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What happened in Forensic Science Last Year

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What happened in forensic Science last year? Which new discoveries? Which new techniques? Any new insights? Would you like to know about them? And if yes, what is the best way to do that?

Simple, some of us might say. Read all the 5000 odd indexed journals and we will know. Unfortunately many of us may find it a little bit too much. That is why we at the "*Anil Aggrawal's Internet Journal of Forensic Medicine and Toxicology*" thought it worthwhile to scan all the journals and give in a nutshell the latest and newest that occurred in the world of forensic medicine and toxicology last year. A number of authors/publishers helped by supplying reprints of their papers ungrudgingly. Many of them sent their papers in word/pdf/ascii format via Email to the journal office. The journal is thankful to all these authors/publishers. We hope to receive similar co-operation from all in future.

New techniques

...A remarkable use of echocardiography for solving a legal question...
We all heard about terms such as forensic radiology, but what exactly is *Forensic echocardiography*. Well, if you want to know all about it, you may want to read J.M. Cotton, J.C. Cooke and M.J. Monaghan's paper entitled "*Forensic echocardiography: a case in point*" ***[Echocardiography. 2000 Feb; 17(2): 193-4]***. In this paper, the authors report the case of a 36-year-old man who sustained a stab wound to the chest. After admission, he required emergency pericardiocentesis. Transthoracic echocardiography (TTE) revealed a traumatic ventricular septal defect and a defect in the anterior mitral valve leaflet. These lesions could have been caused either by the initial stab wound, or by the operative procedure, which was done on the patient (pericardiocentesis). If it was due to pericardiocentesis, it could have serious medicolegal repercussions, with the doctors possibly being sued for negligence. How did the authors resolve the question? Well, they positioned the transducer over the stab wound, and showed that the lesions were in the same plane as the entry site. They could thus rule out iatrogenic trauma. Remarkable use of echocardiography for medicolegal purposes! And sure enough we must call it *Forensic echocardiography*. I certainly heard this term for the first time in my life, and next time such a case comes to me, I will remember how I can resolve this question.

Wildlife forensics

What happened in wildlife forensics last year? One of the most interesting papers in this area originated from Adelaide, Australia. Written by Prof Roger W. Byard, J.D. Gilbert and C.M. Kemper ***[Dolphin deaths: forensic investigations. Med-J-Aust. 2001 Dec 3-17; 175(11-12): 623-4]***, it describes two cases of dolphins, possibly killed by poachers. In the first case, an adult male Indian Ocean Bottlenose dolphin (*Tursiops cf aduncus*) was found floating off an Adelaide beach on 11 December 2000. An autopsy displayed a single lethal stab wound to the ventral thorax between the flippers. A detailed examination of the wound indicated that the weapon was single edged. In the second case an immature male Common Bottlenose dolphin (*Tursiops cf truncatus*) was found dead on a beach in the southeast of South Australia on 19 May 2001. Although an examination did reveal a similar wound, it was perhaps post-mortem. According to the Fisheries Act 1982 (South Australia) Reprint no. 8, it is an offence to kill a marine mammal. The offender may get a fine of Aus $30,000 and/or up to two years incarceration in prison.

...Prof Roger W. Byard and colleagues could tell the investigators in a remarkable way, how the dolphins were being killed...

The conclusion by the authors that the weapon used to kill the dolphins was most likely a knife or some similar single edged sharp weapon resulted in the launching of a coordinated search for the perpetrators, with media appeals to the public for help. The paper is remarkable for the painstaking investigation done in such cases. Not only was the measurement, assessment and recording of injuries undertaken in a most detailed manner, specimens were taken for histological examination, and even stored for possible future DNA matching and toxicological evaluation. One hopes that painstaking efforts like these on the part of all of us, may bring wildlife crimes at a very low level. One gets to know from the references (used in this paper) that the author has written more papers related to wildlife forensics. Readers interested in knowing more about these papers, or discussing their own wildlife forensic related problems, may want to get in touch with Prof Roger W. Byard (byard.roger@saugov.sa.gov.au)

Fatal toxicities with exotic poisons

Nutmeg

Ever heard of death with nutmeg? Well, if you haven't, read this paper ***[Nutmeg (myristicin) poisoning - report on a fatal case and a series of cases recorded by a poison information centre. Forensic-Sci-Int. 2001 Apr 15; 118(1): 87-90]*** by U Stein, H. Greyer, and H. Hentschel. It tells us about one earlier case occurring in literature too. In the case described by the authors, myristicin (4 microg/ml) was detected in the postmortem serum of a 55-year-old woman. We are told that this is for the first time that myristicin was ever detected in a postmortem sample.

...Ever heard of fatal toxicity with nutmeg? If not, you may want to read on...

Identification was achieved with the aid of UV-VIS spectroscopy and TLC; for quantification, HPLC was used. The serum analysis revealed yet another drug - flunitrazepam (0.072 microg/ml). Because of this finding, it was thought that death had perhaps been due to the combined toxic effect of both substances.

The paper is remarkable for the fact that nutmeg is not known to cause death. The authors inform us that from 1996 to 1998, seven poisonings with nutmeg were recorded by the Erfurt Poison

Information Centre. Even where higher doses (20-80 g of powder) had been ingested, a life-threatening situation was never observed. In one of these cases, a myristicin blood level of 2 microg/ml was measured 8 hours after ingestion of two to three tablespoonful of nutmeg powder (approx. 14-21 g, or 280-420 mg/kg).

Some of us might like to have some background on Nutmeg and Mace. These are household spices which are derived from the nutmeg tree *Myristica fragrans*. Nutmeg (Called *jaiphal* in Hindi) comes from the seed of the fruit, while mace (*javitri* in Hindi) is the dried seed coat (scarlet aril). They contain myristicin and produce psychic effects similar to marijuana when ingested in large quantities, approximating the equivalent of two whole grated nutmegs. They are rarely ingested by drug misusers except in desperation, because of their severe side-effects, like dry mouth, severe thirst, palpitation, abdominal pain, nausea, vertigo and agitation. Nutmeg is a widely used `prison drug' since it is readily and cheaply available to the prison inmates. Nutmeg and Mace - just like marijuana - are not known to cause death.

Editorials

It always interests me when I find an editorial related to forensic medicine in a *Non forensic* journal. I spotted several last year. The major ones were "*Dentists assisting Israeli police*" by B. Peretz ***[Refuat-Hapeh-Vehashinayim. 2001 Jan; 18(1): 79]*** from Israel, "*Forensic science: taking giant steps forward*" by M. Schanfield ***[Croat-Med-J. 2001 Jun; 42(3): 219-20]*** from Croatia, and "*Forensic neuroscience on trial*" (Anonymous) ***[Nat-Neurosci. 2001 Jan; 4(1): 1]*** from United States.

Burns

Quick, answer this question - Which burns faster, pubic or head hair? Most of us would imagine that they would burn equally fast. But read the paper by M. Bohnert, M. Faller Marquardt and S. Pollak ***[Zum unterschiedlichen Brandverhalten von Kopf- und Schamhaaren (Differential burns of head and pubic hair) Arch-Kriminol. 2001 Jan-Feb; 207(1-2): 42-8]***. This interesting paper in German comes from *Institut für Rechtsmedizin*, Universität Freiburg. The history is most interesting. A woman, was hospitalized with extensive burns in the genital and perineal region. She lived apart from her husband and accused him to have inflicted the injuries with a lighter and a burning candle out of jealousy. The husband denied the accusations and stated that he wanted to singe off the pubic hair with the lighter during sadomasochist sexual practices performed in mutual agreement. As he did so extensive flames suddenly developed - something he had not expected - thus causing the burns.

...For the record. Pubic hair burn faster than scalp hair!...

As a forensic specialist how would you verify the claims of either? Well, the authors cut off tufts of head and pubic hair and set them on fire with a lighter to compare their burning behavior. And now comes the interesting finding. Pubic hair was easily inflammable and burnt almost completely within about 10 seconds developing up to 10 cm high flames, whereas straight head hair developed only minor flames and the singed hairs stopped burning spontaneously some seconds later already. This piece of information can be quite helpful to all of us, while dealing with cases of burns. Future investigators may want to investigate if this effect was due to oils/lotions etc. applied on the scalp hair.

Miscellaneous

Simultaneous sudden infant death syndrome (SSIDS)

Have you heard of Simultaneous sudden infant death syndrome (SSIDS)? Well, if you haven't, you may want to read this interesting paper ***[Simultaneous sudden infant death syndrome: a proposed definition and worldwide review of cases. Am-J-Forensic-Med-Pathol. 2001 Mar; 22(1): 23-32]***. SIDS as we all know is the sudden and unexplained death of an infant, usually within the first year of life. But this unusual paper by S.A. Koehler, S. Ladham, A. Shakir and Cyril Wecht describes as many as 41 cases of deaths of a pair of twins in a similar manner! The authors have called this phenomenon Simultaneous sudden infant death syndrome (SSIDS).

Koehler and colleagues give three criteria which must be fulfilled before the deaths of a pair of twins be labeled as SSIDS. These are:

...Koehler and colleagues give us the criteria of Simultaneous sudden infant death syndrome (SSIDS), and describe as many as 41 such cases...

(1) Infants should either be monozygotic or dizygotic to each other. Usually this implies twins but triplets etc. could be involved.

(2) Death must occur within 24 hours of each other ("simultaneous")

(3) Infants must be less than 1 year of age. Some investigators however do not include neonates less than 7 days of age.

The last criterion seems to have come from the paper by Willinger. ***[Willinger M, James LS, Catz C. Defining the sudden infant death syndrome. Pediatric Pathol. 1991; 11: 677-684]***

The study found that only 12 pairs of twins met all three criteria (29.2%), nine pairs met two criteria (21.9%), alternative cause of death was offered in five pairs of twins (12.1%) and in the remaining 15 pairs (36.6%), only limited information was available; therefore, no conclusions could be reached.

On pages 33-37 of the same journal, there is yet another similar report by the same group ***[Simultaneous sudden infant death syndrome: a case report. Am-J-Forensic-Med-Pathol. 2001 Mar; 22(1): 33-7]***, which the readers may want to go through. The paper describes the first ever reported case of simultaneous sudden infant death syndrome (SSIDS) in Allegheny County, Pennsylvania. This occurred on February 27, 1998. Two-month-old black fraternal twin girls were both found dead in their crib at the same time. After an in-depth death scene investigation, police investigation, toxicologic analysis, and complete autopsies, a specific cause of death could not be identified, and therefore the authors listed the deaths of the two girls as that due to simultaneous sudden infant death syndrome (SSIDS).

A call for better International co-operation among Forensic professionals

No "Brides in the bath" this time. Instead it is a groom - and an old one at that! This paper by Gilber Lau (From the *Center for Forensic Medicine*, Singapore) is a haunting reminder of the famous murders by George Joseph Smith, known to all historians of Forensic Medicine as the infamous "Brides in the Bath" murderer. This interesting case reported by Lau in *Medicine, Science and Law* ***[Did he drown or was he murdered? Med-Sci-Law. 2002 Apr; 42(2): 172-80]*** is not so much remarkable for its investigation into a possible case of homicidal drowning as it is for its call for a more coherent international co-operation among forensic and police professionals.

Gilbert Lau
Singapore



The paper describes the case of an unemployed, 60-year-old Singaporean gentleman, who died during a brief overseas trip to another South-East Asian country. Lau tactfully refrains from naming this country, but does mention that it is "a semi-isolationist neighboring country, which was formerly ruled by a communist regime". Well, it hardly leaves anything to imagination. To go on with the case, the deceased had, presumably, drowned in the bathtub of his hotel room, which he shared with his then 44-year-old companion, who was supposedly his nephew. The paper goes on to tell, that this old man was a destitute who was not really the uncle of this 44-year-old companion. Instead he (the uncle), was really the sworn brother of his late father! This information coming on page 176 seemed important to me, as it makes the case stronger in favor of homicide - although Lau fails to make this point, perhaps consciously.

The relevant public health and medico-legal authorities of the host country conducted only an external examination of the body at the scene, whereupon they agreed with the police that his death was probably due to accidental drowning following an episode of syncope. It would appear that this verdict was based almost entirely on circumstantial and hearsay evidence. No autopsy was performed, presumably because no facilities existed for such procedures in those countries. As the paper informs us, even cases of homicide with firearms attract only a partial autopsy! Instead of a complete and proper autopsy, considerable reliance was placed on the observation that abdominal compression resulted in the outflow of a small amount of water from the mouth, as being proof of drowning (Lau later dismisses even this finding - however tenuous it is - by asserting that the deceased might have drunk water before going to bath!). A few days later, the body was cremated in the host country and the remains (ashes) were subsequently repatriated to Singapore. It later transpired that, shortly before they embarked on the ill-fated trip, the deceased's 'nephew' had purchased, on the former's behalf, travel insurance policies (covering accidental injury and death) amounting to a total of S$800,000 from five different insurance companies, as well as a separate life policy for a further S$100,000, most of which had been issued within the fortnight prior to their departure.

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Interestingly, the beneficiary (later the plaintiff in the ensuing civil trial some three years later) of all of these policies, was the ex-wife of the deceased's 'nephew', with whom he had, in fact, continued to live although they were officially divorced several years ago. Whilst the claim against the life policy had been settled, the first five insurers declined to issue payment on grounds of

suspicion that the deceased had been the victim of a homicide, planned or executed by the 'nephew', wherein the beneficiary was a conspirator of sorts.

Lau (the author of this paper) was approached by defense counsel (representing the various insurers), for assistance in this matter. It was felt that a proper forensic review was seriously hampered by the lack of a full autopsy which would have been indispensable in ascertaining the actual cause of death and in eliminating other possibilities, apart from drowning, such as death from natural causes, other forms of injury, poisoning, or homicide. It was also emphasized that the mere presence of ingested water is not diagnostic of drowning. Eventually, after a protracted but unsuccessful attempt at mediation (in the course of which, the plaintiff rejected the offer of a reduced, although apparently sizable quantum), the matter came before the High Court, which found in favor of the defendants. It appeared that the judge was more than convinced that the deceased was indeed the victim of a homicide of which the plaintiff was a conspirator and her ex-husband, the perpetrator, as even a cursory perusal of the written judgment would indicate. Accordingly, the court ruled that the plaintiff (in her capacity as both the beneficiary of the insurance policies and executor of the estate) and her ex-husband had, effectively, deprived the insurers of their contractual right (as stipulated in the insurance policies) to have an autopsy conducted on the body of the deceased and they were, therefore, entitled to deny liability.

This case illustrates the difficulties inherent in conducting an independent review of a putative instance of drowning, where convincing and reliable forensic evidence and documentation are largely wanting; this being compounded by its occurrence in a foreign jurisdiction whose medico-legal practices differ substantially from that to which one is accustomed. It may even be said that the corpus delecti was destroyed, in this instance, by cremation. It is also unusual in that a de-facto finding of murder was made in a civil court (whose standard of proof is much lower than that of a criminal court - being that of a balance of probabilities) and that this had, subsequently, spurred the police to undertake a criminal investigation for conspiracy to murder. In the event, the civil appeal was dismissed by the Court of Appeal, but no charge was laid against any of the suspects for want of sufficient forensic or investigative evidence of a criminal offence having been committed.

The main value of the paper lies in its somewhat shrilly call for better international co-operation in such cases (in which the national of one country dies in another, especially where medicolegal practices may be completely different). Reading the paper it almost appears as if the culprit - the nephew - purposely made a visit to that country to do his deed, knowing fully well he had better chances to conceal his crime there. Had there been a better international co-operation, forensic experts could have been called from a neighboring country (to conduct the autopsy), or at least the authorities of the host country would *not* have allowed the cremation of the dead body. The paper lists a big appendix in the end giving extracts from the judgment of the civil court, which denied payment to the nephew and his ex-wife.

Readers wanting to read the full case may want to get in touch with Dr. Lau himself.

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Note

Authors, publishers, researchers are invited to send full papers/abstracts/summaries of their seminal works to the journal office for inclusion in the future installments of this column. If we missed out some entries, which you think should have been included in the *current column*, kindly email to us. The papers can be sent via snail mail or Email, and (if sent via Email) can either be in word, ASCII, pdf, or jpg formats (i.e. published paper scanned as a picture file). Authors may also want to send their own pictures/pictures related to the paper, to be published along with the abstracts. The address at which the papers/abstracts/pictures etc. can be sent is:

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