new method in estimating post mortem interval

Hau Chee Teo

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Introduction: The conventional assessment of post mortem changes is based on physical observation of soft tissue destruction. Total Body Score (TBS) system is a system developed by Megyesi on 2005 which allows quantitative assessment on decomposition process based on 3 main body parts, which are (i) head and neck, (ii) body trunk and (iii) hands and legs. **Methods:** A total of 12 rabbits (*Oryctolagus cuniculus*) carcasses were used to study the effect of burial and type of clothing on rate of decomposition through TBS system assessment. Body parts were scored independently thus overcoming the various rate of decomposition on the same body. The total scores from 3 body parts is known as TBS score. Thus this score reflects the current overall decomposition process. Subjects were separated into 3 groups: no clothing, light clothing and heavy clothing. Control subjects were placed on the ground surface while test subjects were buried at 30 cm depth graves. **Results:** The head, neck and limb regions were found to decay faster than the body trunk region. We noted that burial had significantly delayed post mortem change as compared to subjects which were exposed on ground surface because burial delayed decomposition due to lower insect activity and lower soil temperature. The soil layer had also blocked the accessibility of major arthropods to the subject, causing further delay in decomposition. Clothing was found not statistically significant in affecting decomposition in all groups. However, we noticed that clothing prolonged decay of bodies on ground surface while mummification occurred on body parts that were exposed directly to the atmosphere. On the other hand, clothing delayed decomposition among buried subjects because the body parts were physically separated from soil and arthropods accessibility. **Conclusion:** Repetitive exhumation showed faster TBS score increase. Unfortunately, the changes were not statistically significant.

Poster: 1646. Sudden adult death: A forensic autopsy series of 534 cases with gender and control comparison

Geoffroy Lorin de la Grandmaison¹, Anne-Laure Naneix¹, Marie-Cécile Pärrier², Eloi Marijon², Xavier Jouven²

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Introduction/Objective: The aim of our study was to highlight the epidemiological difference in adult sudden death between males and females. The type of pathologies found in adult victims of sudden death was compared to control cases in order to determine the most significant pathologies involved in sudden death. **Methods:** Among all autopsies performed between 1995 and 2009, 534 adult cases of sudden death and 154 cases who violently died were respectively selected. For each case, a complete autopsy was carried out, including systematic histological examination of all major organs. Age, sex, place of death, stress before death, heart weight and causes of death were reported for the sudden death group. Age, sex, heart weight and cardiac pathologies were reported for the control group. **Results:** The sudden death population was composed of 369 males and 165 females. There was no statistical difference regarding age between males and female. Sudden death took place more often at home in women than in men ($p < 0.0001$). A stressful event was more frequently found in men than in women ($p = 0.03$). Deaths caused by cardiovascular diseases were more frequent in males than in females, especially Coronary Artery Disease (CAD) ($p < 0.0001$). Cardiomyopathy was more often the cause of death in women, particularly Arrhythmogenic Right Ventricular Cardiomyopathy (ARVC). Cardiac pathologies were found in 45% of the control cases. CAD and ARVC were statistically more frequent in the sudden death group than in the control group. Heart weight was higher in the sudden death group than in the control cases ($p < 0.0001$). **Conclusion:** According to our study, profile of sudden death is different between males and females. Cardiac pathologies involved in sudden death can be frequently found in control population. So, morphological findings must be carefully assessed by the forensic pathologist to avoid the risk of overdiagnosis.

Poster: 1664. The cause and manner of death in schizophrenic patientsJ L Thomsen¹, L.H.Trger¹, L.H.Jensen¹, J.Banner², L.W.Boel³, G.Ottesen⁴, C.B.Hyer⁴

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Introduction: Schizophrenics have a pronounced shorter life expectancy. Only few publications have addressed this issue. **Methods:** Two of us (LHT and LHJ) examined in retrospect 92 schizophrenic patients who had undergone a medico-legal autopsy. They were consecutively selected from the period 2003-2012. **Results:** Accidental death was very prominent (45%). In 17% of the entire group of patients, the manner of death was unascertained and the cause of death in 12%. Intoxication was the most frequent cause of death (58%), including cases of polypharmacy. In 43 out of the 53 cases of intoxication, it was unintended, and in 9 out of these 43, death was due to anti-psychotic drugs only without any interference by alcohol, opiates or other drugs. **Discussion:** The results clearly indicate intoxication with anti-psychotic drugs to be a major problem. The prescription pattern needs to be analyzed as there was poly-pharmacy in some cases. It was however not always known, if the drugs were prescribed by physicians or achieved in other ways. It is thought provoking that the manner of death was unknown in 17% and the cause of death in 12%. Some of these cases may be due to the arrhythmogenic effect of antipsychotic drugs. **Conclusion:** In an attempt to unveil the true causes and manner of death in schizophrenic patients, a prospective project SURVIVE has been launched by the three institutes of forensic medicine in Denmark. Comprehensive genetic, toxicology, pathology, microbiology, scanning and biochemistry analyses are being performed during a two year period in all mentally ill patients who undergo a forensic post-mortem during that period.

Poster: 1713. Murder-suicide: A case report from ThailandAmpon Chamsuwan¹, Pramualpim P²

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Introduction: Homicide followed by suicide or murder-suicide (dyadic death) refers to a phenomenon where an individual kills someone and subsequently takes his or her own life within one week. The incidence rate in Thailand was rare. According to retrospective study of homicide-suicide information from newspapers in 1979-1999. Rujipak T showed that the most frequent perpetrator ages were between 21 and 30 yrs. Most of them were married men and low socio-economical workers. Gunshot was the most common method and common type of homicide-linked suicide is spousal or consortia killing. **Methods and Results:** The author report a case study in Khon Kaen, northeastern Thailand. A couple were found dead in their burned home. The wife was found in their bedroom and the autopsy showed that she was stabbed at left chest and had blunt head injuries. No soot was found in her trachea or gastrointestinal tract. The husband was found near the back of the house with third degree burn over 100% of body surface area and soot was found in the trachea. The neighbor told that the couple were arguing about the gambling habit of the wife and she was told to stop, otherwise she would be killed. A piece of bicycle wheel which was burnt found in the living room. **Conclusion:** Though the carboxyhemoglobin were negative in both persons, the author and the police concluded that this case was murder-suicide. The wife was killed by stab wound at chest and blunt head injury, then burnt by using gasoline. The husband who was offender killed himself by self immolation. The motive was the financial stress.

Poster: 1714. Two cases of cerebral hematoma in basal ganglia with traumatic head injuries

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Tohoku University Graduate School of Medicine

Introduction: In trauma cases where autopsy reveals cerebral hematoma, pathologists must determine whether the lesion is spontaneous or traumatic. **Methods:** We report two cases of hemorrhage in the basal ganglia with severe head injuries. **Case 1:** The victim was a man in his 80s found unconscious and lying on a floor. He had complained of a headache and nausea two hours prior to his death. **Result:** An autopsy showed occipital bruising; fracture of the occipital bone; severe subarachnoid hemorrhage; left subdural hematoma; contusions of both frontal lobes; hematoma around the left putamen; and hemorrhage into the lateral ventricle. Based on computed tomography (CT) findings and macroscopic examination, the hematoma showed typical primary hemorrhage. Considering the antemortem symptoms, we assumed that he spontaneously developed cerebral hemorrhage, fell, and hit his head; fatal head injuries could have resulted. **Case 2:** The victim was a man in his 80s who died when his mobility scooter ran into an automobile at an intersection. The autopsy revealed bruises on the face; slight subarachnoid hemorrhage; a large hematoma in the right basal ganglia; a small hematoma around the left basal ganglia; and the left corona radiata. Based on CT findings and macroscopic observation, we assumed that the fatal hemorrhage of right basal ganglia was spontaneously developed. The tricycle could have remained upright after the stroke, with the man remaining seated but unconscious, leading to the collision. **Conclusion:** Most brain injuries caused by falls are either coup-contrecoup contusions, which produce hemorrhagic lesions of white matter, or are related to fracture. Some

brain injuries caused by traffic accidents are diffuse, and can appear as hemorrhage in the white matter of the superior frontal gyrus. In contrast, large hematomas of the basal ganglia are usually endogenous in origin. In our two cases, postmortem CT findings provided useful information to diagnosis primary parenchymal hemorrhage.

Poster: 1750. Injury, pre-existing congenital anomaly and medicolegal interpretation

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Introduction: A 12 year old girl with congenital hypoplasia of odontoid process of axis vertebra was pushed. The injuries were exacerbated in the presence of the anomaly. She was admitted in hospital and provided treatment but she succumbed to her injuries. **Methods:** An autopsy was performed and the case being associated with history of assault was taken to court. The medicolegal issues relating to responsibility and degree of responsibility were argued and resolved in accordance to the prevalent Law. **Conclusion:** In this paper, the outcome and discussion of the present case is compared with possible outcomes for a similar case in other countries with reference to laws applicable in that country. The discussion brings out interesting contrasts in the interpretation and raises issues on the basis of fixing Criminal responsibility.

Poster: 1753. Sudden cardiac death of a young professional footballer during a match

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Introduction: Sudden death in young athletes remains an exciting chapter for the challenge of forensic pathologists to find the medical cause of death. Cause is not always clear. There are some difficult cases requiring detailed laboratory and necroscopy explorations. **Methods and Results:** We present a case of the young man who died suddenly while playing professional football and whose cause of death was acute myocardial infarction associated with multiple myocardial bridges (1.8 cm on the anterior interventricular artery, 1.3 cm on the circumflex artery, and an intramyocardial trajectory of the posterior interventricular artery). It was a triple myocardial bridging associated with atypical coronary topography. Myocardial bridging (MB) is defined as the presence of an intramural course of a coronary artery, most likely caused by a defect in resorption of the musculature that encircles the epicardial arteries during morphogenesis. **Conclusion:** The authors discuss the causes of death and possible consequences of this pathology. Potential malpractice issues are analyzed on sports medicine physicians who rated the health of the footballer over time.

Poster: 1781. A case of homicide by heart attack

Mohd Suhani Mohd Noor, Mohammad Sharafi Zaini, Mohammad Bahruddin

Ministry of Health Malaysia, Hospital Sultanah Bahiyah

Introduction: It is not generally understood by the legal authorities and the public, including clinicians, that a homicide may be effected through a pre-existing natural disease such as a coronary heart disease. Typical presentation will be a sudden collapse leading to death either during or soon after an assault where the physical trauma involved is minimal or non-fatal in nature. Given the circumstances of such a death, the strict legal test is Would he have died at that moment in time if the assault had not taken place? The fact that an assault victim may be rendered vulnerable by a potentially fatal pre-existing illness is immaterial. Such deaths should rightly be classified as homicides. **Methods:** We present the case of a 54 year old man who died from an acute myocardial infarction after having sustained minor blunt assaultive injuries. Case report: A 54 year old hypertensive man had complained of sudden chest pain in the Emergency Department after having sustained minor blunt assaultive injuries 2 hours earlier. **Results:** ECG showed evidence of acute myocardial infarction, and in spite of an emergency percutaneous coronary intervention, he died later in the day. The autopsy showed severe coronary atherosclerosis with evidence of stenting, and an extensive reperfused area of acute anterior myocardial infarction. His death was certified as myocardial infarction in a man with blunt force trauma. Although initially charged with culpable homicide not amounting to murder, his assailant was subsequently found guilty of an amended lesser charge of causing grievous hurt. Discussion: The forensic criteria for homicide by heart attack is discussed. **Conclusion:** Any death from an apparent underlying illness occurring soon after an assault or any other form of trauma must be subjected to a thorough medico-legal investigation. This will ensure the assignment of the appropriate manner of death and subsequent adjudication.

Poster: 1789. The aberrant sudden death of a healthy young man

Mohd Suhani Mohd Noor, Wan Zafirah Zamaliana Alias, Mohammad Bahruddin

Ministry of Health Malaysia; Hospital Sultanah Bahiyah

Introduction: It is uncommon for sudden cardiac death to occur in healthy young persons, and such deaths can be devastating for the family and the community. Determining the precise cause for these sudden deaths may be one of the most challenging tasks faced by forensic pathologists. Although the majority of sudden cardiac deaths may be ascribed to coronary atherosclerosis, there are other causes as well. Non-atherosclerotic coronary artery diseases are often unrecognised. **Methods:** We present a case of sudden cardiac death of an apparently healthy young man where the dominant autopsy finding was dysplastic intramural coronary arteries. Case report: A 29 year old man suddenly collapsed while chatting with his family members and could not be resuscitated. **Results:** Postmortem examination of the heart revealed transmural fibrosis of the posterior wall of left ventricle in the presence of healthy epicardial coronaries. Histological examination of the left ventricle and interventricular septum showed dysplastic intramural coronary arteries with myocardial fibrosis of the adjacent areas and evidence of contraction band necrosis. There was no evidence of hypertrophic cardiomyopathy, and postmortem toxicology was negative. His death was certified as intramural coronary artery dysplasia. Discussion: The pathology of intramural coronary artery dysplasia is discussed. Forensic pathologists should be aware of the possibility of a non-atherosclerotic coronary disease causing ischemic damage to the myocardium with arrhythmia and eventual sudden cardiac death. **Conclusion:** Determining the precise cause of death for these cases will lead to better understanding of the incidence, causes and circumstances surrounding sudden cardiac deaths, and better preventive strategies in the future.

Poster: 1795. Perimortem fracture or taphonomic modifications due to dogs action?Bogdan Malinescu¹, Mariana Rosu²*¹Ilfov Medico-Legal Service, Bucharest, Romania; ²"Mina Minovici" National Institute of Legal Medicine, Bucharest, Romania*

Introduction: Anthropological expertise in skull fractures is difficult, with numerous limitations, on account of the absence of clear criteria for differentiating perimortem fractures against taphonomic alterations. **Methods:** We present a case of anthropological expertise regarding some skull fragments, found near a landfill, consisting of two cranial segments (anterior and posterior). The separation line is parallel to the coronal suture. Expertise objectives were: establishing biological profiling in order to identify the person, the mechanism of skull fracture and its vital or postmortem aspect. **Results:** Equatorial skull fracture line from the cranial apex presents at the temporo-parietal bilateral 2 each punctured areas, shaped, with the involvement of both tables and diploia, with the largest hole at the outer table. The holes from the both sides of the skull were most likely produced by dogs canines that dropping the victim's head in both areas of maximum curvature side (right and left), produced the fracture line during constriction. **Conclusion:** Correlating police investigation and results from anthropological examination, the identification of the person was possible, appreciating that the most likely separation of the skull in 2 fragments was due to carnivores bites (canids), produced postmortem, also sustained by the absence of blood infiltrates in areas where the continuity of bone was interrupted.

Poster: 1803. An autopsy case of the aorto-esophageal fistula due to a chronic aortic dissection with massive gastrointestinal bleedingTomonori Nagai¹, Hiroshi Takeshita¹, Meri Takada¹, Shirushi Takahashi², Kazumi Kuroyanagi³, Norimasa Kageyama³, Aya Takada², Kazuyuki Saito⁴, Toshiji Mukai¹*¹Department of Legal Medicine, St. Marianna University School of Medicine, Japan; ²Department of Forensic Medicine, Saitama Medical University, Japan; ³Tokyo Medical Examiner's Office; ⁴Department of Forensic Medicine, Faculty of Medicine, Juntendo University, Japan*

Introduction: Aorto-esophageal fistula (AEF) is a rare but life-threatening condition, most commonly caused by a thoracic aortic true aneurysm. Objective: We present an extremely rare case of AEF due to chronic aortic dissection in this report. **Case report:** The patient was a 72-year-old man without detailed medical history, while it was said that he had undergone treatment for hypertension, cardiac insufficiency and aortic dissection 3 years previously. He was found dead with massive hematemesis in the washroom of a hotel in which he was staying. Autopsy revealed a chronic aortic dissection of the thoracic aorta with a false lumen communicating to a true lumen by two channels. The outer wall of the false lumen penetrated to the esophagus in the level of the physiological stenosis, resulting in a massive gastrointestinal bleeding. **Conclusion:** We reviewed the literature on AEF and discussed the pathogenesis of the condition.

Poster: 1807. The forensic importance of the injuries produced during CPR maneuvers

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Introduction: In Romania, the cardiopulmonary resuscitation protocol requires that, for whatever reason, the specific maneuvers must last 40 minutes. During this time interval, the team that performs the resuscitation maneuvers determines whether or not the patient shows signs of life. Often, during the resuscitation maneuvers, thoracic injuries are produced, sometimes overlapping the previous trauma by worsening it. **Objective:** to identify the lesions produced during the resuscitation maneuvers, their seriousness, whether they have a vital character, whether they have occurred during life and whether they contributed to the thanatogeos mechanism. **Methods:** it was selected a total number of 40 cases of deceased persons to whom cardiopulmonary resuscitation maneuvers were applied; the patients underwent forensic autopsies in 2012. The following conditions were checked: age, sex, medical cause that imposed the resuscitation, type of death (violent, nonviolent) and whether the post resuscitation lesions had a vital character. The essential criterion followed was whether the trauma produced by the resuscitation contributed to the thanatogeos mechanism. **Results:** In all the examined cases there were various post resuscitation lesions of different gravity, from rib fractures to internal organs damage. In more than half of the cases, the injuries had a vital character. In at least two cases the post resuscitation lesions contributed to the thanatogeos mechanism, as competitor factors. **Conclusion:** the resuscitation techniques can be improved so as not to cause severe injuries which may favor or even cause the death of the patient.

Poster: 1808. A forensic comparative analysis of suicides in 2 Romanian Counties situated at a far distance and with a different population structure: Bihor and Calarasi County

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Introduction: Suicide is a violent cause of death common in our country. This phenomenon, however, is not evenly spread across the country, but instead it depends on the ethnic structure of the population. In areas with the majority of the inhabitants are Hungarian, the number of suicides is very high. In areas where the population is mixed (Romanian, Hungarian, Gypsies, Slovaks, Bulgarians, Ukrainians) the suicidal phenomenon has a medium-scale, and in areas where the population is composed mostly from Romanian inhabitants, the number of suicides is small. **Objective:** to identify the suicidal potential in different areas of the country and the causes and conditions that favor this phenomenon. **Methods:** we have studied all the cases of suicides autopsied from the two counties in 2012 by selecting the following items: age, sex, area of provenance, nationality, religion, method of suicide, alcohol level in the body; we have also watched the social-economic situation of the victims (education, married/divorced/widower, job, income, history of psychiatric illnesses, stress) in the last period of time. **Results:** in separate graphs and tables for each county we presented the suicidal phenomenon in all analyzed aspects resulting in a predominant number of suicides where the ethnic population consisted of Hungarians and other nationalities other than Romanians, where religion was different than the Orthodox; in addition, we found that the victims were frequently consuming alcohol and had a poor social status (low income, unemployment, recent psychotrauma). **Conclusion:** the forensic study conducted reveals clearly an uneven distribution of suicides in Romania; the distribution of the cases is directly related to nationality, religion, alcohol consumption and social status of the victims.

Poster: 1809. Cardiopulmonary caused deaths at youth from Romania; forensic aspects

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Introduction: Deaths at young people with no medical history in Romania are labeled as sudden deaths and are followed by autopsies, according to the law. **Objective:** is to specify with certainty the cause of death at young people under 30 years old with no medical history. Additionally, the paper outlines the risk factors that led to these unexpected deaths. **Methods:** it were analyzed all the necropsy reports performed to victims having up to 30 years and classified as sudden deaths over a period of 3 years old from Bihor county -Romania. The items followed and subsequently analyzed and presented in tables and graphs were the following: sex, age, area of provenance, occupation, conditions in which the death occurred and the cause of death. **Results:** it was found that in most cases deaths at young people is higher in the male gender, with a 8:2 ration. The most vulnerable age period is between 20 and 25 years old. The condition in which death occurred was unexpectedly not the physical exercise, but a state of tiredness (fatigue) with minimal symptoms, unsuggestive for an organic disease. At these cases, we have determined that the thanatogenos mechanism occurred amid a severe viral interstitial pneumonia with hemorrhagic alveolitis. In the cases in which death occurred after a minimum or average effort, then it was most often due to cardiac causes, again due to viral etiology (myocarditis, coronaritis) or developmental anomalies of the coronary epicardial arterial tree. There are also described some less common causes of deaths at young people (aneurysm ruptures, acute myocardial infarction, idiopathic pulmonary embolism). **Conclusion:** Based on analyzing the cases, the frequency, cause and conditions that may cause the death to young people with ages under 30.

Poster: 1820. Blood smear examination is fundamental to autopsy diagnosis of fulminant infection: report of three cases

Shirushi Takahashi

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Introduction: We report three cases in which blood smear examination was fundamental to diagnosing fulminant bacterial infections. **Objective:** From a practical view point, it is important to take into account smear test in cases with antecedent symptoms of infection, progressive postmortem changes or non-environmental hyperthermia. **Methods and Results:** Case 1: A woman in her thirties at 22 weeks of pregnancy developed fever, fatigue and diarrhea. On the following day, she presented with massive genital bleeding and respiratory distress. On arrival of emergency services, she was in cardiopulmonary arrest, and resuscitation was not successful. Autopsy indicated rapid progression of postmortem changes. Smear test of the blood revealed numerous Gram-positive chain cocci. The uterus was enlarged and hemorrhagic, and small numbers of neutrophil and macrophages were scattered in the perimetrium. The cause of death was determined as fulminant group A Streptococcus infection. Case 2: A male four-month-old infant developed fever, abdominal distension, diarrhea and respiratory distress. The following day he was taken to emergency hospital due to vomiting and convulsion. Blood smear test revealed numerous Gram-positive chain cocci. He was pronounced dead 5 hours after arrival. Autopsy revealed a large number of cocci in multiple organs, acute splenitis, hemorrhages of adrenal glands, hemophagocytic lymphohistiocytosis and eczema of anterior neck. His cause of death was determined as fulminant group A Streptococcus infection. Case 3: A male four-month-old infant with an overweight at birth (4520 g) was found unresponsive with his face down in a crib. Spontaneous circulation was returned at the emergency hospital, but he was pronounced dead 16 hours after discovery. **Conclusion:** At autopsy, postmortem changes were rapidly-advancing compared to postmortem interval. Smear test of the blood revealed numerous Gram-positive capsulated short bacilli. Other findings were hemophagocytic lymphohistiocytosis in the bone marrow and acute splenitis. The cause of death was determined as sepsis secondary to Clostridium infection.

Poster: 1851. Explosive injuries following bomb blasts in Sri LankaPradeep Rohan Ruwanpura¹ Janaki Warushahenndi², Ajith Rathnaweera³¹Consultant Judicial Medical Officer, Teaching Hospital, Karapitiya, Galle, Sri Lanka; ²Department of Forensic Medicine, Faculty Medicine, Karapitiya; ³Faculty of Medicine, Karapitiya

Introduction: Injuries due to high explosive devices were often seen in Sri Lanka during past two decades, especially during the period from 1995 to 1997 and from 2004 to 2008 due to escalations of civil conflict. The specificity of bomb attacks in Sri Lanka is attributed to involvement of suicide bombers. There had been two categories of suicide bombers: Body Bomber, who may be described as a person with high explosive device attached to his body in different forms of attire including that of a pregnant woman and Carried bombs using other movable device, explosive effects of which had distinguishably reflected in the overall injury pattern. According to security information, there were about 125 attacks on civilian and military targets since 1986. The incidents were predominantly taken place in Colombo and autopsies on most of the cases were performed at the Office of the Judicial Medical Officer Colombo. **Objective:** The present study is based on findings of autopsy examinations, scene visits, and information gathered from the police sources and evidence given in the subsequent Court proceedings etc. **Methods:** Analysis of injury patterns revealed that the below categories of explosive injuries seems to be more applicable to the local explosive scene than existing six types of explosion injuries. a) a suicide bomber, b) combined effect injuries including total disruption, c) blast wave injuries, d) burns, e) Injuries due to flying missiles and f) circumstantial effects. **Results:** The absence of shrapnel wounds, severe disruption of the trunk, and extensive burns of the transected body margin and presence of a cyanide capsule made a suicide bomber clearly distinguishable from other victims. **Conclusion:** The recognition of the above injury patterns and their bodily effects found to be pivotal in crime-scene investigations, subsequent legal proceedings and organization of preventive measures. The effects of the modern vehicles with impact resistant mechanisms on the gravity of injuries have also been considered.

Poster: 1864. Anomalous origin of the right coronary artery from the pulmonary artery: An autopsied sudden death case with severe atherosclerotic diseases of the left coronary arteryAya Takada¹, Kazuyuki Saito², Tomonori Nagai³, Hiroaki Nakanishi²¹Department of Forensic Medicine, Saitama Medical University; ²Department of Forensic Medicine, Faculty of Medicine, Juntendo University; ³Department of Legal Medicine, St Marianna University School of Medicine

Introduction: Anomalous origin of the right coronary artery from the pulmonary artery (ARCAPA) is a rare coronary artery anomaly. It may contribute to myocardial ischemia or sudden death, although the lesion is usually asymptomatic. **Objective:** We report a sudden death case of ARCAPA coexisting with severe atherosclerotic disease. **Methods and Results:** Case report: A 58-year-old man was found with cardiac arrest and immediately transported to an emergency hospital, but was not resuscitated. He had been healthy until when he complained of chest pain several days before death, although heart murmur was pointed out and valvular heart disease was suspected in his childhood. **Autopsy findings:** The heart weighed 440 g. The

right coronary artery arose from the right sinus of the pulmonary trunk with normal distribution, but was dilated with thin walls showing macroscopically vein-like looks. The left coronary artery that normally originated and distributed was markedly dilated and tortuous. Severe atherosclerosis was found in the main branches of the left coronary artery. The left descending artery just distal portion of the first septal branch had the most severely stenotic lesion. Many gross anastomotic vessels (collateral circulations) were observed between the left and right coronary arteries. Massive subendocardial fibrosis was found both in antero- and posteroseptal walls of the left ventricle. Acute myocardial infarction was not evident. Histologically, the aberrant vein-like RCA was arterial in structure because of obvious media. Discussion: Reduction of both the right and left coronary arterial flows and together with further increase of coronary steal due to atherosclerotic obstructive coronary disease might contribute to lethal condition in addition to coronary steal phenomenon primarily caused by ARCAPA. **Conclusion:** We consider that deterioration of the myocardial ischemia and/or lethal arrhythmia based on the ischemic lesion of the myocardium might have been the cause sudden death in this case.

Poster: 1978. Specifications and burn degree of Merapi eruption victims at Department of Forensic Medicine, Dr. Sardjito Hospital Yogyakarta

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Introduction: In October 2010 Merapi eruption 25 people are death and all of them can be identified. Meanwhile, in November 2010, the 2nd eruption, causing more casualties at least 144 dead victims were taken to the Dr. Sardjito hospital, which only 59 bodies can be identified. Differences in the number of victims can be seen that different cause. According to volcanologist, the victims of Merapi eruption attacked heat clouds with temperatures around 300 degrees Celsius in 1 region, while in the 2 regions attacked clouds with temperatures above 800 degrees. This paper does not discuss the identification process but causes that much different from the first and second Merapi eruption. **Objective:** To determine the difference from the specification and the degree of burns of Merapi Eruption victims of Merapi Eruption 1 and 2. **Methods:** Case description: The examination for the victims of first Merapi eruption found only between one and two which formed the basis of wound erythema, bullae and swelling of the wound and the surrounding areas. Bodies relatively intact and easily recognizable so that is not found difficulty in the identification process. **Results:** At the time of the examination held for the victims of Merapi eruption 2 found an average 3-degree burns over a wound that has been charred, necrotic tissue sometimes seem harsh black colored. Merapi eruption victims in this time was difficult that can not be recognized as well as the state of the bodies that have been blackened, as well as many of the bodies that come in a whole state or even just a piece of bone that is incomplete. **Conclusion:** At the time of the examination held for the victims of Merapi eruption found only 1 degree burns between one and two which formed the basis of wound erythema, bullae and swelling of the wound and the surrounding areas. Bodies relatively intact and easily recognizable so that is not found difficulty in the identification process. At the time of the examination held for the victims of Merapi eruption 2 found an average 3-degree burns over a wound that has been charred, necrotic tissue sometimes seem harsh black colored. Merapi eruption victims in this 2 much that can not be recognized as well as the state of the bodies that have been blackened, as well as many of the bodies that come in a whole state or even just a piece of bone that is incomplete.

Poster: 1980. Death of a pregnant woman- is it accidental, homicidal or iatrogenic?

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Introduction: This case involves a sudden death of a pregnant woman with an array of confusing findings demanding an explanation for their aetiology. Petechial haemorrhages over conjunctivae, grip marks over upper arms, contusions on lower lip and strap muscles and an abrasion over the neck raised the suspicion of pressure over the face and neck causing her death. On the other hand, blood stained amniotic fluid, mild fatty liver and the presence of peritoneal free fluid raised the possibility of a natural cause. An accurate interpretation of injuries and other autopsy findings lead to correct cause and manner of death. **Results:** It was discovered that cardiopulmonary resuscitation and Ambu ventilation had been continued for nearly 45 minutes in the ward. Relatives explained the grip marks on the upper arms as caused due to supporting her lifeless body out of the vehicle and in the ward from one place to another. Petechial haemorrhages could well be seen in natural deaths. Resuscitative lip injuries are a well accepted phenomenon. The mere finding of minor bruises over strap muscles of the neck without cardinal signs of manual strangulation viz. characteristic bilateral skin trauma with subjacent soft tissue haemorrhages and laryngeal and hyoid bone injuries emphasizes that one should exercise great caution before suggesting the possibility of pressure over neck as the cause of death. Histology, microbiology and toxicology play a crucial role in deaths of this nature. **Conclusion:** The injuries mentioned above were accidental and resuscitative artifacts. The cause of death was unascertainable with existing facilities though it was related to a pathological process associated with pregnancy.

Poster: 2025. Dead victim identification of Merapi volcano eruption 2010

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Introduction: Merapi volcano is located in the northside of Yogyakarta city, in the center part of Java Island, Indonesia. As one of the most active volcano in the world, regularly, Merapi erupts in about 4 years. Merapi has a characteristic eruption with danger pyroclastic flows. The eruption in 2010 is believed as the largest since 1855, with twice eruption on 25 October and 11 November 2010. Although the government had many efforts to manage the disaster and to minimal the victim, however, hundreds victims were burnt dead. In this study the author will present the dead victims identification. **Objective:** To report the dead victim management of Merapi volcano eruption in 2010. **Methods:** The data were taken from the document of body examination in Department of Forensic Medicine, Dr Sardjito Hospital, Yogyakarta. **Result:** Totally 234 dead victims were examined from twice eruptions, consists of 115 male, 80 female, and 39 undetermined. **Conclusion:** For the first eruption, 25 bodies were all identified successfully. However, for the second eruption, 78 bodies of 209 victims were unidentified due to lack of antemortem information.

Poster: 2029. Honour killing: A case report of a double murder

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Introduction: An honor killing (in Hindi this term can be translated as Samman Hatya) is the murder of a female family community believe the victim to have brought dishonor upon the family, clan, or community. This perceived dishonor is normally the result of (a) utilizing dress codes unacceptable to the family (b) wanting out of an arranged marriage or choosing to marry by own choice, (c) engaging in certain sexual acts or (d) engaging in relations with the same sex. These killings result from the perception that defense of honor justifies killing a person whose behavior dishonors their clan or family. Honor killings have been reported from antiquity from all over the world, however the recent past has shown an alarming and disturbing resurgence of this inhuman deed. **Objective:** This paper presents two cases related to honor killing: the first a dual homicide of two lovers who were killed in the name of preserving family honor and hanged after death together by the entire village. **Conclusion:** The pattern of injuries in both cases and crime scene are discussed as a typical scenario in such cases in India or clan member by one or more fellow family members, where the murderers and potentially the wider perpetrators of this horrible crime (the society at large) extinguish human life by totally inhuman methods.

Poster: 2033. Rope burn: A case report

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Introduction: Hanging is a common method of suicide where ligature marks are significant to forensic pathologists in determining the cause and manner of death. Sometimes, rope burn is found around the ligature mark which further helps in determining the manner of death. **Conclusion:** They are produced by friction of rope against the skin hence, are always ante mortem in nature.

Poster: 2038. Sudden unexpected infant death from pulmonary arterial hypertensionYui Igari¹, Tadashi Hosoya¹, Yoshie Hayashizaki¹, Tsukasa Ohuchi¹, Akihito Usui², Yusuke Kawasumi²

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Introduction: A 3-year-old girl with no particular medical history complained of a stomachache and died immediately on the way to the hospital. **Methods and Results:** The autopsy revealed marked right ventricular hypertrophy and dilation with no other cardiac abnormalities. Microscopically, the pulmonary small arteries showed marked medial hypertrophy and varying degrees of intimal and adventitial thickening. Frequently, many of these arteries were almost completely obstructed. Additionally, mononuclear inflammatory cell infiltration was seen in and around the bronchial and bronchiolar walls. Pulmonary arterial hypertension (PAH) is a rare disease characterized by raised pulmonary vascular resistance and arterial pressure that can lead to right heart failure and death. PAH is a progressive disease with poor prognosis and sudden death is not unusual. Furthermore, sudden death is more likely to occur in patients with hypoxia, which causes further pulmonary vasoconstriction and an inability to maintain adequate cardiac output, resulting in cardiogenic shock and death. Therefore, pneumonia can be fatal as a result of alveolar hypoxia. **Conclusion:** Finally, we concluded that the cause of death was attributable to acute heart failure accompanied by PAH and that PAH might have worsened secondary to the bronchiolitis.

PAH occurs mainly in young adult women, but can present at any age, and may result in sudden, unexpected death. Forensic pathologists should consider PAH as a cause of sudden, unexpected death.

Poster: 2043. Incidence of coronary artery disease in non-cardiac unnatural deaths - A preliminary postmortem coronary angiographic study

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Introduction: During routine postmortem histopathology in asymptomatic cases of assault/ accidents revealed evidence of coronary artery disease of varying grades. **Objective:** A preliminary study using postmortem angiography was undertaken to see the incidence of CAD in non cardiac unnatural deaths. **Methods:** A total of 128 unnatural death cases were studied comprising 88 males and 40 females, who were brought for postmortem examination. X ray films were procured from the dept. Radiology of the institute. Barium Sulphate was procured from the market. The department has the facility of X ray machine. **Results:** It was found that of the study group, 34% males and 20% females showed evidence of CAD. Of the males showing CAD, 83 % had single vessel disease and 13 % had double vessel disease, while only one individual had triple vessel disease. In case of the females, all the cases of CAD were of single vessel disease. LAD was the most common vessel involved, followed by RCA, and in cases of double vessel disease, LAD in combination with LCX was responsible for 75 % of the cases. The most common age group involved in males was 31- 40 yrs while in females it was 21-30 yrs. **Conclusion:** In general, the prevalence of CAD is on the rise, particularly in younger population owing to the changes in their lifestyle and food habits. This preliminary study revealed evidence of CAD in 34% male and 20% female population, particularly in the age group 20-40 yrs. Further detailed studies are needed to confirm our findings and to support the need for preventive cardiology in the early years of life.

Poster: 2081. Fatal accident involving slow moving vehicles

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Introduction: Fatal outcomes are rare following road traffic accidents between slow moving vehicles such as bullock carts and pedal cycles. There is also a possibility of missing fatal injuries at busy accident units even at a tertiary hospital. **Methods:** The case under discussion is one such incident where an apparently a normal victim of a road traffic trauma ended up in death. A 55 years old man had a fall following an accident with a bullock cart while he was riding a pedal cycle. No history of loss of consciousness or ENT bleeding. He had pain in the chest and minor bleeding from external injuries. He was admitted to a tertiary care hospital and GCS on admission was 15/15. Since there were no apparent fractures in X-rays, he was discharged. He was having diabetes and hyperlipidemia but was not on regular treatments. Two days later, he developed difficulty in breathing and was re-admitted to the same hospital and died in the same evening. **Results:** Autopsy revealed fractures in the 2nd thoracic vertebra and bilateral ribs. There was massive bilateral whitish pleural effusion with collapsed lungs. Cause of death was kept under investigations. Reporting of ante-mortem X-rays by consultant radiologist confirmed the above fractures. Cytology of pleural fluid showed lymphocytic infiltration and culture was negative. Histopathology of organs was unremarkable except for early diabetic changes in the kidneys. The probable causes of death following autopsy included i. Pyothorax due to immune suppression following diabetes. ii. Diabetic keto-acidosis due to uncontrolled diabetes. iii. Acute myocardial infarction. Following further investigations. The cause of death was ascertained as Chylothorax due to rupture of thoracic duct due to blunt force trauma to the chest following road traffic trauma. **Conclusion:** This death may have been prevented if clinicians had initially managed properly. It is a potential case of medical negligence.

Poster: 2082. Maternal death due to diffuse venous thrombosis

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Introduction: Diffuse venous thrombosis can clinically manifest in different ways and the diagnosis of which requires a high index of suspicion. Thrombosis of the veins that drain to IVC such as deep vein thrombosis (DVT) and pelvic vein thrombosis can cause pulmonary thromboembolism. Emboli of mesenteric thrombosis reach liver. This is a case where the clinicians missed the diagnosis of maternal diffuse venous thrombosis. A 25 year old married primi para of 15 weeks of gestation presented to a Base Hospital with severe abdominal pain and vaginal bleeding. Even with the evacuation of retained products of conception (ERPC) for an incomplete abortion, the abdominal pain did not settle. Two days later, small

bowel gangrene was diagnosed ultrasonically and an emergency resection was done. In spite of treatment, she died before recovery of the surgery. Dead body was brought to a tertiary care hospital for autopsy together with the preserved resected gangrenous small bowel specimen. History revealed that she had been suffering from calf pain for the last 3 months without any evidence of septic abortion or long term hospitalization. At autopsy, there were no skin rashes. There was bilateral pulmonary thromboembolism with thrombosis of the deep veins of limbs. Thrombosis of endometrial vessels of the gravid uterus and the superior mesenteric vein were also noted. Histopathology confirmed diffuse venous thrombosis and embolism. Finally, the COD was given as pulmonary thromboembolism due to DVT following Immobilization and pregnancy. Abortion due to thrombosis of endometrial vessels and bowel gangrene due to thrombosis of superior mesenteric vein were considered contributory factors because those warranted the surgery. **Conclusion:** There was evidence of diffuse venous thrombosis such as calf pain with deep vein thrombosis, incomplete abortion with uterine thrombosis and bowel gangrene with mesenteric thrombosis. But these were not diagnosed clinically or during the surgeries.

Poster: 2086. Study of autopsy cases of self-inflicted bicycle accidents in Okayama Prefecture, Japan

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Introduction: While most fatal bicycle accidents are caused by collision with motorvehicles, some are caused by self-inflicted accidents. However, there are few reports in which such cases have been statistically examined. **Objective:** We focused on autopsied cases died from self-inflicted bicycle accidents. **Methods:** During the five years (2007-2011), there were 17 cases for which autopsies were performed after death arising from self-inflicted bicycle accidents in our institute. **Results:** They comprised 12 male and five female, with an average age of 62.6. On the other hand, according to the Okayama prefecture traffic yearbook, the number of these accidents was 12. Cause of death of 7 cases was cervical spine injury, and that of 6 cases drowning, 3 cases head injury, and 1 case death caused by cold temperature. Regarding the situation of accidents, there were 10 cases of falling off into canals, 4 cases of falling off into side ditches, and 1 case each of falling off into river and paddy field. Alcohol test was performed on all the cases, and 11 cases tested positive (64.7%); the 4 drowning cases without severe damage all tested positive. The study at this time clarified that death in almost all the cases was caused by falling off into canals or gutters, and it is considered necessary to install fall prevention fences and covers for gutters. Almost 2 out of 3 cases tested positive for alcohol, and the 4 cases of drowning without severe injury were all drunk. **Conclusion:** It was considered necessary to further propagate awareness of the risk of drunk-riding. It was found difficult to fully understand deaths arising from self-inflicted bicycle accidents from traffic accident statistics as they were often handled as criminal cases if the persons were found away from bicycles in Japan. Therefore, forensic information is required in order to clarify the actual situation.

Poster: 2093. Osteometric sex determination from radius

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Introduction: Determination of sex is one of the major criteria for identification of an individual in medicolegal investigations. There is usually no difficulty in determination of sex if the pelvis and skull are available as they exhibit the most reliable and pronounced characteristics for determination of sex in cases of putrefied, mutilated and skeletonised bodies. However, difficulty in determination of sex may arise in those cases where only a few skeletal or fragmentary remains like bones of the upper or lower extremities are brought for examination. In such situations, the long bones have specially been used for sexing because of the ease of defining osteo-metric measurements. **Objective:** The present study was aimed to obtain sexual dimorphic standards for radii (forearm bones) in Haryana, a North Indian State. **Methods:** A total number of eight osteometric parameters and weight were obtained on a sample of 200 radii of known sex (50 pairs from males and 50 pairs from females) harvested from autopsy subjects brought to the mortuary in the department of Forensic Medicine, Pt. B. D. Sharma PGIMS, Rohtak (Haryana) India. The identification and demarking points were calculated for all the variables. The data were then subjected to stepwise and direct discriminant function analysis. **Results:** The transverse diameter of head, weight and sagittal diameter of head were found to be the best among the nine variables studied. The most dimorphic single parameter was the transverse diameter of head of radius which provided an accuracy of 95.5% in determination of sex. Weight of the radius was the 2nd best of all the parameters which provided an accuracy of 93.5% in determination of sex followed by the sagittal diameter of head with accuracy (91.5%). **Conclusion:** The results of different osteo-metric parameters of radii bones establishing sexual dimorphism will be discussed in this paper.

Poster: 2101. Drift of blood electrolyte and blood gas data measured after death by drowning

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Introduction: Until now, the autopsy diagnosis of drowning has been performed based on the presence of plankton in organs. Objective: it is thought that blood electrolyte and gas analysis results provide important evidence of death by drowning. **Methods:** For a precise diagnosis of drowning, we measured the blood concentrations of electrolytes such as sodium (Na), chloride, (Cl) magnesium (Mg), and calcium (Ca) as well as other trace metals by inductively coupled plasma atomic emission spectrometry (ICP-AES) in human bodies submitted to the University of Tsukuba for medicolegal autopsy within 5 days after death by drowning in either rivers (fresh water) or seawater. We also measured the blood gas concentrations of these samples using a blood gas analyzer. **Results:** The blood concentrations of Na and Cl were higher than normal after drowning in seawater, but were lower than normal after drowning in fresh water. The blood concentration of Mg was higher than normal in seawater. However, we did not find a significant elevation in fresh water. The blood concentration of Ca was slightly higher than normal after drowning in fresh water and considerably higher than normal in seawater. Measurement of blood gas concentrations revealed that the mean hemoglobin oxygenation saturation in cases of drowning was no more than 11%. **Conclusion:** Using ICP-AES and blood gas analysis, we can diagnose death by drowning and identify the location at which it occurred based on comparison between the specific composition of blood and reference water. Another advantage of ICP-AES is that various metallic elements can be quickly, simply, and easily measured from a small volume of a liquid sample. Thus, this technique is extremely useful for the diagnosis of drowning by medicolegal autopsy.

Poster: 2102. A surreptitious disposal: Mechanism of injury production to decide manner of death

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Introduction: Interpretation of injuries to ascertain the circumstances is the main role of the forensic medical specialist in clinical examination or autopsy. An unidentified body was found near a housing complex with injuries over exposed areas of the body. The scene was undisturbed. Examination of the clothing was unremarkable. There were impact abrasions to the right side of the face and wedge fracture of right tibia. There was abrasion over the back of the body with underlying soft tissue and muscle contusion. Avulsion of skin and subcutaneous tissue with haemorrhagic pocket formation was seen on left calf. Suture diastasis of the pubic symphysis with destruction of sacroiliac joint was noted (Openbook fracture). Parts of stomach and spleen were herniated through the lacerated left dome of diaphragm with moderate left haemothorax and collapsed left lung. Further police investigation revealed a complicated story which was a cause for concern. There were no injuries suggestive of intentional trauma in the body. Wedge fracture of tibia is usually seen in primary impact injuries due to the bumper of the vehicle. Wheel passes over the lower extremities, exerting tangential pressure on the skin and subcutaneous tissue, separating them from underlying muscle. Where great pressure is applied to pubic area as in running over by vehicle wheel the pelvis may be splayed open, the symphysis separating and one or both sacroiliac joints becoming dislocated. Traumatic rupture of the diaphragm is most often caused by severe blunt trauma to the lower anterior chest or lower abdomen. Impact abrasions were due to secondary injuries. **Conclusion:** This case illustrates the importance of interpretation of injuries especially the mechanism of their production in coming to the conclusion of manner of death.

Poster: 2107. Fulminant peritonitis caused by salpingitis: A case report

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Introduction: Fatal case of pelvic inflammatory disease reported in non-immunocompromised patient is relatively uncommon, and in patients without a previous history of using intrauterine device, delivery, and abortion is quite rare. **Methods:** Herein we report peritonitis originating in salpingitis began with symptoms of gastroenteritis that was fatal within about a day of the onset. **Results:** A 44-year-old previously healthy woman who had not been pregnant before developed symptoms of abdominal pain, diarrhea, and vomiting after dinner of the day before the death. The next day, she admitted to the hospital because of prolonged symptoms. Inflammatory reaction was detected by a blood examination and she was diagnosed with acute gastroenteritis. Despite rehydration and intravenous injection of antibiotic, after 17 hours of onset, she showed a reduction in blood pressure and loss of consciousness. She was put on ventilator support and vasopressor therapy was performed, however, she eventually died 25 hours after the start of symptoms. Purulent ascites was found at autopsy and inflammation of uterine appendages especially in fallopian tube was histologically detected. No other inflammatory focus was found, so that salpingitis was considered as causative disease of peritonitis. Although blood culture, ascites culture, and Gram stain were performed, we could not confirm responsible bacteria. **Conclusion:** Pelvic inflammatory disease is rare but important cause of peritonitis and progress to a fatal outcome. When intra-abdominal infection is suspected, careful examination of pelvic organ must be needed.

Poster: 2112. The study of records of medical malpractice in the field of urology in medical council organization of Islamic Republic of Iran from 2004 to 2011

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Introduction: In spite of the numerous advancements in diagnosis and treatment of the diseases, today, lodging files against physicians and medical assistants is increasing. Population growth, social awareness and growing number of physicians, as well as implementation of complex and modern devices in diagnosis and treatment of the diseases are the reasons for such complains. Moreover, the lessening of traditional relationship between patient and physician accelerates this phenomenon. **Objective:** The aim of our study was to assess etiologies and motivations of complains, rate and type of malpractice and at last find a solution for decreasing physicians malpractice. **Methods:** In a retrospective descriptive- analytic study we evaluated the records of medical malpractice in the field of urology during 2004 to 2011, in medical council organization of Islamic Republic of Iran. **Results:** During this time among 2977 cases of medical malpractice, 21 (0.7%) have been related to this field. In 76.2% of the cases acquittal verdict and in 23.8% of the cases malpractice verdict have been issued. Of the total number of the cases 52.4% of them have been related to private centers, 23.8% related to non academic governmental centers and 23.8% were related to academic centers. 28.6% of the malpractice cases resulted in the death of the patient, the rest resulted in physical handicap and deficiency. **Conclusion:** Improvement in the patient-physician relationship, Implementation of medical ethics, decrease in related financial affairs, improvement of professional skills and knowledge of the physicians, adequate briefing of the patients before diagnostic and therapeutic procedures and accommodation of therapeutic centers with the advanced technical equipments has significant effect on the lessening of ignorance and complaints.

Poster: 2126. Evidential value of blowflies *Chrysomya megacephala* and *Aechotandrus ruffacies* in forensic investigation

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Introduction: Blowflies has been reported to be the first to arrive on a dead, immediately after death. Their immature is an important physical evidence which the crime scene investigators encountered from decomposed body, and forensic entomologist applied this evidence in estimating time of death. This was done based on the age of the biggest or oldest blowflies larvae. However, any interruption in the development of blowflies will lead to an error and give a huge impact in solving the main question in forensic investigation, which is the time of death. **Objective:** Highly decomposed body is also lack of biological specimens, in which there is a need to explore the use of other physical evidence found on the remains for toxicology analysis. **Methods:** Our laboratory have studied several toxins and drugs, along with gunshot powder deposited on blowflies food substrate, in order to determine the influence of those chemical substances in development of forensically-important blowflies in Malaysia, *Chrysomya megacephala* and *Chrysomya ruffacies*. Larvae, pupae and adults samples of both species were also subjected to chemical analysis using different types of instrument such as Gas Chromatography coupled with Mass Spectrometry (GC-MS), High Performance Liquid Chromatography (HPLC) and Atomic Absorption Spectroscopy (AAS). **Results:** It was found that the presence of toxins and GSR in blowflies larvae system affected the development rates of both flies and the blowflies samples could be used to determine the presence of toxins and GSR in carcasses and any other food substrates. **Conclusion:** Blowflies *C. megacephala* and *A. ruffacies* are suggested as important and alternative specimens for toxicology analysis in forensic investigations.

Poster: 2129. Efficacy of mass burials as a tool of managing dead in mass disasters, reappraisal of Sri Lanka post Tsunami experience

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Introduction: Sri Lanka experienced its major natural disaster in December 2004 losing well over 35000 lives. Though Sri Lanka did remarkably well in the management of injured and preventing disease outbreaks in temporary settlements and camps, the management of deceased was highly deficient. Most of the affected countries adopted mass burials during the post tsunami period for disposal of dead. **Objective:** Is to reassess the existing mass burial sites used for disposal of dead during post Asian tsunami period in Sri Lanka to identify minimum standards and best practices for such procedures. **Methods:** The data available for ten selected post Tsunami mass burial sites in southern Sri Lanka were perused and geographical locations of them were observed periodically to assess the human intervention and the impact of the burial sites to the surrounding human habitats. The data obtained from similar mass burial sites in India and Thailand was used

for comparison. The criteria for selecting mass burial sites were not uniform throughout the affected areas. **Results:** Some mass burial sites were located just opposite the community habitats. The depths of these sites were also varied and some of the burials were just few feet deep. The boundaries of any of the mass burial sites were indistinct when they were inspected 6 months after the disaster by a team of forensic experts. Most burial sites were utilized for reburials and some burials were performed during the evening or in the night sealing off any possibility of proper documentation and leaving thousands of mourning survivors in misery forever. **Conclusion:** Any form of mass burial always has a negative psychosocial impact at the individual and community level. Our results conclude that it is essential to formulate proper application guidelines for mass burials by experts in view of structuring disaster resilience in the affected communities.

Poster: 2139. Asphyxia due to helium inhalation

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Introduction: A 27-year-old, Chinese male, was found dead in a room in a beachside Resort in a small coastal town in Malaysia. The body was lying supine on a bed with his head covered by a plastic bag, that was connected to a helium gas cylinder, via a plastic tubing. Suicide notes were found on the table in the room. A medico-legal autopsy was performed show facial congestion and petechiae on external examination. **Results:** Internal examination showed pulmonary oedema and congestion. Toxicology analysis was unremarkable. The cause of death was asphyxia due to helium inhalation. The helium gas had replaced the oxygen, leading to an oxygen-deficient atmosphere within the plastic bag. **Conclusion:** This case is unique as it is a rare method of suicide and the first of its kind reported in Malaysia.

Poster: 2140. Blunt force trauma to skull with various instruments

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Introduction: Deaths due to blunt force trauma to the head as a result of assault are some of the most common cases encountered by the practicing forensic pathologist. Previous studies have shown inflicting injury to the head region is one of the most effective methods of murder. The important factors that determine severity of trauma include the type of weapon used, type and site of skull fracture, intra cranial haemorrhage and the severity of brain injury. **Objective:** The aim of this study was to determine the characteristics of blunt force trauma to the skull produced by different instruments. **Methods:** Nine adult monkey (*Macaca fascicularis*) skulls were used as model. **Results** Commonly found blunt objects comprising of hammer, hockey stick and helmet were used in this study. Trauma caused by these objects onto the model was analyzed based on the resulting trauma and fracture. Results showed that the trauma resulting from all investigated instruments have not produced any specific patterns of fractures at various anatomical site of the models skull. It is also noted that the severity of trauma was not affected by the surface area of blunt objects used to hit the subjects. **Conclusion:** Based on these observations, we conclude that other factors also play a role in the outcome of the trauma.

Poster: 2146. Young tend to die of road traffic accidents, suicides or being killed by someone?: An analysis of medico-legal deaths

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Introduction: Young people tend to get aggressive or depressed and may risk their lives. **Objective:** To describe demographic and postmortem findings of medico-legal deaths reported to a tertiary care hospital from Jan-2011 to Dec-2012. **Methods:** All deaths referred during study period were retrospectively analyzed. **Results:** Out of 1502 postmortems 67.3% were natural deaths, 16.8% accidents, 6.1% suicides and 3.5% homicides. Majority (54.5%) were pre-mature deaths (<60 years) with mean age 54.4 (+/-19.05). Majority (71.4%) were males. Majority (54.8%) were Non-Communicable Diseases (NCDs) and were 19.9% and 59.2% in =<30 and >30 years of age respectively (p<0.01). The most common COD was IHD (22.9%) and was also associated with age (p<0.01). CVS accounted for 40.5% deaths and was associated with both age and sex (p<0.01). Out of 887 natural deaths only 170 were infectious Communicable Diseases (CDs), out of which 89 were respiratory causes. RTA accounted for 171 deaths and were 17.1% and 10.6% respectively among =<30 and >30 years (p<0.01). There were 34 train injury deaths and were 4.1% and 0.9% respectively among 5 police stations along the coastal railway line and other police stations (p<0.01). There were 50 suicides by hanging and were associated with age (p<0.01) but not with gender and ethnicity (p>0.05). There were 46 homicides and were 7.8% and 2.4% among =<40 and >40 years respectively (p<0.01) but were not associated with gender and ethnicity (p>0.05). **Conclusion:** NCD was the leading cause of mortality. Majority were premature deaths. CDs were dominant only in respiratory deaths. More than 30 years old people tend to die of NCDs especially by CVS causes such as IHD. Young tend to die of RTAs, suicide by hanging or being killed by someone. Limitation of access to railway lines to reduce the local railway deaths is recommended.

Poster: 2153. Public knowledge towards inquest and autopsy: Sri Lankan perspectiveAmal Vadysinghe¹, Perera WNS¹, Paranitharan P¹, Perera BPP¹, Priyadarshani BAM², Madushani MD², Vadysinghe AN¹¹Department of Forensic Medicine, Forensic Pathology, Faculty of Medicine, Peradeniya University; ²Department of Forensic Medicine, Faculty of Medicine, Ragama, Sri Lanka

Introduction: Society has a role to play in the process of inquest and autopsy. Lack of understanding of their importance to a healthy society is one of the reasons why some people have a strong feeling against them. Knowing how members of a community think about inquest and autopsy may help the police, doctors and inquires to deal with families more appropriately. **Objective:** To find out the public knowledge towards inquest and autopsy. **Methods:** Randomly selected next of kin of deceased, who had attended autopsy and/or inquest at North Colombo Teaching Hospital in Sri Lanka were interviewed with a questionnaire as a preliminary study. **Results:** Of the participants, only 41% agreed that they had adequate knowledge on process of inquest and autopsy. 93 % of them had secondary or higher education. Only 11% were aware that inquest can be held by the magistrate or the Inquirer Into sudden death and 27% believed that police or the doctor was responsible. 55% stated consent is needed for judicial autopsy and 87 % were aware on all the suspicious deaths should be subjected to an inquest. Most of them knew natural deaths where the cause of death was not known (71%) or accidental deaths (84%) are subjected to inquest procedure. **Discussion:** It was revealed that even among the people, who thought that their knowledge on autopsy and inquest was adequate, there was a sizeable minority, who thought that doctors and police hold inquests. Some even thought that consent is necessary for judicial autopsy. However, there was reasonable knowledge on indications for autopsy and inquest. **Conclusion:** Although inquests and autopsies have been standard practices for more than a century public knowledge on them was not satisfactory as expected. Therefore, more intervention to improve their understanding is recommended.

Poster: 2154. Qualitative evaluation of routine microscopy in medico-legal autopsy: An experience in Malaysia National Institute of Forensic Medicine

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Introduction: The necessity of routine microscopic examination in medico-legal autopsies is always questionable, especially in cases with obvious macroscopic findings. A qualitative evaluation is aiming at determining the need for microscopic examination following post-mortem examination. **Methods:** This prospective study was conducted at Malaysia National Institute of Forensic Medicine with an average of 500-600 medico-legal autopsies per year under the request of police. During the period of June 2012 to August 2013, doctors corresponded to questionnaires regarding sampled tissues for microscopic studies after performing autopsies. **Results:** From 150 cases received, the feedbacks comprised of 127 males and 23 females with 74% natural deaths, 12% accidental deaths, 7.3% homicidal deaths, 2.7% suicidal death and 4% manner of death is undetermined. The main reasons to conduct microscopic studies were to confirm gross findings, followed by the need to establish the cause of death. As a result, 36% causes of death were established or refined after microscopic examination, with the proportion of 87% natural deaths and the rest from accidental, suicidal, and homicidal categories. The cause of death remained unascertained in 11.1% of cases even after microscopy, mainly due to decomposition. Heart, lung and liver were the most common tissues sampled and consequently, tissues with most significant contribution were heart and lungs. This implied that these tissues commonly presented significant histological findings that required microscopic evaluation in medico-legal autopsies. **Conclusion:** In conclusion, cases where microscopic examination shows an important role were significant in numbers and aided the autopsy tremendously. However in cases where causes of death remained the same even after microscopy, a measure for prioritization shall be proposed as a guideline to reduce unnecessary effort.

Poster: 2155. Trend of homicidal deaths in the State of Pahang and Terengganu from 2008 to 2012: A 5-year retrospective study of medico-legal autopsies

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Introduction: The state of Pahang and Terengganu are two major states on the East Coast of West Malaysia. Until end of 2012, almost all homicidal autopsy cases were attended by Forensic Medicine Consultant and Specialists whom were based in Hospital Tengku Ampuan Afzan, Kuantan, Pahang. **Objective:** The aim of the study was to determine the causes and epidemiological aspects of homicidal deaths over five year duration, from year 2008 to 2012. **Methods:** The autopsies were performed at various hospitals including districts as well as state hospitals depended on where the referrals were made. **Results:** A total of 124 cases were identified with male victims predominated (86.3%). Majority of the homicide victims aged between 19 to 28 years old (17.7%) and the highest proportion was Malay (38.7%). **Conclusion:** The most common cause of death was gunshot injuries (35.5%), followed by blunt force and sharp injuries.

Poster: 2172. Characteristics of heat related deaths in Osaka

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Introduction: In Japan which greeted the aged society, the heatstroke based on global warming is one of the social problems. **Objective:** We need to analyze the conditions of the heatstroke involving the heat related deaths. **Methods:** We surveyed and analyzed the heatstroke as follows; 1) the emergency conveyance records of heatstroke patients from Osaka Municipal Fire Department, 2) inspection records of heat related deaths from Osaka Medical Examiner's Office Autopsy record, 3) The past meteorological data from the Meteorological Agency. **Results:** Many patients were conveyed by an ambulance in a hospital from May to September, 192 to 1,010 per year (2008-2011) in Osaka City with a population of 2,650,000. Serious cases are within 1%. According to Osaka Medical Examiner's Office, 8 to 42 people per year died due to heat stroke (2005-2012). 82% of them died at home. Most of them are elderly (71.1±12.4y.o.). Using multivariable logistic regression, we found many factors of heatstroke. In emergency cases, the average temperature (OR 1.350) and the discomfort index (OR 1.224) and the ranking of the maximum temperature (OR 0.740) were the significant factors. And in heat related deaths, the maximum temperature of the previous day (OR 1.449), the lowest temperature of the previous day (OR 1.386), Ranking of the maximum temperature (OR 0.889), and Ranking of the maximum temperature the previous day (OR 0.879) were the significant factors. **Conclusions:** Most of emergency cases of heatstroke are found at an early stage. But the heatstroke of the elderly people at home is hard to be found and they are often found dead the next day.

Poster: 2178. Postmortem Caesarean section by family request: Cultural indication of a forensic service

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Introduction: Post-mortem Caesarean section to a dead woman is usually performed to deliver live fetus, when doctor predicts that the fetus will be survive. Post-mortem Caesarean section to dead woman with dead fetus in the womb, is extraordinary rare in the medical literatures. **Methods:** A 26 years old pregnant woman was died due to placental abruption, before medical intervention was done by the ObGyn. Death certificate was issued and signed by the doctor. The father of the woman was upset by the fact that the baby still in the womb of the late, because there is a belief in Indonesian culture, that a pregnant woman, who died with the fetus in her womb, can become ghost kuntilanak, who likes to bother lived human. He himself did not believed the myth, but he insisted to deliver the fetus to prevent the gossip. The ObGyn refused to do Caesarean section, because of no indication. **Results:** By the request of family, a forensic pathologist performed post-mortem SC to deliver the fetus. A dead baby boy was successfully separated from the mother. The baby was bathed, and clothed properly. **Conclusion:** Embalming fluid was injected to the mother and her baby, because the burial will be delayed for 3 days. The mother and her baby was then put in a coffin and buried as one.

Poster: 2181. Embalming and corpse reconstruction, a small part of forensic services that gives a huge impact on the family and cultural aspect

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Introduction: The main job of a forensic pathologist in Indonesia is to perform services in the field of forensic pathologist (autopsy), clinical forensic (clinical forensic examination) and forensic laboratory work. Apart from this main job, sometimes forensic pathologist is also need to do some additional services by family request, such as embalming and corpse reconstruction. Embalming is medical intervention in which preservatives are introduced into the body to delay the decomposition, to kill microorganisms, to preserve the profile temporarily for the purpose of sanitation, transportation, or cosmetic. In order to give the best result on embalming, some formulas and methods are developed. Corpse reconstruction is a medical intervention in which doctor reunite the body parts or wound to give the best appearance of the corpse to the family. **Conclusion:** The aims of both services is to provide the best appearance of the late to give the family the last sweet memory to remember.

Poster: 2182. Victim identification in Himalayan tsunami disaster: Challenges in Indian setupManeel Grover¹, Ishwer Tayal², Maneel Grover³¹JSS University, Mysore, Karnataka, India, ²Govt. Medical College, Haldwani, Nainital, India, ³Amity Institute of Forensic Science, Amity University, Uttar Pradesh, India

Introduction: With a rise in the unpredictability, unfamiliarity, speed and uncertainty in mass disaster situations occurring in the modern world, the focus of Forensic Medicine and Odontology has expanded to include the identification of the victims of these natural or man-made calamities. The number and expertise of forensic experts needs to be revamped at the earliest so that post disaster rehabilitation and recovery phases can be achieved successfully. The flashfloods or Himalayan Tsunami of June 2013 caused severe devastation and loss of life in Uttarakhand, a hill state in North India. **Objective:** The present study aims at discussing the problems in the aftermath of such devastating situations towards disaster victim identification in Indian setup and few of the recommendations to develop some SOPs for the same.

Poster: 2183. Light microscopic study of hepato -renal lesion & their reversibility after long term administration of Arsenic Trioxide in Sprague Dawley ratsSiti Sarah Ahmad Shahidan¹, Effat Omar², Jesmine Khan¹, Mohamed Nasimul Islam¹¹Faculty of Medicine, Universiti Teknologi MARA (UiTM), 47000 Sungai Buloh, Malaysia. ²Centre for Pathology Diagnostic and Research Laboratories & Institute of Medical Molecular Biotechnology, Faculty of Medicine, Universiti Teknologi MARA

Introduction: Arsenic is widely distributed in nature in the form of chemical compound or metalloids. Over 100 million people of the world are at risk of exposure to arsenic. It causes variety of pathologic conditions for example cutaneous and visceral malignancies. It is believed to be mixed with drinking water of shallow natural reservoirs. 8-hydroxy-2-deoxyguanosine (8-OHdG) is one of the major reactive oxygen species which is widely accepted as a sensitive marker of oxidative DNA damage. **Objective:** we study the presence of 8-OHdG by immunohistochemistry using monoclonal antibody and investigate the reversibility of kidney and liver lesion after long term administration of arsenic and its withdrawal. **Methods:** 36 rats has been used as samples and divided into 6 groups which are control group and Arsenic group. In arsenic group, each of the rats was given arsenic solution at a dose of 3mg/kg body weight once a day by gastric gavage feeding for 12 weeks and then been withdrawn from arsenic solution after 2 weeks, 4 weeks, 8 weeks and 12 weeks to see the effect of withdrawal of Arsenic toward the kidney and liver. It was analyzed by immunohistochemistry grading. **Results:** 12 weeks of Arsenic administration resulted in positive immunohistochemical staining of liver and kidney. There were some recovery effects from the withdrawal of arsenic in the arsenic treated rats. Immunohistochemical staining was decreased with the duration of withdrawal period. **Discussion:** The marker of 8-OHdG is sensitive marker of reactive oxidative stress due to toxicity by arsenic. The Hepatocyte and Kidney was the important target organ of arsenic toxicity. Once the arsenic is withdraw, the histology improving slowly because restoration of glutathione in liver which are the anti-oxidant. **Conclusion:** Withdrawal of arsenic partially reversed arsenic-induced alteration of hepatocyte and renal histology. It is recommended that elimination of the source of Arsenic is important for the recovery of the people affected with its toxicity.

Poster: 2309. Soot embolism in a charred body, the ultimate proof of life: A case reportRazuin R^{1,3}, Omar E^{1,2}, Shahidan MN³¹Centre for Pathology Diagnostic and Research Laboratories, Faculty of Medicine, Universiti Teknologi MARA; ²Institute of Medical Molecular Biotechnology, Faculty of Medicine, Universiti Teknologi MARA; ³Department of Forensic Medicine, Hospital Sungai Buloh, Malaysia

Introduction: Charred bodies can be very challenging for forensic pathologists. **Objective:** Medico-legal examination of severely burnt victim demands that post mortem heat-related changes be differentiated from ante-mortem trauma. The effects of heat on the body frequently continue beyond death, leading to destruction and consumption of the body by the fire. **Methods and Results:** The case is of a charred human remain found in an oil palm estate covered by burnt tyres. Pre-autopsy imaging showed a fractured skull with presence of a bullet within the head. The body was of a male, with unrecognisable facial features, pugilistic attitude and reduced body size due to fire damage with sparing of the posterior surface. Autopsy examination revealed a large fracture at the skull vault, consistent with blunt force trauma. An entry gunshot wound was observed on the left side of the body of mandible, associated with base of skull fracture. Heat-related fractures were also noted on the right side of the frontal bone. The brain had a cooked appearance and increased in consistency, with haemorrhages present. A projectile was retrieved from the right side of the occipital lobe. Further examination showed hyperaemic larynx, trachea and the main bronchi, with presence of soot. Soot was also present in the oesophagus. Black spots, measuring 1-2 mm were present on the surface and parenchyma of the heart, liver, pancreas and kidneys. Histopathology examination showed soot embolism within the vessels in the affected organ. **Conclusion:** Soot embolism is an extraordinary phenomenon. Its presence indicated that the deceased was alive at the time of fire. It is the ultimate evidence of cardiac viability, a rare finding to support the proof of life in a charred body.

Poster: 2310. C-reactive protein expression in visceral and subcutaneous fat in centrally obese and lean subjects: A forensic autopsy study

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Introduction: Central obesity (COB) is a major risk factor for atherosclerosis, the main pathology behind coronary artery disease (CAD), a leading cause of death in Malaysia. Visceral fat is more associated with atherosclerosis compared to subcutaneous adipose tissue. Pro-inflammatory mediators, such as C-reactive protein (CRP) produced by adipose tissue exert effects on the vasculature promoting the atherogenesis. This study aims to investigate the expression of CRP in visceral and subcutaneous adipocytes and macrophages in COB individuals compared to lean controls (NC). **Methods:** A total of 53 autopsy cases (16 COB, mean±SD age: 43.9±11.8 years and 37 NC: 33.7±11.4; 45 males and 8 females) were recruited. This was a cross sectional study of P61 autopsy cases with defined inclusion criteria. Subjects were divided into COB and NC groups, based on WC measured midway between the last rib and iliac crest, prior to autopsy. The subcutaneous fat (SAT) and visceral fat (VAT) were sampled, fixed in formalin and embedded in paraffin blocks. Immunohistochemical staining with CRP primary antibody were reviewed by two pathologists, presence of CRP expression in adipocytes and macrophage were reported. **Results:** There were no differences in adipocyte CRP expression between SAT and VAT in COB as well as in NC ($p>0.05$). Similarly, no difference in macrophage CRP expression between SAT and VAT in both groups ($p>0.05$). **Conclusion:** There is no difference in CRP expression of both adipocyte and macrophage SAT and VAT in COB and NC autopsy subjects.

IMAGING

Poster: 1709. Assessment of the relationship between drowning and fluid accumulation in the airways on post-mortem computed tomography

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Introduction: Recent reports have detailed common computed tomography (CT) findings in drowning victims, fluid accumulation in the main bronchi, trachea, maxillary and sphenoidal sinuses, and emphysema. **Objective:** This study assessed the association between drowning and fluid accumulation in the airways and evaluated the diagnostic performance of post-mortem CT for drowning based on the presence or absence of these findings. **Methods:** This study retrospectively investigated 138 subjects: 38 drowning and 100 non-drowning cases. CT images were evaluated for the presence of fluid in the airways and compared with forensic autopsy findings. **Results:** The 35 (92%) of the 38 drowning cases had fluid accumulation in the airways. Fluid accumulation in the airways was also found in 46 (46%) of the 100 non-drowning cases. Pearson's chi-square test demonstrated that fluid accumulation in the airways was significantly associated with drowning ($p<0.001$). The sensitivity of the drowning diagnosis was 92%, specificity was 54%, accuracy was 65%, positive predictive value was 43%, and negative predictive value was 95%. Drowning was significantly associated with fluid accumulation in the airways, but the specificity and positive predictive value of the drowning diagnosis were poor. Therefore, although the presence of fluid in the airways cannot be used to diagnose drowning, the absence of the fluid may be used to virtually exclude drowning. However, 3 of 38 drowning cases showed little fluid accumulation in the airways. Careful physical inspection is required. Our results may correspond almost exactly to the previous reports of the relationship between drowning and fluid accumulation in the paranasal sinuses. **Conclusion:** Fluid accumulation in the airways on post-mortem CT is more common in drowning victims. The absence of fluid can be used to virtually exclude drowning.

Poster: 2011. Digital image analysis of CCTV images as forensic evidence

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Introduction: The main theme of this paper is for the scientific analysis of image-based information for forensic science applications available at the scene of occurrence and trail of the occurrence. **Methods and Results:** Computation based software (CANVAS, Adobe, Corel-Draw etc.), information technology and digital evidence, and these closely related technologies indicate an impact on the process of digital image analysis using enhancement, filtering techniques. Forensic image analysis has becoming an activity that forms part of most forensic evidential examinations like trace evidence, documents, hand writing, firearms, shoe-marks, fingerprints, etc. In some interesting cases studies, an image as the primary evidence type

e.g. CCTV can also be used as evidence individual characterization on the image using these techniques are having a great value for forensic point-of-view. **Conclusion:** In this paper, we have tried an approach of systematic applicability of these tools to change in forensic image analysis, which have been used by the forensic community till and also suggested some important aspect of CCTV images, when & which crime occurred.

LAW (CRIMINAL JUSTICE, COURT SYSTEM & HUMAN RIGHT)

Poster: 1290. Adducing forensic evidence in Malaysian syariah court: Setting the right course

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Introduction: Admissibility of forensic evidence is not alien to the modern legal world. Forensic evidence is often tendered in court trials in countries which enforce man-made law. In Malaysia, the area of forensic science endures positive developments and evolutions. Simultaneously, the area of forensic evidence evolves and forensic evidence is often tendered in trials at the civil courts. Meanwhile, how does syariah principle perceive forensic evidence? To what extent can such evidence be adduced in the Malaysian syariah courts today? This research looks into issues of admissibility and tendering of forensic evidence in syariah court trials in this country. It attempts to identify related problems and suggest practical solutions. **Conclusion:** All discussions and arguments will be based on syariah principles and existing syariah legal provisions under the enactment.

Poster: 1404. Hazard in the illegal nursery: Two case studies

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Introduction: Even the laws in Thailand regulate that the nursery must be registered. There are many nurseries are still also established illegally. These illegal nurseries are likely to cause harm to the children who they were taking care of. **Objective:** Here the author presents two cases of a child who had been harmed by illegal nurseries. **Methods and Results:** The first case was a 5-month-old girl who had history of falling from a baby walker in a small illegal nursery. The caregiver, however, did not bring the child to the hospital until her parents came back and found that she was injured at her right thigh. The parents, by themselves, brought her to the hospital. The doctor found that she had spiral-fracture of her right femur. The second case was a 2-year-old girl who had history of falling from only 1-foot-height chair in the morning and her head hit the cushion pad on the ground. She was taken care by a large illegal nursery which had more than ten children while there were only two caregivers. Then the caregiver brought her to the hospital in the afternoon after she had alteration of consciousness. The doctor found that she had linear skull fracture of the occipital bone and severe brain edema. The bilateral craniectomy was done to save life. Unfortunately, she, later on, died 20 days after the surgery. In addition, this nursery had reputation of a number of incidents of violence prior to this event. There are similarities in both cases e.g. the delay of seeking medical care and the injury incompatible with history. **Conclusion:** From case studies mentioned above, it could be realized that bringing a child to an illegal nursery is extremely risky. Although in Thailand there are laws those aims at preventing child abuse. The implementation, however, does not work as expected.

Poster: 1707. Appreciating significance of medical ethics from a case study

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Introduction: Medical students need to appreciate the significance of ethics and medical jurisprudence during the course of medical education. The basic principles of medical ethics regarding beneficence, non-maleficence, autonomy, justice and respect are important for the medical students to understand so that they can demonstrate professionalism and integrity when they become medical practitioners. **Objective:** This case study aims to describe the management of a patient with traumatic injury where proper investigation was lacking leading to complications that needed further surgical intervention to resolve the underlying medical disorder. **Methods:** The medical history and physical examination of a teenager involved in a motor vehicle accident is described to illustrate the nature of the injury that he suffered, the investigations done, the diagnosis made and the treatment provided. This is a case of a fracture at the left femur, where surgical intervention was done and radioimaging ordered to monitor the treatment. However, there was deficiency in the evaluation of the surgical procedure leading to left leg shortening, pain and limited range of movement. The patient required another surgery 10 months later for further treatment. **Results:** From this case study, a number of medical ethical issues are relevant with respect to patient care. This include issues of inadequate investigations, inconvenience suffered by the patient, the role of medical practitioners to accept accountability and saying sorry regarding the outcome of the management of the patient. **Conclusion:** As medical students, it is important to realize the significants of the basic principles of medical ethics in order to provide quality care

to the patients. In this case proper history taking, physical examination, investigations need to be done to arrive at a correct diagnosis so that proper management could be provided to avoid unnecessary complications. All medical practitioners need to be aware the medico-legal consequences of medical negligence.

Poster: 1972. Sexual violence towards females at Matara

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Introduction: Statistics on sexual violence towards females are limited and underestimated as many cases go unrecorded. **Objective:** The study was designated to find out epidemiological and socio-economic statistics of the victims of sexual violence and the medico-legal aspects of injuries due to sexual violence. **Methods:** All the sexual violence cases referred to the Judicial Medical officer's office, General hospital, Matara from 1st of January 2012 to 1st of December 2012 were retrospectively analyzed. **Results:** There were 260 victims referred for medico-legal examination. The age of the victims ranged from 4 years to 62 years. From the total number, 177 (68%) victims were below 16 years. Among them 177 (68%) belong to the age group of 11-16 years. 234 (90%) of the victims were from low socio-economic class and 210 (80%) of them had studied below grade 10. The alleged incident had taken place at the victims house in 110 (42%) cases. In 148 (57%) cases, the victim had given the consent for the alleged act. The pregnancy was confirmed in 22 (8%) at the time of examination. Hymenal tears were observed in 100 (38%) cases and 11 had fresh tears. In 149 (57%) cases the assailant was the boy friend of the victim. Extragenital injuries were present only in 4 (1.5%) cases. **Conclusion:** Majority of the victims were below 16 years of age belonging to low socio-economic class. Majority had given consent for the alleged act and this could be a reason for lack of extragenital injuries. Conclusion: This data highlights the magnitude of juvenile sexual abuse especially by the boy friends of the victims.

Poster: 2008. Juvenile delinquency in India: Legal, ethical and social issues

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Introduction: The gang rape of a medical student in Delhi NCR, India, in December 2012, caught the attention of the media, and forced the Government to take a relook at the anti-rape laws. Since one of the perpetrators was a 17-year old boy, it also brought to the fore, debates on the juvenile justice system. One suggestion was to bring down the age limit back to 16 yrs, since it had recently (2000) been revised to 18 years. The counter-argument to this proposal is that this would amount to arbitrariness in law, and that, changes in the legal system cannot be dictated by mob outrage. The victim, who was airlifted to Singapore by the Government of India in a last ditch stand to save her and who eventually succumbed to her extensive internal injuries, came to be identified as 'Nirbhaya' or fearless. Despite the indignation of people the world over, neither the discussions nor the amendments to the existing acts have prevented these crimes. On August 20 2013, another gruesome gang rape occurred on a 23-year old lady journalist in Mumbai. Once again one of the five accused was a 17-year old. According to earlier Juvenile Justice Act (India) of 1986, a juvenile was a person below 16 years of age. A new act, the Juvenile Justice (Care and Protection of Children) Act of 2000 has been enacted and with the upper age limit of a juvenile raised from 16 years to 18 years. This presentation brings into focus the so-called 'twilight zone' juvenile delinquents between the ages of 16 and 18, wherein they are neither adults nor children in the common sense of the words. Punishment under law is just one facet of the problem. **Conclusion:** Where will these delinquents be kept? What will be done with regard to reforming them? What are the ethical issues? Will society accept them back once they are eighteen? These and other issues will be addressed.

LEGAL MEDICINE

Poster: 1636. Fabricated mechanical injuries: The scenario in an Indian state

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Introduction: Fabricated mechanical injuries are the type of medico legal injuries inflicted with some motive. It is a self suffered torture with a purpose contrary to the one defined under the U.N. Convention Against Torture and Other Cruel, Inhumane or Degrading Treatment or Punishment wherein physical pain or suffering is caused to self to support a false charge of assault against some alleged accused or the assaulted person having been sustained minor injuries, inflicted fabricated injuries on self to enhance gravity of crime and penal punishment against the accused. **Results:** Out of 200 cases of mechanical injuries from assault and examined by the author, 26 cases were diagnosed as being fabricated or were strongly suspected to be fabricated injury cases sustained to support a false charge of assault. **Conclusion:** General profile and pattern of such fabricated mechanical injuries in the Indian state of Punjab with corrective and preventive measures to check self-harm and penal punishment to those who suffered such injuries, are discussed in this paper.

Poster: 1711. Ethical dilemma between Advance Medical Directives and medically treatable condition

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Introduction: Advance Medical Directives were originally introduced by advocates of terminally ill group stating a choice to receive or refuse treatment options prior should such need arise, during the time where the patient may become incapable of doing so. Such directives are not universally accepted. This could lead to difficulties for the medical practitioners to make decisions regarding patient management. In this situation effective communication is vital. **Objective:** To highlight the ethical dilemma faced by medical practitioners when providing healthcare to patients with chronic medical disorders who have expressed their intentions of no further medical intervention. In addition, some family members also subscribed to the directives, when they should have adequate information prior to reaching to such decision. **Methods:** This is a case report, describing a 57 year old lady with underlying hypertension, chronic renal disease and congestive cardiac failure, non compliant treatment, presented to the emergency department after experiencing progressive shortness of breath and suspected episode of seizure. History wise and investigations concluded the diagnosis of ureamic encephalopathy complicated by metabolic acidosis, severe electrolyte disturbances and pulmonary edema which warranted the patient for an emergency dialysis. However, the patient and family presented with an advance directives denying any form of active management which included emergency dialysis. **Result:** The advance directive was honored although was opposed by the accompanying family members. Patient was given supportive care instead. Patient later fitted in the emergency department and her condition deteriorates further with no active management. Family contacted the proxy; reverse order was established and management of the patient proceed accordingly although delayed. However, patient survived the ordeal and is recovering well. **Conclusion:** There is a need to educate medical personnel with regards to advance directives and available options to deal with the problem if situation arises. Adequate explanations and effective communication could facilitate decision making. This will ensure the best treatment for the patient, avoiding mismanagement or delay in treatment hence providing better outcome for the patient.

Poster: 1716. Significance of drug screening in forensic autopsy: Retrospective investigation of routine toxicological findings in the southern half of Osaka city and surrounding areas

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Introduction: Toxicological analyses are important in forensic autopsy but are often depend on the limitations of individual institutions. The present study retrospectively investigated routine drug screening results at our institute to examine the significance of toxicological evidence. **Methods:** Forensic autopsy cases (n = 2,778) during a 17-year period (January 1996-December 2012) at our institute, which covers the southern half of Osaka city and surrounding areas, were reviewed. Drug screening was performed using GC/MS in all cases. **Results:** Drugs were detected in 505 cases (18.2%), including amphetamines (n = 141, 5.1%), major tranquilizers (n = 38, 1.4%), minor tranquilizers (n = 248, 8.9%), antidepressants (n = 17, 0.6%), cold remedies (n = 48, 1.7%), and other drugs (n = 13, 0.5%). Among these, fatal intoxication (n = 168, 6.0%) involved amphetamines (n = 60), major tranquilizers (n = 24), minor tranquilizers (n = 75), antidepressants (n = 1), and cold remedies (n = 8); most cases involved self-administration (n = 128), including amphetamine abuse (n = 25), alleged suicide using tranquilizers (n = 7), and accidental overdose of cold remedies (n = 3), while homicide was not included. In cases other than fatal intoxication, amphetamines (n = 9), minor tranquilizers (n = 16), and cold remedies (n = 4) were detected in suicide victims (total n = 212), suggesting mental disorders, including drug abuse, but depressants were infrequent (n = 1). These drugs were also detected occasionally for other manners of death, including homicide (n = 39/349), accidental falls (n = 26/122), and natural death (n = 61/472), but infrequently for traffic accidents (n = 12/192). **Conclusion:** These observations suggested the regional characteristics and importance of toxicological evidence not only as the cause of death but also as the background of fatalities.

Poster: 1717. Cardiac injury during cardiopulmonary resuscitation involving closed chest compression in forensic autopsy cases

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Introduction/Objective: Complications during cardiopulmonary resuscitation (CPR) are important factors that may affect patients survivability and postmortem findings that should be distinguished from prior traumas. The present study investigated complications of CPR with special regard to cardiac injury due to closed chest compression (CCC), which is of special interest in both clinical and forensic practices. **2) Methods:** Forensic autopsy cases (n = 737) during a four-years period (February 2009-January 2013) at our institute were examined. **3) Results:** Among these autopsy cases, 125 cases (17.0%; 98 adults and 27 children) had a clinical history of CPR with CCC. Complications of CCC were detected in 73 cases (58.4%; 72 adults and 1 child; 73.5% and 3.7%, respectively), including rib fractures (n = 72, 57.6%), sternum fracture (n = 68, 54.4%), mediastinal hematoma (n = 31, 24.8%), pericardial hematoma (n = 3, 2.4%), cardiac contusion (n = 5, 4.0%), pulmonary vein injury (n = 1, 0.8%), lung injury (n = 1, 0.8%), hemothorax (n = 4, 3.2%), and liver injury (n = 3, 2.4%). All cases of cardiac injury involved myocardial contusions/lacerations with epicardial hemorrhages in elderly subjects (>60 years of age); the sites of injuries were frequently around the atrioventricular border, corresponding to the edge(s) of rib/sternal fracture(s). These cases had complications of mediastinal hematoma (n = 2), epicardial hemorrhages (n = 2), incomplete right atrial/ventricular laceration (n = 3), left pulmonary vein laceration and massive hemopericardium without clotting (n = 1), and hepatic lacerations (n = 1). These cardiac injuries were regarded as a consequence of intensive CPR rather than a cause of unsuccessful CPR. **4) Conclusions:** Cardiac injury during CPR due to CCC was incidentally found in elderly subjects, associated with rib/sternal fracture(s) as a consequence of intensive CPR.

Poster: 1772. Perinatal deaths following forceps delivery; two case reports

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Introduction: Death of a newborn baby, especially when the delivery is being medically assisted arouses a huge public concern and outcry. Thorough postmortem examination by a forensic pathologist is an essential part of the medico-legal investigation of such deaths. **Objective:** I report forensic investigation of two cases of perinatal death following application of forceps. **Methods and Results:** Case history Case 1: 26 year old primigravida in delayed 2nd stage was attempted to manage by application of forceps. Ultimately the child was delivered by emergency caesarean section due to failed forceps. The baby showed no signs of life at the time of delivery and there was bleeding from right ear and nose. Postmortem revealed severe head injury including diffuse sub scalp hematoma, comminuted fractures of the skull involving both parietal bones, patchy periosteal bleeding in all bones including base of the skull, moderate cerebral oedema, diffuse sub arachnoid hemorrhage and cerebral contusions. There was aspirated blood in the upper and lower airways. Case 2: 30 year old primigravida was found to have delayed 2nd stage and moderate meconium resulting in application of forceps. Ultimately child was delivered by emergency caesarean section due to failed forceps. The baby showed no signs of life at the time of delivery. Postmortem revealed severe head injury including sub scalp hematoma, compound comminuted depressed fractures of the skull, periosteal bleeding in suture lines of the base of the skull and cerebral oedema. **Conclusion:** The cause of death was concluded as cranio cerebral injuries complicating attempted forceps delivery for treatment of obstructed labour in both cases. However the judgment on application of forceps, and the procedure needs thorough evaluation in concluding the opinion on possible medical maltreatment.

Poster: 1969. The frequencies of R1193Q polymorphism in the SCN5A gene in Japanese and German populations

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Introduction: The SCN5A (sodium channel, voltage-gated, type V, alpha subunit) gene encodes the cardiac sodium channel, a member of the voltage-gated sodium channel family. SCN5A mutations have been associated with a variety of inherited arrhythmias, including long QT syndrome and Brugada syndrome. **Objective:** We examined mutations in the SCN5A gene and identified a heterozygous mutation causing an R1193Q amino acid substitution in 1 case of sudden cardiac death and in 2 cases of sudden infant death syndrome. The R1193Q substitution was identified in patients with Brugada syndrome and long QT syndrome. It was reported that the R1193Q substitution accelerates the inactivation of the sodium channel current. We investigated the frequency of the R1193Q substitution in the Japanese and German populations. **Methods:** Genomic

DNA was isolated from blood samples in 1171 Japanese (Fukuoka, 200; Miyazaki, 199; Kagoshima, 202; Okinawa, 196; Iki, 84; Tsushima, 106; Goto, 184) and 94 German populations. The mutational analysis was performed using the TaqMan assay for SNP genotyping. This study was approved by the Fukuoka University School of Medicine Ethical Review Board. **Results:** The R1193Q mutant allele frequencies in Fukuoka, Miyazaki, Kagoshima, Tsushima and Goto were in the range of 0.05-0.06, while the frequencies of Iki and Okinawa were 0.0298 and 0.0153, respectively. The R1193Q mutant allele was not found in German population. It has been reported that the R1193Q substitution was identified in Chinese. These results suggest that there is a probability that the R1193Q substitution is specific to Asian populations. **Conclusion:** Mutant analyses in the Japanese and German populations indicate that the R1193Q mutant allele in the SCN5A gene might be specific to Asian populations.

Poster: 2170. Developing and implementing a curriculum in sexual assault forensic medical examination in Sri Lanka: Process and lessons learnt

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Introduction: Sexual assault forensic medical examination (SAFE) in Sri Lanka in the rural hospitals is performed by non specialist doctors. A curriculum was developed for SAFE by specialists in Forensic Medicine and implemented nationwide for non specialists. **Objective:** This paper will examine the processes of curriculum development and its implementation. The lessons learnt during these processes will be highlighted. **Methods:** A needs assessment of all stakeholders was done. Stakeholders included medical, legal, forensic science professionals, university academics and victim advocates. The curriculum was developed by a participatory process through a series of workshops to produce an outcome based curriculum. A smaller committee developed the teaching module and implemented the curriculum with several 40 hour workshops to over 100 doctors nationwide. Both authors were curriculum developers as well as experts for the development of teaching module. **Results:** Positive feedback was received from trainees and participation was optimal when workshops were held close to trainees workplace. **Conclusion:** Curriculum development in Forensic Medicine in Sri Lanka has often been done with minimal attention to stakeholder needs. Traditionally course contents are repeated with minimal review. An outcome based approach yielded a comprehensive SAFE curriculum. The lessons learnt included the importance of stakeholder needs in curriculum development, team skills of specialists and need for more wholistic postgraduate training on SAFE. Specialists also appreciated the value of more active teaching methods in imparting skills. Training workshops will have more satisfactory attendance when conducted in proximity to workplace.

SCIENCE (FORENSIC SCIENCE; DRUGS; TOXICOLOGY)

Poster: 1292. Simultaneous determination of Zinc (Zn), Cadmium (Cd), Lead (Pb) and Copper (Cu) in blood using Differential-Pulse Anodic-Stripping Voltammetry

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Introduction: The salts of Zinc (Zn), Cadmium (Cd), Lead (Pb) & Copper (Cu) are of great toxicological importance and can cause poisoning in high doses. Therefore quantitative determination of traces of Zinc, Cadmium, Lead and Copper in blood is very essential. **Objective:** Quantitative determination of traces of Zinc, Cadmium, Lead and Copper in blood using Differential-Pulse Anodic-Stripping Voltammetry. **Methods:** Blood was processed by wet digestion method using concentrated nitric acid and sulphuric acid. Determination of zinc, cadmium, lead and copper, was made in acetate buffer (pH 4.6) with a sweep rate (scan rate) of 59.5 mV/s and pulse amplitude 50 mV by Hanging Mercury Dropping Electrode (HMDE) by standard addition method. The solution was stirred during pre-electrolysis at -1150 mV (vs. Ag/ AgCl) for 90 second and the potential was scanned from -1150m V to +100m V (vs. Ag/ AgCl). **Results:** In the present study, the conc. of the Zinc, Cadmium, Lead, & Copper in blood was successfully determined by Differential-Pulse Anodic-Stripping Voltammetry technique. In our study the minimum levels of zinc, cadmium, lead and copper were zero and maximum level of zinc, cadmium, lead, and copper were 62.407 mg/L, 1.279 mg/L, 5.340 mg/L and 7.977 mg/L respectively. Under these conditions the limit of detection of zinc, cadmium, lead, and copper were 1.0 g/L, 0.1g/L, 0.1 g/L and 1.0 g/L respectively. The proposed technique is cost effective, rapid and easy to perform and is highly sensitive. **Conclusion:** It is possible to simultaneously determine the concentration of traces of Zinc, Cadmium, Lead and Copper in blood using differential-pulse anodic-stripping voltammetry. **Keywords:** Blood, Voltammetry, Anodic stripping, zinc, cadmium, lead, copper.

Poster: 1548. Toxicology of new designer drugs of abuse: Their detection in body fluids and interpretation

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Introduction: Abuse of the designer drugs is continuously increasing, especially synthetic cannabinoids. Synthetic cannabinoids have attracted much public attention since 2008, due to their cannabis-like effects. Besides, phenethylamines, tryptamines, and piperazines have been identified. In addition, research chemicals are noticed to abuse recently. Since the abuse of these drugs become very prevalent, the detection of them in biological fluids has been a task in the field of forensic toxicology. Therefore in this talk, the method to detect them in urine will be discussed by identifying the appropriate urinary biomarkers. **Methods:** In order to suggest appropriate urinary biomarkers to prove JWH-018 or JWH-073 intake, the major metabolites of JWH-018 and JWH-073 were selected. And a method for the quantification of these metabolites using solid-phase extraction based on LCMS/MS analysis was validated. By this method, authentic urine specimens obtained from drug offenders were screened via a synthetic cannabinoid ELISA kit and were analyzed by LCMS/MS for confirmation. **Results:** Twenty-one out of a total of 52 samples (40%) were found positive for at least one metabolite of JWH-018 or JWH-073. **Conclusion:** Based on the results, it may have some pitfalls to determine the ingestion of specific synthetic cannabinoids by detecting a few metabolites, considering the continuous emergence of structurally related synthetic cannabinoids. Thus, use of synthetic cannabinoids should be proven carefully through comprehensive investigation of analytical results of biological specimens. In addition, the detection of JWH-122, AM 2201 and MAM 2201 in urine and hair will be also studied and presented in the future.

Poster: 1621. Sex determination using the copy number variation detection method

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Introduction: The current methods of sex determination are mainly based on detection of the Y-chromosome. These methods are able to identify an unknown sample as male directly, but female gender is judged indirectly by not observing the Y-chromosome. **Objective:** Therefore, positive determination of the female gender is necessary because a false judgment may be caused by the quality or quantity of the template DNA in the Y-chromosome detecting method. We developed a novel method for sex determination by analysis of the number of X-chromosomes by the comparative Ct method using real-time polymerase chain reaction (PCR). **Methods:** Samples of intra-oral epithelial cells were collected from 20 male and 20 female healthy Japanese adults. We designed a primer for the target region according to the X-chromosomal gene in the amelogenin gene region without the copy number variation region. The reference region was the ribonuclease P gene region that was included in the commercial kit. Determination of the number of X-chromosomes was statistically and automatically judged using CopyCaller Software. **Results:** The number of X-chromosomes can be determined by the comparative Ct method using real-time PCR because all samples were judged equally using 1 ng template DNA. The judgment limits of this method were determined to be 0.1 ng template DNA. In this forensic sample case, the male amelogenin-Y gene was not detected by the short tandem repeat typing kit; however, the proposed method accurately judged the number of X-chromosomes in the sample as one. Therefore, this method is confirmed useful for sex determination and applicable to forensic samples. **Conclusion:** We developed a sex determination method for forensic practice by analyzing the number of X-chromosomes.

Poster: 1643. Modification of conventional anti-formin solution in human bone maceration technique

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Introduction: Anti-formin solution was one of the very first solutions used in human bone cleaning, preparing by heating sodium carbonate (NaCO₃) and bleaching powder with of water. **Methods:** The solution is then filtered and added with sodium hydroxide. In this preparation process, heating and filtering procedures are found to be impractical, the sodium carbonate aggregated easily in ambient humidity and the bleaching powder is recognized to pose hazardous to the users. Hence, a modification solution was created and started to be used as human bone cleaning solution in Department of Forensic Medicine Hospital Tengku Ampuan Afzan Kuantan, Pahang. In this modified solution, sodium bicarbonate (NaHCO₃) that is more stable in ambient temperature is replacing with sodium carbonate and a safe powerful oxidizer, i.e. 37% hydrogen peroxide is used instead of the bleaching powder and no heating is involved. In the modified method, 1 part of sodium bicarbonate is mixed with 3 parts of hydrogen peroxide (H₂O₂) and diluted with 6 parts of water. This amount is adequate to immerse a skull, the amount of chemicals can multiply from 2-6 depending the total bones to be cleaned. This modified anti-formin solution is found to be efficiently clear off the soft tissue especially for bones still attaching with adipose tissues. **Results:** The bones from this maceration are found to be clean and clear, returning the bones to its natural color. This is because the properties of sodium bicarbonate as neutralizer, deodorizer and anti- calculus. Moreover, hydrogen peroxide is an effective

surface sanitizer to be used in high-level disinfection and sterilization. Utmost importance, this solution will not destroy the DNA of the bone. After maceration, the bone is still can be used for DNA analysis. **Conclusion:** Hence, the modified anti-formin solution is thought to be one of the most economical, safest and efficient bone cleaning solutions.

Poster: 1688. Determination of volume of waste produced in relation to the amount of pseudoephedrine extracted from pharmaceutical preparations in New Zealand

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Introduction: In New Zealand, pseudoephedrine has been used as a main precursor for the manufacturing of methamphetamine. This precursor is legitimately used as nasal decongestants in its salt form such as hydrochloride, phosphate and sulphate in the over-the-counter medications and in prescribed cold and flu tablets. At this time in New Zealand 17 pharmaceutical preparations contain pseudoephedrine as their main ingredient. This gives the clandestine laboratory operators an access to use pseudoephedrine as a precursor of choice to manufacture methamphetamine. However, to date liquid waste has not been studied for this purpose. **Objective:** This study examines the minimum volume of liquid waste produced while extracting the most pseudoephedrine from its preparations using alcohol and toluene and base extraction method. **Methods:** This study was divided into two phases: a detailed comparison between toluene and base extraction and alcohol extraction using Contac NT and Codral Original Cold & Flu tablet to identify a suitable extraction method and pharmaceutical preparation, followed by quantitation of pseudoephedrine using a Gas Chromatography. The study, thus, aims to predict the past production of the drug clandestine laboratory based on the liquid waste found at the scene. **Conclusion:** In doing so, it aims to establish a framework to guide the forensic chemist to establish a minimum amount of yield that could have been produced based on the liquid waste found at the scene.

Poster: 1698. Evaluation of stochastic variations in low-template STR profiles for forensic casework applications

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Introduction: The increasing sensitivity of STR typing kits to detect low levels of DNA has lead to an increasing number of partial DNA profiles and accompanying stochastic variations characterized by heterozygote imbalance and allele dropout. **Methods:** Using the AmpFISTR Identifier® Plus amplification kit, the STR profiles (carried out in duplicates and by two analysts) for DNA templates ranging between 500 pg to 1.9 pg (from an individual heterozygous at all AmpFISTR® Identifier loci) were examined. **Conclusion:** Based on the findings of this study, a number of guidelines have been recommended for purposes of casework with low template DNA.

Poster: 1727. The Role of Reactive Oxygen Species and Oxidative Stress in Carbon Monoxide Toxicity: An in-depth Analysis

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Introduction: The underlying mechanism of the central nervous system (CNS) injury after acute carbon monoxide (CO) poisoning is interlaced with multiple factors including apoptosis, abnormal inflammatory responses, hypoxia, and ischemia/reperfusion-like problems. One of the current hypotheses as regards the molecular mechanism of CO poisoning is the oxidative injury induced by reactive oxygen species (ROS), free radicals and neuronal nitric oxide (NO). Up to now, the relevant mechanism of this injury is poorly understood as well. The weakening of antioxidant systems and the increase of lipid peroxidation in the CNS have been accused though. **Conclusion:** Accordingly, in this study, we aimed to highlight the relationship between oxidative stress and CO poisoning from the perspective of forensic toxicology and molecular toxicology.

Poster: 1780. Profile of nicotine use among alcohol dependent patients visiting a tertiary care treatment centre in North India

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Introduction: Tobacco use among alcohol dependent individuals is quite high. Alcohol dependents who smoke regularly may die of smoking related disorder rather than alcohol related disease. Understanding the pattern of tobacco use with co-morbid alcohol use may help in planning appropriate prevention/ treatment strategies. **Objective:** The study aimed at examining the profile and pattern of nicotine use among alcohol dependent patients visiting a tertiary care treatment centre in North India. **Methods:** Male patients fulfilling DSM-IV (Diagnostics & Statistical Manual of Mental Disorder), criteria for nicotine and alcohol dependence, attending the out patient department of the tertiary care treatment centre were recruited after obtaining informed consent. The socio-demographic profile, drug use history, nicotine associated health problems and general health problem were recorded. Motivation to stop tobacco use was assessed qualitatively using direct questions about their interest and intentions to quit. **Results:** A total of 149 subjects were included in the study. The mean age of study sample was 37.6±10.44 years. Tobacco was reported as the gateway drug in 90% of the cases. Exclusive bidi use reported in 42 % of the subjects. Mean duration of bidi and co-morbid alcohol use was higher than cigarette or smokeless tobacco use. Problems associated with nicotine use & general health was reported by 41 % & 39% of the subjects. Unsuccessful past quit attempts was present in 85 % cases. More than 90 % subjects remained interested in quitting the tobacco use. **Conclusion:** The results suggest that these patients represent a separate population requiring higher attention from the treating physician.

Poster: 1814. Discrimination between postmortem and antemortem blood by quantitative analysis of microRNAs

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Introduction: We devised a method of discriminating postmortem from antemortem blood by quantifying microRNAs (miRNAs), a class of small non-coding RNA molecules with a length of 18-24 nucleotides that plays essential roles in many cellular processes. The postmortem blood miRNA marker, miR-1 we employed, is known to show tissue-specific distribution and it is abundantly expressed in the heart and skeletal muscles of humans and other mammals. **Methods:** The TaqMan polymerase chain reaction (TaqMan-qPCR) revealed several hundred-fold higher miR-1 levels in the peripheral blood of cadavers at two days postmortem compared with antemortem peripheral blood. **Results:** Postmortem degeneration appeared to cause the release of intramuscular miR-1 into the serous fluid and the blood. Degradation over time had little effect on the relative amounts of miRNAs in experimentally prepared blood and bloodstains and postmortem blood was still distinguishable from antemortem blood using our method. **Conclusion:** We applied this method to blood samples from a woman who had been stabbed with a knife and who subsequently bled to death, and the results helped to clarify the circumstances surrounding her death.

Poster: 1815. Organ and tissue identification by quantitative analysis of microRNAs

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Introduction: MicroRNAs (miRNAs) are small non-coding RNA molecules with a length of 18-24 nucleotides that play essential roles in many cellular processes. It is known that some miRNAs show tissue-specific or cell-type-specific expression. **Objective:** We have investigated the possible application of miRNA expression profiles for organ and/or tissue discrimination. **Method:** miRNAs in total RNA samples derived from organ or tissue sections were quantified by using the TaqMan polymerase chain reaction (TaqMan-qPCR). **Results:** Relative abundance of miRNAs, for example miR-122, miR-125b, miR-124a, and miR-223, show promise for use in organ or tissue discrimination. Degradation has minimal effect on the relative abundance of miRNAs in the organs and tissues of decomposed bodies. **Conclusion:** We applied this method to decomposed tissues that were obtained from the cranial cavities of skeletonized and mummified bodies. miRNA profiles closely resembling those of cerebral tissue of cadavers at 1 day postmortem were still obtainable from the tissues.

Poster: 1826. Microscopic study of diatoms from selected Johor water resourcesChean Nee Chai¹, Mohd Aznool Haidy Ahsorori², Mohd Bakri Bakar²¹Department of Chemistry, Faculty of Science, University Technology Malaysia (UTM), Skudai, Johor, Malaysia; ²Department of Forensic Medicine, Hospital Sultanah Aminah Johor Bahru, 80100 Johor Darul Tazim, Malaysia

Introduction: Diatoms are considered to have useful examining potential for forensic investigations. A person whose death was caused by drowning consumed substantial amount of water into his lungs and through circulatory system. Diatoms are usually not only found in lungs but also in other organs, such as spleen, kidney, liver, intestine and bone marrow. Due to the presence of silica-cell wall, diatoms are resistant to enzymatic and acid digestion in the human body and thereby of benefit to post-mortem analysis. **Objective:** Therefore, investigating characteristic and inhabiting features of diatom would be of assistance in forensic research. **Methods:** In this study, water samples from selected rivers and seas in the state of Johor, Malaysia were collected preserved and kept under 4°C. Planktonic net was used to entrap diatoms and cells were viewed under microscope. The morphologies and characteristics of diatom cells were examined with magnification of 400x and 1000x. Their genera were identified. **Results:** In the water samples collected from different sampling locations of Johor Straits, it was found that the genera melosira, cyclotella, stephanodiscus, navicula, nitzschia, and pseudo-nitzschia mainly existed in the water samples. It was observed that most of these diatom genera appeared in all water samples collected from Johor Straits. Different genera were seen to be more dominant in different sampling locations. **Conclusions:** Accumulation of these diatoms data integrates into a concrete database and will therefore provide an overall aspect of diatoms in water source of different locations.

Poster: 1849. Determination of paracetamol content in suspected counterfeit Panadol tablets using reversed-phase high performance liquid chromatography

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Introduction: The issue of counterfeiting is a worldwide problem. This scenario may happen to consumer goods such as handbags and shoes, forgeries of documents, currencies and also pharmaceutical products which include modern medicine, traditional medicine, supplement and others. In Malaysia, all pharmaceutical products must be registered with the Ministry of Health to ensure its safety, quality and efficacy. However, there are still loopholes in the present law which contribute to the availability of counterfeit medicines in the market. Paracetamol (PCM), an over-the-counter drug is one of the most common medicines used to relieve pain and fever often associated with cold and flu. Due to its wide use, affordability and availability, PCM is susceptible to be counterfeited. **Objective:** The objective of this study is to determine the content of PCM in suspected counterfeit Panadol tablets. **Methods:** In this study, ten samples of suspected counterfeit Panadol were obtained from retail shops and herb stores in selected areas of Johor. Meditag hologram decoder was used to identify whether the sample was original or counterfeit. HPLC analysis was done using Agilent Eclipse Plus, C18 column (150 x 4.6 mm i.d., 5 µm) as stationary phase with a flow rate of 1.0 mL/min. Mobile phase consisted of methanol:water (70:30 v/v) with UV detection at 227nm. The method was validated in accordance to ICH Q2 Guidelines for linearity, specificity, accuracy and precision. The proposed method was shown to be linear and specific in the range of 10-80 µg/mL ($r^2=0.9998$). The accuracy and precision was also determined. **Results:** Preliminary results have shown that the method used was well-suited to the separation and determination of PCM content in the suspected counterfeit Panadol tablets. **Conclusion:** As a conclusion, it is hoped that this study can be used to increase awareness and knowledge among the public regarding counterfeit products and the implications of using them.

Poster: 1868. Measurement of human canine teeth from dental casting for gender determination

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Introduction: The identification of deceased is an important aspect in forensic dentistry particularly in cases of unusual circumstances. Gender determination on the deceased may be directed to the teeth due to differential of sexual dimorphism corresponding to a specific gender. **Objective:** The study was focused on measuring the width of canine teeth between Malaysian male and female human subjects according to the mandibular canine index (MCI) method using a vernier caliper. MCI method calculates the ratio value of maximum crown over the width at mesio-distal (MD) and inter-canine width. **Methods:** Random sampling was performed in several dentistry clinics in Pontian, Skudai and Senai involving 50 males and 50 females in the age group of 14 to 60 years using their dental casting. The study revealed significant differences between the width of canine teeth of males and females. **Results:** Statistical analysis using SPSS 18.0 found patients both male and female, ages between 20 to 29 years illustrated noteworthy differences in sexual dimorphism of their canine at 20.7%, while dimorphism between the age of 10 to 19 years were lowest at 3.1%. Interestingly, the size of the right mandibular canine showed greater variety between both genders as compared to the one on the left. **Conclusion:** Males and females were distinguishable by the width of their mandibular canine, a male exhibited greater than 0.7 cm whereas the female with less than 0.7cm.

Poster: 1903. Determination of anionic content in chemical ignition molotov cocktail using ion chromatographyWan Nur Syahirah Wan Mohammad¹, Mohd Shahru Bahari¹, Ngat Ngoh Lisa Tang², Azlimin Mat Noor³¹Universiti Teknologi Malaysia; ²Royal Malaysia Police; ³Fire Rescue Department Malaysia

Introduction: The Chemical Ignition Molotov Cocktail (CIMC) is one of the improvised incendiary devices (IIDs) that has been used recently in acts of terrorism. **Objective:** It is in the interest of the police department to gather information about the composition and type of device employed by determining inorganic ions that present are in CIMC residues namely sulphate, chlorate, perchlorate and chloride. In simulated ground experiments, these improvised CIMC using petrol, kerosene and diesel as accelerants were thrown against a brick wall which initiated the fire as a consequence of the exothermic reaction produced by the combination of the concentrated sulphuric acid and the potassium chlorate. **Methods:** Chromatography (IC) was employed to determine the ionic composition of the CIMC residues in order to identify the chemical reagents used for the device. **Results:** Preliminary results showed that sulphate, chlorate, and chloride were detected in most samples. However, perchlorate could not be detected since not all potassium chlorate reacted with sulphuric acid when the bottle was broken. Nitrate was also found in the sample which could have originated from the soil close to the sites where CIMC were thrown. It was also noted that petrol gave the most powerful explosion on the CIMC devices as compared to kerosene and diesel. **Conclusion:** Combustible material such as sugar was also found to give more destructive power on these devices as reflected by the more powerful combustion.

Poster: 1908. Profiling of organic explosives from post-blast pipe bomb residues employing gas chromatography with electron capture detectionUmi Kalthom Ahmad¹, Megat Mohd. Faris Megat Shaffari¹, Mohamad Afiq Mohamed Huri¹, Soo Me Tong²¹Department of Chemistry, Faculty of Science, Universiti Teknologi Malaysia, 81310, UTM Johor Bahru, Johor Darul Tazim;²Forensic Laboratory, Royal Malaysia Police, Jalan Cheras, 43200 Cheras, Selangor

Introduction: The increased bombing activities in recent years have spurred much awareness amongst forensic scientists of the importance of post-blast investigation. **Objective:** The analysis of post-blast bomb residues is particularly crucial for identification of explosives used in home-made bombs. **Methods:** In this study, four types of pyrotechnics obtained from controlled deflagration of pipe bombs were sampled using cotton ball swabbing technique to recover post-blast residues from PVC pipe bomb fragments. Post-blast explosive residues were analyzed using gas chromatography with electron capture detector (GC-ECD). A HP5 (30 m x 0.25 mm x 0.25 µm) capillary column was utilized with helium as the carrier gas and nitrogen as the make-up gas. **Results:** The results of this preliminary study revealed that the four types of pyrotechnic samples could be clearly differentiated via their different GC profiles. Comparison of the GC profiles of pre-blast explosives with the post-blast swab extracts gave good similarities. This indicated that the swabbing technique was successful in recovering organic analytes and reflected on the composition of the original pyrotechnic explosives. **Conclusion:** However, positive identification of each analyte peak warrants the use of gas chromatography-mass spectrometry (GC-MS) for further analysis.

Poster: 1974. An unusual case of fatal anaphylaxis due to CeftriaxoneJanaki Warushahennadi¹, Rohan Ruwanpura², Ady Gayan¹Faculty of Medicine, Karapitiya, Galle, Sri Lanka, ²Karapitiya Teaching Hospital, Galle, Sri Lanka

Introduction: Here we present a case of a 9 year old child, who apparently died due to anaphylaxis due to Ceftriaxone, which is a third generation cephalosporine antibiotic. There had been several reported cases due to different types of ceftriaxone induced adverse effect, including few fatalities. **Methods and Results:** Case History: The child was hospitalized for septic complications of respiratory origin which was treated with intravenous ceftriaxone. During administration of 3rd dose, the child developed cyanosis, acute circulatory failure and died within two hours, in spite of intensive resuscitation. The child did not have any previous history of allergic reactions for cephalosporin or penicillin. The beta tryptase level on post mortem serum sample was negative. The histology revealed focal inflammatory reactions in the lungs and focal areas of fatty degeneration of liver. The cause of death concluded as anaphylactic shock following ceftriaxone induced adverse reaction. Discussion: The ceftriaxone is responsible for serious adverse effect including cardiac arrest, anaphylactic and anaphylactoid reactions. It is an uncommon feature to develop an adverse effect while infusing the drug as the reaction usually develops few minutes after the infusion which is not favour of the cause of death. Although the urticaria and bronchospasm was absent, the presence of cyanosis and acute circulatory failure was in favour of the given cause of death. The beta tryptase level was negative but it is elevated in most cases of anaphylaxis. The high titer of beta tryptase level does not always correlate with the diagnosis as in some patients, it is within normal range after clinical diagnosis anaphylaxis. **Conclusion:** The probable cause of death was acute anaphylaxis due to adverse reaction for ceftriaxone. But other possible causes for death could not be excluded.

Poster: 1982. Practices on the use of pesticides among the paddy cultivators in low country dry zone in Sri LankaSanjaya Hulathduwa¹, KGTD Bandara¹, P. Paranitharan²¹Dept. of Forensic Medicine, Faculty of Medical Sciences University of Sri Jayawardenepura Nugegoda, Sri Lanka; ²Dept. of Forensic Medicine, Faculty of Medicine, University of Kelaniya, Sri Lanka

Introduction: The main livelihood in the low country dry zone of Sri Lanka is paddy cultivation. Since recent times, pesticides are increasingly being used by Sri Lankan farmers with reported adverse health outcomes. **Objective:** To study the safe use of pesticides by paddy cultivators in the Sri Lankan dry zone. **Methods and Results:** Designed as a descriptive cross-sectional study, this was conducted in certain areas in low country dry zone, using an interviewer-administered questionnaire and a structured interview. Results: 88% had read the labels on pesticide bottles and adhered to the instructions in varying degrees while 4% had never read the instructions. 34.7% had mixed different types of pesticides before application. 72% had the habit of regularly checking the equipments for faults and leakages. 89.3% had never worn eye shields while 37.3% of them used to handle pesticides with bare hands. 51.3% had the habit of cleaning the spray nozzle by blowing air through it by placing it in the mouth. 69.3% had never used gloves during the entire process of application. 47.7% had never used face masks. 76.7% had applied pesticides bare-footedly. 68% had used long-sleeved shirts and 68.7% had used full length trousers. 38% claimed that they never spray in windy environments. It is observed that a significant proportion had, smoked (12.7%), taken food or drinks (5.3%) and chewed betel (32%) while application of pesticides. 91.3% had the habit of taking a shower after application. 87.3% had changed the clothes immediately following application. 78.7% had never washed other house-hold linen together with clothes used for pesticide application. **Conclusion:** The majority of respondents were defective in the manner and technique of using personal protective devices and other safety measures during different phases of application of pesticides. This emphasizes the need for further interventions to reinforce safety practices in this aspect.

Poster: 1999. The Future of Rapid DNA

Melissa May

Strategic Planning, NetBio, USA

Introduction: DNA analysis has been cited as the gold standard in forensic science, aiding law enforcement in identifying criminals, solving crimes, and exonerating the innocent. When fully integrated into the law enforcement environment, rapid DNA technology has been designed to increase the speed of DNA processing, minimize the crime lab DNA backlogs, and help lower the cost of law enforcement by providing a biometric link between a criminal activity and an individual being held in custody. The DNAscan Rapid DNA Analysis System, from GE Healthcare Life Sciences and NetBio, is a fully automated rapid DNA profiling system. The system generates full STR profiles (with the CODIS core loci) from 5 buccal swabs simultaneously in less than 85 min. The DNAscan System has been designed and tested to provide data quality and concordance comparable to traditional laboratory-based forensic DNA analysis methods. The instrument has been ruggedized for use outside the laboratory environment and requires no recalibration or alignment after transport. The system also contains on-board expert system analysis software that processes all data and designates alleles to generate STR profiles without the need for manual review by a DNA scientist. The DNAscan System includes a lab-on-a-chip consumable, the BioChipSet Cassette, which houses all reagents, eliminating reagent handling by the user and reducing the risk of contamination. **Conclusion:** All reagents have been optimized and tested to provide robust and reliable amplification in a microfluidic environment without the need for refrigeration.

Poster: 2046. Ten-minute drug screening

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Introduction: We addressed the development of a new reliable drug screening method which completes within 10 min using combination of modified QuEChERS (Quick, Easy, Cheap, Effective, Rugged, Safe) method and FIA-MS/MS (Flow injection analysis-tandem mass spectrometry, ABSCIEX 5500 QTRAP). **Methods:** Extraction from whole blood was carried out according to the modified QuEChERS method (Leg Med 2012;14:286). The purified sample was transferred into a clean vial and 10 µL was injected directly onto the FIA-MS/MS. The results obtained by this method were compared with those by LC-MS/MS analysis (ABSCIEX 3200QTRAP). In this study, we targeted 187 drugs and poisons commonly encountered in Japan. 3) **Results and Discussion:** The modified QuEChERS method took about 5 min for extraction and FIA-MS/MS analysis needed only 1.5 min per sample (No column equilibration required). Therefore, a sequence of analytical procedures, from the pretreatment of whole blood to the reporting of results can be completed within 10 minutes. The results by FIA-MS/MS were almost identical with the results by LC-MS/MS. 4) **Conclusions:** The devised new drug screening method allowed the identification of drugs and poisons from whole blood within 10 minutes on practical forensic cases.

Poster: 2073. Determination of chemical fingerprint of Ron 95 commercial petrol in Malaysia by chemometric analysis

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Introduction: Arson is one of the most difficult crimes to investigate due to the lack of physical evidence associating a suspect to the crime. In fire investigation, petroleum-based accelerants such as gasoline are the most commonly used because of their volatility, flammability and availability. **Objective:** The objective of this study was to determine the chemical fingerprints of unburnt RON 95 petrol for Petronas, Shell and BHP by using chemometric analysis. This experimental research was conducted in two phases. Phase one involved the determination of the chemical fingerprint of RON 95 petrol for three selected brands. In phase two, comparison were made to determine the composition differences amongst RON 95 petrol collected from different service stations at different locations. **Methods:** All samples obtained from 15 service stations were then stored in glass bottle covered with aluminium foil to avoid exposure to the light and heat. Hexane was used as a solvent to extract hydrocarbons which were then injected into the gas chromatography flame ion detector (GC / FID) for analysis. Chemometric analysis comprising of chi-square test, principle component analysis (PCA) and QUEST model analysis were applied on the collected data. Chi-square test results showed that the data was consistent. **Results:** No positive results were obtained from PCA analysis. However, QUEST model analysis gave 93.3 percent validation. Chemical fingerprint of Petronas RON 95 was identified at a standard retention time of 25.5 min, 6.70 min, 9.20 min, 10.25 min and 22.95 min. Samples of RON 95 petrol from Shell, were at standard retention time 5.25, 5.60, 6.70, 9.20, 10.25 and 22.95 minute. On the other hand, RON 95 BHP petrol had chemical fingerprint retention time at minute 5.60, 6.70 and 10.25. **Conclusion:** All chemical fingerprints were constructed based on the characteristics of the area under the peak and not peak height as commonly being used.

Poster: 2091. Central supervision in postgraduate training in Forensic Pathology: incomplete causes of death corrected

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Introduction: Postgraduate(PG) training in forensic medicine in Sri Lanka is conducted by the board of study in forensic medicine of the postgraduate institute of medicine (PGIM). Trainees are attached to individual supervisors in training centres island wide. Recently the board of study commenced central periodic supervision of all trainees regarding their competencies. **Objective:** The last five causes of death (COD) issued by PG trainees submitted electronically were examined by two specialists to detect possible errors. **Methods and Results:** Nine first year, four second year, three third year, and three fourth year trainees sent five COD each. Shortcomings included non compliance with a standard format like failure to write the underlying or immediate cause of death; seen more with first years than with senior trainees. Feedback given to all trainees and trainers resulted in error correction and better commitment for supervision. Incomplete COD is a universal problem and can mislead the criminal justice system and have a negative impact on the public health system. Trainees should write COD according to accepted standards, supervised by trainers to ensure development of safe practitioners. **Conclusion:** A central supervisory body has detected errors in the system. This can be applied to other core competencies as well. Feedback to trainees and trainers will contribute to producing safe medicolegal specialists. First year trainees should be supervised more closely when formulating COD. Similar to the COD all competencies in the training can be supervised centrally, periodically to detect areas for improvements in trainers supervisory role.

Poster: 2117. Forensic classification and discrimination of red ballpoint pen inks using high performance thin layer chromatography

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Introduction: Ink analysis is an important field in document examination. Most of the letters in threatening cases such as blackmail letter and ransom note are generally written with red pen ink. Therefore, this study focus on red ballpoint pen inks that are available in local market. **Methods:** A total of 12 pen model from six different brands were chosen as sample in this study. Pen inks were extracted from the paper with methanol solvent and separated by HPTLC technique using a solvent mixture of ethyl acetate, methanol and distilled water (70:35:30, v/v/v) as mobile phase. **Results:** Chromatogram profile obtained by HPTLC technique had been used to classify the pen inks while discrimination of pen inks has been done based on the retention factor (Rf) value. Besides, the homogeneity of ink has been tested by analyzing nine ink line samples on the same HPTLC plate. The results of repeated analysis were also compared based on the relative standard deviation (RSD) in order to determine the repeatability and reproducibility of HPTLC technique. **Conclusion:** In conclusion, all pens were

successfully classified into eight classes and a total of 62 out of 66 pen pairs were successfully differentiated among each other with discrimination power of 93.94%. It was also found that the studied pen ink is homogeneous with RSD in the range of 0-2.23%. This study has also demonstrated that HPTLC technique is repeatable and reproducible (RSD<5.00%).

Poster: 2118. Differences in entry and exit wounds by semi-automatic pistol at different shooting distances

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Introduction: Semi-automatic pistol is a handgun which consists of a chamber and a barrel. This pistol uses the mechanism of semi automatic to fire a projectile, by pressing the trigger separately for each firing. In this mechanism, the cartridge case is ejected from the pistol and a new cartridge is reloaded into the chamber automatically until the entire cartridge in the magazine is reloaded. Gunshot wound usually contains an entry wound and an exit wound. The scientific study on gunshot wound is known as wound ballistic. In this study, it is important to differentiate entry wound and exit wound. **Objective:** Aim of this study was to determine the differences between entry and exit wounds by using semi-automatic pistol at different shooting distances. **Methods:** Three shooting distances were studied, which include the contact distance (0 m), close contact distance (1 m) and intermediate distance (3 m). The test firing was conducted at the shooting range of PALAPES UKM. The targets used for test firing were six swines with weight around 25-30 kg. Morphological features such as size, shape and presence of GSR material on the gunshot wound were documented. **Results:** There was a significant difference in the size between entry and exit wounds at contact shooting distance (0m) and intermediate shooting distance (3 m). Shape of wound can be used to differentiate entry and exit wounds at all shooting distances where entry wounds normally made up of polygonal shape such as round and oval whereas exit wounds normally made up of stellate and irregular shape. Presence of GSR can be used to differentiate entry and exit wound at contact shooting distance (0 m). At close contact (1 m) and intermediate (3 m) shooting distance, both entry and exit wounds showed no presence of GSR. There was a significant relationship between the shooting distances with the size of entry wounds. An equation and a model to estimate the shooting distance was developed by using these morphological features. **Conclusion:** Different shooting distances produce different characteristics between entry and exit wounds. It is hoped that this study can provide more information on differentiating entry and exit wounds.

Poster: 2119. Experimenting difference saw types and sizes on cutting human long bones

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Introduction: Pahang is the third largest state in Malaysia, after Sarawak and Sabah, and the largest in the Peninsular Malaysia. The physical geography can be broken into roughly three sections: the highlands, the rainforest, and the coastal areas. The rainforest covers two third of the state which makes it an ideal place as dumping site of evidence, bodies as well as skeletal remains. A lot of times, the skeletal remains were cut with multiple marks, most of the time with peculiar patterns and shapes. Recently, we received a case consisting of bones that were already dismantled with specific type of injury. **Methods:** A test to determine the injuries to the bone by different types and sizes of saw was carried out. Instruments used included a hand saw and a grinding machine with four different sizes of grinding wheels that are most commonly used. Specimens used consisted of three different densities of wood, one round wood, ABS round pressure pipe and long bones. **Conclusion:** From the experiment, we concluded that the injury on the bone was consistent with the mark made by one of the most commonly used grinding wheel. However, the limitation to this experiment includes the strength of the cutter, ages of the bone and bone density. In a nutshell, the pattern of injury will reveal the truth of the instruments used.

Poster: 2120. A comparative analysis between fingerprint lifting methods (dusting and fuming) in our local environment

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Introduction: Latent fingerprints are one of the best evidences that can be found on various crime scenes. It can be used to prove that an individual was at the crime scene at any given time. There are many techniques available for a successful fingerprint lifting. Two of the most common ones are fingerprint powder dusting and cyanoacrylate fuming. **Objective:** This research aims to compare both the techniques and determine which has a higher success rate especially on retrieving fingerprints exposed to local environmental conditions for three days. **Methods:** Fingerprint samples were collected from 18 subjects on glass, perspex and aluminium slides. These samples were then exposed to local environmental conditions for three days. The fingerprints were then developed using the aforementioned techniques. Number of minutiae found on the fingerprints retrieved from samples are compared with those found from reference fingerprints of the subjects. 12 or more

minutiae found indicates a positive outcome. **Results:** 100% of fingerprints retrieved from glass slides using both methods turned up a positive result. Fuming had a higher success rate on the perspective surface at 89% compared to dusting (5.6%). It was the same with aluminium slides where fuming had a 100% success rate but dusting only had a 72% success rate. **Conclusion:** Based on the results, it can be safely said that fuming results in clearer fingerprints and more minutiae can be found from the retrieved fingerprints even including the prior exposure to less than optimum local conditions. This proves that fuming is a better fingerprint lifting method.

Poster: 2130. Donepezil concentration in a cadaver. Donepezil might be associated with the cause of death

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Introduction: Donepezil is a widely used cholinesterase inhibitor for the treatment of Alzheimer's disease (AD). The safety and efficacy of DPZ have been reported in clinical trials, but several studies indicate that DPZ is associated with severe cardiac side effects because of its cholinergic properties. Moreover, excessive doses of DPZ are associated with toxic symptoms (vomiting, bradycardia, unconsciousness) or may be fatal. **Objective:** This study aimed to investigate the relationship between the blood concentration of DPZ in cadavers and the cause of death. **Methods:** We measured the blood and urine concentrations of DPZ in cadavers and compared our findings with previous studies. We included 15 of 416 cases in which DPZ was detected in screening tests. **Results:** DPZ was detected in the heart blood at a lowest concentration of 18 ng/mL and a highest concentration of 1335 ng/mL. The urinary DPZ levels were measured in 9 cadavers and the lowest concentration of DPZ in the urine was 26 ng/mL and the highest was 2454 ng/mL. In cadavers with very high concentrations of DPZ, side effects and poisoning were thought to be the cause of death. **Conclusion:** However, death by poisoning cannot be ascertained only on the basis of blood concentrations. Examination of the individual differences in the metabolism and postmortem redistribution is still unknown. To determine the exact cause of death, postmortem redistribution should be determined in animals, and these results should be compared with those obtained in living patients. DPZ was detected at high concentration in postmortem sample. The further research is required for the relation with the cause of death.

Poster: 2132. Preliminary anthropometric comparison of cross-sectional external ear between mono-zygotic twin

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Introduction: This cross-sectional study was aimed to provide anthropometric information of external ear between monozygotic twin, also known as identical twin. Since there is no detailed study of ear morphology or anthropometry among Malaysian, this study was done to provide some information that may be useful for physical anthropologist, plastic surgeon and also for forensic scientists. **Methods:** For this preliminary study, data of general external ear features along with the measurements of inter-landmark length were taken from identical twins ages between 7 to 18 years old throughout Malaysia, in order to explore whether data from external ear can be used as a purpose of individualization of identical twin. Measurements were taken using digital caliper with the resolution 0.01mm. Statistical analysis was performed on all data collected using SPSS software, paired samples t-test to obtain the differences between both individual from the same pair of twin. **Results and Discussion:** Results showed that more than 50% of identical twins shared same type and shape of ear between pairs. Majority of identical twins that was 89.8% of twins have the same type of earlobe between pairs. Comparison of ear dimension measurement between gender of identical twins showed that male has 2-4mm longer and wider ear than female. Statistical analysis showed that mean differences of measurement of outer ear landmarks between pairs of identical twins was only between 2.95 to 5.84%. There were no significant differences between ears of identical twins for almost all dimensions of inter-landmarks except for ear base length of right ear ($p=0.003$). **Conclusion:** Even though some researchers on ear morphology have reported that individual could be identified from comparison of ear, this present study proved that in general, this tool could not be applied on identical twins. Further study on the details of other ear landmarks is undergoing, and expanding the age groups of the subjects, in order to further investigate the application of external ear as another forensic tool for human identification.

Poster: 2135. Classification of seized clandestine methamphetamine samples using various analytical techniques

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Introduction: Global methamphetamine seizures are on the rise and so as in Malaysia. Within a five year period, between 2007 and 2011, the Royal Malaysia Police has seized a total of 1,253.85kg and 114,442 tablets of methamphetamine crystals and pills respectively and within that period too, 83 clandestine laboratories had been seized. **Methods:** This study involves the application of four analytical techniques which are Fourier Transform Infrared (FTIR), High Performance Liquid

Chromatography (HPLC), Gas Chromatography Mass Spectrometry (GCMS) and Induced Couple Plasma Mass Spectrometry (ICP-MS) as tools in classify seized clandestine methamphetamine samples into various groups. Firstly, twenty clandestine samples were analysed using FTIR with an Attenuated Total Reflectance attachment for methamphetamine identification. Next, the organic impurities in the samples were determined by GCMS and HPLC whereas inorganic impurities were determined by ICP-MS. **Results:** Results obtained from organic and inorganic impurities analysis gave significant information on types of starting material and synthetic route. **Conclusion:** Further analysis on the GCMS data and ICP-MS data could establish possible links between unknown street methamphetamine samples to illegal drug operators which later could become valuable information for intelligence purposes.

Poster: 2142. Discrimination of hair dyes employing infrared analysis

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Introduction: Hair colouring is the practice of changing the colour of hair, involves treatment of the hair with various chemical compounds. These chemicals colour the outer part or cuticle of the hair shaft. The typical hair dyeing method is one in which the hair dye ingredients combine with oxygen to form a reaction that permanently binds the hair dye to the hair shaft. Current hair examination protocols do not attempt to differentiate hair colour using instrumental analysis. **Objective:** This research is intended to assess the ability of Fourier transform infrared (FTIR), a sampling technique used in conjunction with infrared spectroscopy to successfully discriminate the colour of dyed hair and to see whether the natural and synthetic hair dyes might be distinguished. **Methods:** The hair samples were treated with natural and synthetic hair dyes, and natural hairs were cut into smaller portions and grinding it with potassium bromide (KBr) powder to form a pellet. The hairs were analyzed using FTIR and the contribution of the hair dye substrate is predominantly observed. **Results:** 2-hydroxy-1,4-naphthaquinone (lawsone) and p-phenylenediamine (PPD) are the main component found in the natural and synthetic hair dyes respectively. Lawsone absorbs infrared (IR) radiation at wavenumber of 3400-3300 cm⁻¹, 1700-1600 cm⁻¹, 1600-1500 cm⁻¹ and 1280-1200 cm⁻¹, which indicates O-H stretch, C=O stretch, aromatic C=C stretch and C-O bond respectively. In the other hand, PPD absorbs IR radiation at 3450-3200 cm⁻¹, 2900 cm⁻¹, 1500 cm⁻¹, 1300-1200 cm⁻¹ and 850 cm⁻¹, which indicates N-H stretch, C-H stretch, aromatic C=C stretch, C-N bond and C-C bond respectively. **Conclusion:** This shows that natural and synthetic hair dye can be discriminated by using FTIR.

Poster: 2149. Psychosocial profiling of juvenile delinquents through qualitative findings

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Introduction/Objective: Crime among youth is often viewed as one of the most pressing current social problems. While asking what causes delinquency is way easier, providing an answer related to why youths get involved in crime is another story. In order to understand why, making sense of the root causes is crucial. Following this, the present study aims to fill the gap by identifying the psychosocial profiles of juveniles. **Methods:** Eight juveniles in an intervention school voluntarily participated in this study. Each participant was asked the same set of open-ended questions prepared in an interview guide. Questions covered respondents demographic information and personality characteristics, family background, school institution, peers, as well as the delinquent behaviour. Responses were recorded and analysed using N-ViVo 8.0 for themes. **Results:** Thematic analyses indicated that respondents purposively choose to be involved in delinquency. Often, a delinquent act was done out of curiosity and seeking for fun. Motivated by the pleasure and monetary gain from the activity, most respondents found it difficult to stop. Although most of them reported having had good relationships with parents and family members, an absence of punishment for wrongdoings by a parental figure was evident. Deviance was more likely in the presence of weak discipline and weak authority figures in school. Most respondents claimed to have different group of peers; good companions whom they spent a lot of time together and delinquent friends whom they only met to commit offences. **Conclusion:** Findings from this study indicate the importance of identifying problems from both individual and social backgrounds in order to rectify juvenile delinquency at the root level. The information gained can be used to propose better juvenile prevention and rehabilitation systems and practices.

Poster: 2173. Microbial phospholipid fatty acid distributions as an indicator of clandestine grave in different soil pH for crime investigations

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Introduction: Microbial phospholipid fatty acid (PLFA) distributions that associated with the burial under different soil pH and redox conditions have been observed for 120 days. **Methods and Results:** The principal component analysis (PCA) showed that these microbial PLFAs significantly represent a particular burial setting. The score plot of PCA for different soil pH, suggesting that more than ten PLFAs can be significantly attributed to the burial in neutral soils. The PLFA of n-C14:0, n-C16:1 and n-C18:1 are potential burial indicators for alkaline soils. However, there are no PLFAs that can be used to unambiguously characterise burial in acidic soils. The PLFAs of C22:0 and C26:0 significantly represent the cases where the remains were not found during the recovery. Whilst, mono- and diunsaturated PLFAs, i.e. C16:1, C18:1 and C18:2 fatty acids, with other PLFAs can potentially be used as indicators for the cases where the fatty remains are found upon the recovery. The iso- and anteiso- PLFAs, i.e. i-C14:0,a-C15:0 and a-C17:0 fatty acids, together with monounsaturated (C16:1 and C18:1) and saturated (e.g. C16:0 and C17:0) analogues are the potential indicators for burial under aerobic conditions. **Conclusion:** Similarly in cases with the absence of fatty remains, the C22:0 and C26:0 PLFA components characterize anaerobic conditions. PCA results potentially provide useful information in crime investigations.

Poster: 2176. Evaluation of three mounting medium in preparation of diatom slides for microscopic examinations of diatom study

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Introduction: Diatoms are unicellular microorganisms, commonly searched for in the organs of individuals alleged to have died by drowning for the diagnosis of ante-mortem drowning. Microscopic examination of extracted diatoms proves a challenge especially for those inexperienced with diatom examination. Poor visibility of diatoms due to the colourless frustules called for the use of high refractive index mountants for improving the visibility. **Objective:** High refractive index (R.I.) mountants (R.I. 1.6) such as Naphrax and Zrax, although expensive and scarce in Malaysia are also known to release toxic substances during the curing process thereby urging the need for alternative mounting media. **Methods:** In this study, three mountants, Euparal, Canada Balsam and DPX were chosen due to their ready-availability, ease of use and lesser toxicity. The R.I. of these mountants was less than 1.6, ranging from 1.48 to 1.55 but still acceptably higher than the general R.I. for diatoms (1.43) thereby qualifying them to be used as mounting media. Slides of diatoms were prepared by air-drying a drop of diatom stock solution extracted from clams on a coverslip, mounting it with the respective mounting medium and leaving it to cure for few days. Five slides were prepared for each mountant and one air-dried diatom slide served as control. Each slide was examined under 10x, 40x and 100x objective lenses for visibility. **Results:** Examination under 10x objective lens showed good visibility for all the three mountants. Under 40x objective lens, Euparal showed better mono-plane visualization compared to Canada balsam and DPX which required continuous fine-focus readjustment making it harder to record good photographs of diatoms. When examined under 100x objective lens, DPX showed a clearer visibility compared to Euparal and Canada balsam. **Conclusion:** All the three mounting media proved to aid in better visualization of diatoms and can be used as alternative mounting medium for diatom study.

Poster: 1749. Innovated method for detecting diatoms in hospital specimens

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Introduction: Forensic diatom analysis is an important supporting investigating tool for drowning cases. **Objective:** Positive finding of diatoms from various organs can be used as evidence to support the circumstances of drowning. In Malaysia, forensic diatom analysis was only recently implemented in the hospitals. The Forensic Medicine Laboratory at the Hospital Tanguy Apian Azans Hospital (HTAA) Kelantan, Pahang recently introduced this service. **Methods:** A new method was innovated to assist us in detecting the presence of diatoms. In this new method, the organs are digested with hydrogen peroxide (H₂O₂) overnight. The solution is then heated and stirred until it is dried. Distilled water is added and followed by centrifuging. After that, the fluid at the bottom is transferred onto glass slides, and mounted when dry. By using phase contrast microscopy, the shape of the diatoms can be seen clearly at a magnification of 40x. Water samples were also collected and analysed from the site of the drowning. **Results:** For the time being, we are able to detect the presence and shapes of diatoms in all drowning cases that had been confirmed by autopsy. **Conclusion:** This method was found to be convenient and economical for use.

Poster: 2301. A pilot study to quantify explosive mass from crater size in different types of Improvised Explosive Device (IED) blastingT.Nataraja Moorthy¹, Reynold Vicente²*¹Department of Forensic Sciences, Universiti Sains Malaysia, Kubang Kerian, Kelantan; ²Dept of Forensic Medicine, Queen Elizabeth hospital, Sabah*

Introduction/ Objective: The aim of this study was to estimate explosive mass from crater parameter in IED blasting. **Methods:** Several test charges (IEDs) were loaded with different types and quantities of high and low explosives. These were packed in different types of confinement (cloth, PVC and steel pipe) and were blasted. The diameter and depth of the craters resulting from the explosions were measured after each blast and the explosive mass were estimated using empirical equations. Two different formulae were used to estimate high and low explosive mass. **Results:** The result of the investigation revealed that the crater generated by high explosives is longer and deeper compared to the crater from low explosives when similar masses of explosives were used. The crater volume was also dependent on the type of container used. For example, PVC pipe produced a smaller size crater than steel pipe with a similar explosive mass. The size of the crater was directly proportional to the quantity of explosive used. The fragment velocity caused by the high explosive filler IED was comparatively higher than the low explosive filler IED. The high explosive filler IED produced a large number of small size fragment pieces whereas the low explosive filler IED produced smaller number of bigger size fragment pieces. **Conclusion:** It is a valuable indication to recognize the power of explosive even when chemical residue is not recovered.

Poster: 2302. Estimation of stature from 2D footprint measurements in Malaysian Malays by regression analysis

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Introduction/ Objective: This study was conducted to estimate the stature from 2D footprint measurements of Malaysian Malays. **Methods:** The study was carried out involving 400 Malaysian Malays (200 males and 200 females) ranging in age from 18 to 55 years. The stature of the subjects was measured and 800 bilateral footprints were collected using inkless shoeprint kit following standard procedures. From each subject, a total of 10 anthropometric measurements were taken viz. five left heel-toes footprint length measurements and five such right feet measurements were taken. Informed consent and ethical approval were obtained. The collected data were computed and analysed with SPSS computer software. Regression equations were derived to estimate stature from 2D footprint length of males, females and pooled samples. **Results:** All footprint lengths exhibit statistically positive significant correlation with stature. Stature is found to be higher in males than females. The result revealed left sided asymmetry for males and right sided asymmetry for females. The correlation coefficient between footprint length and stature was found to be statistically significant and the coefficient of determination was found to be higher in the pooled sample than males and females. Some of the fifth toe impressions were found missing due to non-contact with the ground during the footprint development process. A missing toe impression may acquire forensic significance as it narrows down the suspects during the identification process. The standard error of estimate (SEE) was found to be smaller. The mean stature of Malays was found to be shorter than West Australian, Turkey and Indian population. **Conclusion:** The result of this investigation provided regression equations for stature estimation from 2D footprints (complete or partial) of Malaysian Malays. These population specific regression equations derived for the pooled sample can be used to estimate stature when the sex of the footprint's owner remains unknown.

Poster 2304. Forensic science services in the Kingdom of Saudi Arabia in criminal investigations and proceedings

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Introduction: The forensic science service is increasingly relied upon by the criminal judicial system to assist in successfully prosecuting criminals and discharging the innocent. However, the value of forensic science relative to the standards of effectiveness, efficiency and fairness have yet to be established in the context of the Kingdom of Saudi Arabia (KSA) as no systematic work has been undertaken to evaluate it since the establishment of the forensic science service in the country. **Objective:** This study entails an investigation into the standards of effectiveness, efficiency and fairness in pre-trial criminal investigations and proceedings. It aims to identify whether forensic science services in the KSA meet the values and needs of a wider criminal justice system. **Results:** The study reveals that the standards of effectiveness and efficiency are inter-reliant on each other. **Conclusion:** It is concluded that the forensic science service works acceptably for some purposes of the criminal justice system in the KSA, while it does not sufficiently interact at an organizational level in regard to the standards of effectiveness and efficiency, aside from the fairness standards, which are seen as compatible with the main stream of the country's laws and culture.

Poster 2306. Optimizing the sample extract for paracetamol quantitation

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Introduction: Paracetamol is an analgesic over-the-counter medicine which commonly involves in incident of intentional self harm or accidentally overdoses. Paracetamol quantitation in biological specimens is important as a diagnostic tool in clinical poisoning situations in assisting the hospital with their treatment procedure. Currently, our laboratory carries out the detection of paracetamol qualitatively together with other drugs. Due to the request from the hospital, a quantitation method is proposed. **Objective:** The objective is to efficiently use the same extract of one sample for screening and quantitation using two instrumental methods, thus reducing analytical time. **Methods:** The liquid-liquid extraction step is applied where the specimen is acidified and extracted with toluene/ether mixture. The organic extract is then cleaned using a simple cleanup procedure. The cleaned extract is evaporated to dryness and reconstituted with solvent before detection using high performance liquid chromatography-photo diode array (HPLC-PDA). Prior to detection, the HPLC-PDA is calibrated with a series of different concentration calibration standards. One independent quality control standard is injected after every ten samples to monitor the reliability of the results. **Results:** The spiked and blank samples were extracted and analysed according to the same extraction and detection procedures. The results were used to determine the limit of detection and limit of quantification of paracetamol. **Conclusion:** This method shows that the extract from one extraction procedure can be used for detection and quantitation of paracetamol, hence reducing amount of sample required, waste generated and analytical time thus expedites the issuance of analytical reports to meet the request and requirement of clients.

SCIENCE (CRIMINALISTICS)**Oral: 1786. The dynamic changes in combustion temperature of cotton in a confined space**

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Introduction: The complex nature of fire causes difficulties in predicting the actual dynamic of fuel combustion in confined spaces. The reconstruction of a fire scene is very useful to reconstruct a fire scene. **Objective:** This study was intended to provide an understanding of the dynamic changes in combustion temperature in a confined space. **Methods:** The subject was cotton with 100% purity which had acted as solid fuel. Combustion process was carried out through actual fire and fire simulation using FDS5. The actual simulation involves the burning of cotton and cotton added with petrol RON 95 as booster. Temperature changes with time intervals of 10s were recorded until combustion was completed. **Results:** There was no difference in burning rate of cotton and cotton with petrol RON 95 during the early development phase of fire. However, the temperature variation between the two simulations began differ widely upon reaching full development phase. These held through until the cooling phase and complete combustion. Meanwhile, the differences in burning temperature of cotton and FDS simulation can be seen in every phase of the fire development until complete combustion. The maximum temperature reached by the cotton, cotton with petrol RON 95 and FDS simulation were 445.0°C (120s), 481.4°C (170s), and 420°C (70s) respectively, while the complete combustions were 240s, 310s and 340s respectively. Based on the results, these findings surely have provided a better understanding of the dynamic changes in burning temperature of cotton in confined space.

FORENSIC PATHOLOGY**Poster: 2314. Autopsy across borders: A future perspective**

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There are situations when autopsies had been performed twice in two different countries. The first autopsy was done where the victim had died and the second autopsy in which the body of the victim had been brought for cremation. Three cases include: A gang rape case from India whose autopsy was conducted in Singapore; a custodial death of Indian National in Pakistan and a death of a British National in India. There is urgent need of standard protocol for autopsies across the border. The prisoner had sustained injuries in the custody in one country and the Government of that country did not hand over the first autopsy report. On second autopsy several organs were found missing. A rape victim was admitted for treatment in Singapore. The autopsy was carried out in Singapore and the second autopsy was carried out in India. Doctors in Singapore reported infection of her lungs and abdomen, as well as significant brain injury and cerebral edema. An 8 year old UK national died during her treatment. The autopsy was carried out in India and second autopsy on the orders of Coroner in UK. There were allegations of organ removal for illegal organ trade contrary to the information available in the first autopsy that the organs had been retained for histopathological and chemical analysis. All the cases highlighted here needs a standard autopsy protocols across the border in seven continents. There should be an effort to iron out discrepancies in standard protocols, if any, and the same information should be adequately disseminated. In such type of cases the first report should be made available to the counterpart country or should be handed over while the body is handed over to the officials of the other country.

FORENSIC MEDICINE**Poster: 2311. Fatal dog bite to the neck**

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A 74 year old elderly male was brought in dead to Forensic Medicine department by the police with history of being mauled by a dog of American Staffordshire breed. Post-mortem examination showed a penetrating injury to the right side of neck that severed the right jugular vein and penetrating injuries to the back of neck that punctured the C3 and C5 vertebrae. The bite mark examination was done by the Forensic Odontologist. The dental examination of the suspected dog was done by the Forensic Odontologist at the Veterinary Department. The dental cast of the suspected dog matched with the injury found on the deceased's neck. The American Staffordshire dog was a medium sized and short coated; it was an aggressive and spirited type of canine. This paper highlights the forensic management and medico legal implication of a case of a fatal dog bite.

Poster: 2312. Disaster victim management of Genting Highlands bus tragedy 2013: Lessons learned

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Efficient Disaster Victim Management (DVM) requires strong cooperation and excellent coordination at intra- and inter-agency levels. Regular mock DVM exercises would enhance preparedness of all relevant agencies. However, the main challenges are creating awareness, inculcating training and coordination in DVM activities benchmarked at international standards. The objectives of this paper were to highlight the management of major incident with mass fatalities in terms of (i) victims identification, (ii) intra- and inter- agencies cooperation and coordination and (iii) effective body release and storage facilities. A recent bus accident which plunged into a 150 feet ravine in Genting Highlands, described as Malaysia's worst road traffic accident, claimed 37 lives and 17 seriously injured victims. All 37 victims were positively identified and subjected to Post-mortem CT examination, consisting of 27 Malaysians and 10 foreigners. The Forensic teams from the National Institute of Forensic Medicine and neighbouring state hospitals were mobilised to perform autopsies on all victims within 24 hours after the accident. In addition, the expertise of the National Forensic Odontology and Radiology services were incorporated in the management team. More than 50 per cent of the victims were released to the family members within 24 hours after completion of the autopsy hence, assistance for body storage at other centres was not necessary as a contingency plan.