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EDITORIAL

Building Bridges To Bridging Gaps : Disseminating knowledge of Forensic Medicine and Sciences to Lawyers, Judges and the General Public.

There are a very few notions that many of us agree, unarguably. The fact that our society is ñhighly traditional and bureaucraticò is one such entity. It is not the aim of this essay to contend why our society is traditional and bureaucratic in an analytic perspective, but, empirically it is pertinent to examine and investigate how this traditional structure has affected engendering ñgapsò between medico-legal métiers. I am not attempting to endorse Derrida in de-structuring the entire construction here, but to elucidate some ill-effects it has delivered and to postulate propositions to proceed in bridging some extant vital gaps and voids.

Distinct divisions and segregations are common features in our society. These social phenomena are reflected in our institutions and between professions. Although an argument can be made in favor of such a segregation in the name of maintaining the integrity, sovereignty and residual power of the profession, it becomes futile and null, when the common goal of several professions are the same. The administration of justice in the best possible way is the common goal of many professions: the legal profession, forensic experts and the judiciary. They ought to work in a team in achieving this common goal. Unfortunately this does not seem to operate as it ought to be. Neither in our culture, nor in our educational system exists a value for team spirit!.

The lawyers learn in a separate traditional legal environment while the scientists imbibe in a notably scientific environment. These two traditions thus entail inherent pedagogic, epistemological and pragmatic differences. However, in the court room issues arise where both these traditions interrelate or rather intersect. For example in establishing rape, the scientific evidence of penetration of a penis, patterns of injuries identified, timing of such injuries and DNA evidence are relevant facts. Therefore it is imperative that the legal fraternity understands the human anatomy of the vulva-vaginal and other regions, types of basic injuries and their interpretations, principles of examination of a sexually abused victim, physiological, psychological, and pathological aspects of sexual intercourse, human psychology , reproduction, DNA science , other laboratory tests pertaining to elucidate semen/hair in the alleged victimôs genitals etc in order to best avail evidence and to appreciate scientific adduce. In contrary, the scientific community requires to understand and appreciate the legal philosophy behind rape, legal appreciation of ñwillò, ñconsentò ñ forceò ,òmensriaò, ñrelevant factsò, ñfacts in issueò, evidence law, circumstantial / direct evidence, sentencing and incriminating approaches, remedial approaches, judicial reasoning, different legal systems etc. in order to comprehend and fully conduce the notion of rape.

Perhaps it may not be so relevant to the forensic scientific community to apprehend such a detailed law as they would not be in judgment of incriminating or discriminating a suspect. However, it is significantly pertinent that the legal community, the judges, public prosecutors, defense lawyers and police understands the scientific basis of a forensic opinion provided to courts, as it will not only empower the court to scrutinize and evaluate the quality of the evidence but also it provides a deeper

comprehension towards synthesis of a comprehensive, acceptable decision, rather than merely accepting an opinion of a scientist for granted. Many scientific expert witnesses feel that not many relevant questions are asked in a court room due to this prevailing gap between the professions. In many instances in court room, no questions are asked by the defense from the scientific witness. When itôs the turn of the defense lawyer to cross examine the medical /scientific witness, the counsel would rise and proceed ñno questionsò. This means two things. Either cross examining the scientific witness deteriorates his case or he is unable to make a defense using the scientific testimony. It is noted that defenses developed using scientific evidence are scarce. Instead they try to develop arguments contradicting some procedural or trivial matters when expert evidence could have been contradicted conceptually otherwise.

Apparently due to these two diagonally different approaches in learning and deducing, the scientist and the lawyer show remarkable differences in their cognitive process and analogy. I, personally having had both these rigorous trainings can diagnose these different mental processes instantaneously.

It is observed that the medical/scientific witness assumes to be a prosecuting witness. Although the expert witness is summoned by the prosecution it does not mean that the expert favors or required to favor prosecution. The obligation of the scientific expert witness is to provide unbiased, true and scientifically acceptable opinions and facts to court. However by discerning pragmatic aspects in the court room such as the expert visiting the state counselsô chambers for a discussion just before the trial could inculcate an attitude in the lay mind of the accused that the medical/scientific witness is opining against him.

It has also been observed that many medical/scientific witnesses provide evidence in court room as if they were ñeye witnessesò: as if they were there at the time of incident! Not realizing that they provide an opinion based on some facts identified/ provided to him: that the reality could have been varying, there by reducing the precision of the opinion.

Bridging these gaps will minimize such issues in the court room. Not only it will uphold justice and rule of law but also improve quality and relevance in administration of justice.

It is important to note how other legal systems operate: to learn and share good practices. In many instance in the US, defense experts are utilized in the court room. In Sri Lanka, it is not culturally accepted among the professionals and in the court room. However these are areas for improvement in our system. Further, there are a fraternity of lawyers in developed countries called forensic lawyers: a subspecialty much sorted after who have training in both fields.

In Sri Lanka, as an initial step Prof. Ravindra Fernando and his Forensic Medicine Department at Colombo University, introduced a university approved Forensic Medicine and Science Diploma program for lawyers. This was a milestone in bridging the gap. Then, in 2008, I could introduce a similar diploma program in Forensic Medicine and Science to lawyers and judges with the help of my colleagues in the department at Peradeniya University. These two university approved recognized courses provide a thorough learning outcome for the legal community belonging to judiciary, prosecution and defense.

It is reasonably assumed that these programs developed with the aim of improving quality of evidential value and medico-legal procedure will positively impact the system. However it is worth looking at whether there has been an improvement in the judicial reasoning, evidential critique, evaluation of facts etc in

real sense, since the inception of these courses.

It is a known fact that crime rates are increasing exponentially. Also it is observed that the conviction rates in criminal matters are decreasing. What does this dichotomy relate? Is there any relationship between the legal community upgrading forensic medicine and science knowledge, with this decreasing conviction rates and court room procedural delays? Or these are mutually exclusive independent events depended on other variables?

On the other hand forensic sciences are now a public domain. The principles, strategies, images, investigations and others are readily accessible to public. It is my view that we need to engage public in combating crime and in investigating crimes. Disseminating forensic and criminal justice knowledge to public will enhance public capacity and would be skillful to routine problem solving, rather than destroying valuable evidence. For example, when they are educated as to the reasons why it is not suitable to delay when there is a suspicion of a sexual abuse of a child and what procedures would be done and what are the reasons for such procedure, perhaps the public will comply much more faster and to a greater depth. Also, the journalists and media personnel will have an opportunity to understand the scientific basis of crime investigations and forensic methodology so that they do not need to philosophize or fiction drama out of a true crime. On the other hand the jury, potential members of jury, police, coroners and Inquirers to sudden deaths, Gramma Niladaris, sociologists, politicians, criminologists and all others who are interested would have an opportunity to learn forensic sciences if they are interested.

One shouldnôt panic or fear, these approaches would not license public to practice forensic disciplines as the criterions and requirements for practicing such professions are accepted and already in place. These would be designed in such basic pedagogical way that the general public will have an opportunity to understand basic aspects of forensic scientific disciplines. I can remember the Senate of University of Peradeniya, requested me to formulate a course (at the time of discussion of the diploma course in forensic medicine and science for lawyers and judges) where interested parties could follow: not limiting the course to certain professions: Valuing dictums ñmore open than usualò and ñfreedom and freeing of educationò.

However, educationally, curriculum of each course has to be designed in a particular way to address its own needs and demands. Therefore it is timely that universities think about generating forensic courses at different levels so that interested parties could follow. This will not only fill existing gaps further but also indirectly and invariably improve justice administration, forensic investigations, expert evidence and public cooperation.

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PRACTICE OF FORENSIC MEDICINE – THEN AND NOW

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This article titled ñPractice of Forensic Medicine - Then and nowò covers a period of 33 years commencing from the year 1974 to the year 2007. The year 1974 refers to the year that I carried out my first post-mortem examination as the acting District Medical Officer of Alawwa in the Kurunagala health division. The year 2007 refers to the year of my retirement when I carried out my last of over 11,000 post-mortem examinations. During a carrier of over 35 years as a government medical officer of which 32 years were as a full time Judicial Medical Officer (JMO), the last 15 years as the Chief Consultant JMO Colombo.

In the year 1974, I was a preliminary grade medical officer with 12 months of service in the government. As the Medical Officer in charge of the peripheral unit Talampitiya in the Kurunegala health division, I was very often called upon by the health authorities to cover up the medico legal work at the District hospitals Polgahawela and Alawwa. On the day that I carried out my first post-mortem examination, District Medical Officer at Polgahawela and Alwwa had reported ósickô. This was the system in those days whenever a murder case was reported in the district. So naturally I was served with the post-mortem order at which time I was engaged on a ñshramadana campaignò in the hospital compound with my hospital staff. I could not ñreport sickò for obvious reasons even though I would have very much liked to have done so.

I went with the police to the ñscene of murderò which was on the banks of the Ma-oya at Walakumbura bordering the Colombo-Kurunegala main road close to Alawwa. There was a bloated decomposed body of a male lying on a óMessaò, a make-shift autopsy table in village style. At that time police constables wore shorts. One such constable was carrying a shot gun possibly to prevent the body from being attacked by several óKabaragoyasô who were roaming about the óMessaô. I was also in mortal fear that the Kabaragoyas would attack me as well, during the post-mortem examination or there may be a misfire hitting me as the police constable carrying the gun appeared to be drunk and unsteady. However, I carried out the post-mortem examination and arrived at the cause of death as due to blunt cranio-cerebral trauma.

But today such a post-mortem examination would not be carried out even by a senior District Medical Officer but referred to the Provincial Judicial Medical Officer or even to the chief JMO Colombo when the provincial JMO is not available causing much inconvenience to the relatives and the police officers.

I assumed duties as the Judicial Medical Officer of General Hospital Ragama in 1975. The situation was the same as in the year 1974. No Medical Officer in the entire Gampaha heath division was willing to carry out post-mortem examinations on cases of murder. Once I visited a scene where a body was hanging from a tree. The relatives and the villages were of the belief that it was murder and post-mortem suspension. After the post-mortem examination when I expressed an initial opinion that it was a case of suicide, the people turned óhostileô and they even

destroyed the ‘dandaô along, which I came to the scene. I was carried over the stream by police officers on my return.

I assumed duties as an Assistant Judicial Medical Officer, Colombo in 1980. Considering my experience in field post-mortem examinations in the past, I was of the firm belief that no post-mortem examinations should ever be conducted in the field on a ‘Messaô.

Today medical officers are adviced that they should not carry out post-mortem examinations in the field. The scene of crime where a dead body is lying is today visited by a medical officer not to carry out the post-mortem examination but to observe the scene, make notes, take photographs and also to carry out basic medico-legal investigations that would help to establish the cause of death, manner of death, time of death and to collect trace material.

This new concept of visiting a ‘scene of deathô has also received support from the Judiciary, Attorney Generalôs department, department of the Government Analyst and the Police department. Dead bodies lying at scenes of death are today never disturbed until the arrival of the Magistrate. Dead bodies are never removed from a scene until the medical officer (DMO / JMO) makes his observations. Further, in most cases of deaths due to explosions and firearms where bodies are lying at the scene, the Government Analyst visits the scene to make his observations. In the year 2005-2006 the Government of Sri Lanka in collaboration with the Swedish police, trained doctors, state prosecutors, forensic scientists and police crime investigations with regards to the importance of a scene of crime in crime investigation.

Today the first personnel to arrive at a scene of crime where a dead body is lying are such specially trained police officers referred to as Scene Of Crime Officers (SOCO). They will preserve the scene, conduct the relevant initial investigation until the arrival of the senior police investigators, the magistrate, the medical officer (DMO / JMO) and the forensic scientist.

Prior to the enactment of the administration of judicial law (AJL) in 1972 medical officers had to appear in person to give evidence in magistrateôs court and even in coroners court, on oath. But since 1972, medico-legal reports, post-mortem examination reports, and other reports submitted by medical officer to courts of law are accepted. However even up to the present day the medical officer must attend high courts to give evidence in cases of murder, attempted murder, sexual offences and similar crimes.

The AJL of 1972 also resulted in the abolition of non summary trials in cases of murder, attempted murder, sexual offices and other grave crimes. The accused in the above mentioned cases were indicted directly in the high court. This only short circuited trials but did not bring justice to the accused. As a result of which the code of Criminal Procedure Act of 1979 reintroduced non-summary inquiries in respect of the crimes mentioned above.

When I first began to attend high courts, all trials were jury trials. Such jury trials were most interesting. It was interesting to see as to how the seven jurors were empanelled at times with objections from the defence counsel and the prosecuting counsel. The presiding judgeôs initial address to the jury on the concepts of law such as ‘You are the sole judges of factsò, ñProof beyond reasonable doubtò, ñInnocent until proven guilty by your verdictò, ñYou are however duty bound to adhere to the legal directions given by me in analyzing evidence and coming to a verdictò, still ring in my ears even after my retirement. This was followed by the opening address of the state prosecutor. Such jury trials continued from day to day. The trial concludes with the final addresses to the jury by the prosecuting counsel, defence counsel and finally by the presiding judge. The

crowning moment of a jury trial was the verdict given by the foreman of the jury as to whether the accused was guilty or not guilty. Wild scenes follow after the verdict of ñguiltyò.

Today we hardly hear of any jury trials. I wonder whether lawyers defending accused in criminal cases have ever explained to them the legal standards required to prove their guilt. Such non jury trials take months or even years to be conducted by which time most often the principle witnesses are dead or the accused persons are dead. To avoid such long delays in the conclusion of trials which often leads to a miscarriage of justice, the Attorney Generals department in consultation with the judiciary introduced the concept of ñTrial-at-Barò in cases of grave crime which includes murder. Such trials are held before their judges of the high court on a day to day basis and a verdict given without delay. The first of such trails in which I gave evidence was the case of torture and murder of Attorney-at-Law Wijedasa Liyanarachchi in the year 1986 while in police custody. This was followed by the case of rape and murder of school girl Krishanthi Kumaraswami and the murder of her mother, brother and neighbour all by ñstrangulationò in the year 1996 at the hands of army personel at a check point in Jaffna. The last of my such cases where I gave evidence at a ñtrial-at-bar- was the murder of the high court Judge, Mr. Sarath Ambepitiya in the year 2004 by drug agents. In the latter two trials all accused were found guilty and sentenced to death.

Up to the year 1979, inquest into deaths such as suicides, fatal road traffic accidents, all other forms of accidental deaths, homicides, deaths in police custody, prisons and mental hospitals were conducted by inquirers into sudden deaths, most of whom were political appointees even without basic education. Yet they held óinquestsô even into the most complicated murder cases and even gave verdicts. Thanks to the enactment of the Code of Criminal Procedure Act of 1979, all cases of murder, suspicious deaths, deaths in police custody, prisons and mental hospitals etc. must necessarily be inquired into by a Magistrate.

In 1975, the year I took forensic medicine as a career, most of the medico-legal work in the country was carried out by district medical officers. They had no special training and knowledge in the field. But yet their evidence was sufficient to sentence an accused to death. Even in the year 1992 when I assumed duties as the chief JMO, Colombo there were only four consultants in the óhealth departmentô. However I am proud to state that when I retired as the Chief JMO, Colombo in the year 2007, there were nearly 50 consultants in the field of forensic medicine.

In the year 1980 when I assumed duties as an assistant JMO, Colombo, I had with me only the 1949 edition of the text book of forensic medicine authored by Sir Sydney Smith. But since then several text books are available. These includes texts by Keith Simpson, Bernard Knight, Keith Mant, Eckert, DiMaio & Diamio, Adelson, Gradwhol, Polson, Gee, Mason, Mclay etc. almost all of whom were professors and world renowed figures in forensic medicine. The earliest text book in forensic medicine in Sri Lanka was published by Prof. N. Saravanapavanandan in the year 1982 titled ñMedico-legal aspects of injuriesò. This was followed by text books by Prof. Niriellage Chandrasiri (Ruhuna) and Prof. C.J. Babapulle (Peradeniya). The writer (Dr. L.B.L. de Alwis) has already published two texts titled ñMedico-legal aspects of injuriesò (Vol. I) and ñForensic Pathology and Scienceò (Vol. II). Two more texts by the writer titled ñForensic Toxicologyò (Vol. III) and ñMedical ethics and Forensic Psychiatryò (Vol. IV) will be published soon.

In the year 1995 the University of Colombo commenced a course in forensic medicine for lawyers leading to the Diploma in Forensic Medicine and Science. It is conducted even today. The number of

diplomates are around 112. In the year 2009, the University of Peradeniya commenced a similar course for lawyers and judges. Such courses in forensic medicine have been very useful to judges, state prosecutors and criminal lawyers to understand medical reports and medical evidence. This has indirectly resulted in an awareness among medical officers to upgrade their medico legal knowledge.

Most of the murders up to the year 1985 were by the use of blunt weapons such as clubs / iron rods or cutting weapons such as swords / knives. Firearms used were invariably shot guns or ógalkattasô. The bombs used were locally made hand bombs referred to as óduppiesô. In the year 1986, the first óterrorist bombô exploded outside the north and east in a plane about to take off to Male from the Katunayake Airport killing amongst others, 14 tourists. Thereafter óterrorist bombsô exploded all over but mainly in and around Colombo killing tens and hundreds of innocent civilians. In 1987, the Pettah Central bus stand explosion killed over 115 civilians, the largest number of civilians killed in a single blast. In January 1996, a blast occurred at the Central Bank, Colombo killing over 90 civilians which included several bank employees and customers.

In 1993, the President of Sri Lanka was killed in a blast, while in 1994, a presidential candidate along with several top politicians of the party he represented were killed by a suicide blast. Over the years such suicide bombers have killed several politicians, including cabinet ministers and security personnel outside the war-zone. In the war-zone, several thousands have been killed on both sides. This massacre of óInnocentsô continued till May 2009 when the ñterroristò organization responsible for such murders was decimated by the Sri Lankan security forces.

The initial ñterroristò bombs were parcel bombs like the Air Lanka, CTO blasts etc. Over the years there was a progressive evolution of the type of terrorist bombs. Hand carts, pedal cycles, motorcycles, cars, vans, tractors and lorries were used much later. Finally was the human bomb referred to as the ósuicide bomberô was developed where females predominate over males. However this was not the end, for last of the terrorist bombs was the use of a óhome-made aircraftô loaded with explosives manned by a suicide cadre. This crashed into the Inland Revenue department building in early 2009 missing its target, which was the Air-force headquarters situated across the road.

The gun-culture was limited to shot guns and ógalkattasô (sawed off shot guns) with the occasional use of pistols and revolvers. But in years 1988-1989, southern insurgents were using T-56 rifled weapons to gun down and kill in broad day light politicians, their supporters, public servants, academics, businessmen and innocent civilians who opposed their political ideology. The government of the day retaliated even more strongly using similar weapons to crush the southern insurgency. At the height of the southern and northern insurgencies, several charred human remains were found almost everywhere. Almost all such ñburnt / charredò bodies were referred to me as the Chief JMO, Colombo. Post-mortem examinations conducted by me revealed that almost all of them had been shot dead on the head and the bodies burned thereafter.

Sri Lanka has also had a fair share of major mass-disasters due to aircraft accidents. The first notable crash occurred in December 1974, when a Martin Air DC 8 aircraft chartered by Garuda Indonesian Airways carrying 182 Haj pilgrims crashed into the 5th Mountain in the seven virgins mountain range at Maskeliya killing all passengers and crew. Again, in the year 1979 Caledonian Airways carrying nearly 200 Haj pilgrims crashed at Kimbulapitiya amidst a coconut estate when trying to land at the Colombo International Airport killing all passengers and crew. In these two major disasters none of the dead were

identified. The causes for their deaths were never established and even the cause for the disaster was not scientifically identified according to the International Civil Aviation Organization (ICAO 1970). It was the Tsunami disaster in December 2004 killing 30-40,000 Sri Lankans and many tourists that paved the way for the establishment of a Disaster Victim Identification (DVI) programme for Sri Lanka with assistance, mainly from the European Union and Great Britain. This DVI programme has been in operation in Sri Lanka since then in the identification of armed forces and innocent civilians who have been victims of terrorist bombs / attacks since then.

From time immemorial, post mortem examinations were conducted by a single medical officer. His reports and evidence were the only evidence before a court trial. However the presence of a 2nd medical officer as an ‘observer’ during a post-mortem examination first arose in the year 1986 when the Bar Association of Sri Lanka requested the Magistrate who held the inquest into the death of Wijedasa Liyanarachchi, an Attorey-at-law who died in police custody. This post-mortem examination was infact conducted by me as the Deputy consultant JMO, Colombo. All what the ‘observer’ did was to get a copy of my full report and submit it to the authorities who appointed him as the ‘observer’ as if it were his own report. This was the first and the last time that I allowed an ‘observer’ to be present at a post-mortem examination conducted by me or any of my assistants at the mortuary of the JMO, Colombo. At the beginning of my article I referred to my last port-mortem examination during 2007, the year of my retirement. The body was that of a Maldivian national, a dissident of the then Maldivian president, whose dead body was found floating in the sea after arrest by Maldivian police. So naturally the opposition to the Maldivian president alleged torture and murder and disposal at sea. The body was referred to me as the Chief JMO, Colombo for the post-mortem examination. The opposition wanted an ‘observer’ to be present at the post-mortem examination. The ‘observer’ named was the same person who appeared as the ‘observer’ in the 1986 death in custody of the Attorney-at-law. I rejected the request for the presence of an ‘observer’ and carried out the post-mortem examination with the additional JMO, Colombo and gave a conclusive report that there were no evidence of torture or death by physical violence and that the death was due to ‘drowning’.

A unique situation arose in December 2003 when a highly respected Sri Lankan Buddhist priest died during a visit to Russia to be conferred a ‘degree’. It was alleged that the death was due to a ‘Christian conspiracy’. The body was brought to Sri Lanka and the post-mortem examination was conducted in the presence of the four most senior forensic pathologists in the country along with a consultant cardiologist. The report given by the panel on the same day concluded positively that the death was due to ‘Ischaemic Heart Disease’. This helped to diffuse what would have been otherwise an ‘explosive situation’ possibly leading to ‘religious riots’.

In the past almost all forensic science investigations pertaining to post-mortem examinations were carried out by the Department of the Government Analyst in Colombo. This has resulted in very long delays in obtaining reports from the Government Analyst. Today however there are provincial sub-units of the Government Analyst department somewhat minimizing delays in obtaining reports. Furthermore, many forensic science investigations are carried out by the medico-legal laboratory of the JMO Office, Colombo. These include basic toxicology, alcohol estimations, serology, biochemistry and diatom studies to name a few.

Histopathological studies were little heard of in the past. But since the year 2000 all consultant JMOs carry out their own

histopathological studies in determining the causes of death and express opinions relating to the death. As a result of which, our forensic pathological services are almost on par, with the rest of the countries in the region.

The most singular forensic science investigation of the present time is the DNA studies. Such DNA technology has helped in the conviction of murderers in the Hokandara murders where five persons of the same family were killed and all young females sexually abused. DNA technology was also useful in identification of the assailant of High Court Judge Mr. Sarath Ambepitiya. But sadly there is no forensic DNA laboratory in Sri Lanka. Studies are carried out by a private laboratory (Genetec) and the Department of Molecular biology of the Kelaniya University.

Until recently medical officers hardly took any photographs at scenes of crime, during autopsies or clinical examinations. Often a police photographer would take a few óshotsô at the scene. But today most medical officers carrying out medico-legal work have their own digital cameras which are used at scenes of crime, during post-mortem examinations and clinical medico-legal examinations. In addition, the police department also uses video recording of scenes of murders and various stages of the post-mortem examinations. This has resulted a new concept of photographic evidence.

X-ray investigations in the past were only for the living. But in the year 1990, X-ray facilities were made available to the mortuary of the office of the JMO, Colombo. Today such X-ray facilities are available indirectly to all mortuaries of Teaching hospitals and provincial general hospitals. These X-ray facilities have been very useful in cases of fatal child abuse, firearm victims, charred bodies etc. Infact, such X-ray evidence has been more useful than the oral evidence of medical officers who conducted the post-mortem examinations.

The instalment of mortuary coolers is again something good for the future. The first time that I ever saw a mortuary cooler was in the year 1980 when I assumed duties as AJMO/Colombo. But since then several other teaching hospitals, general hospitals, and many other district hospitals and even other hospitals carrying out medico-legal work are provided with mortuary coolers. But sadly, most of these coolers ómalfunctionô as they are not ómaintainedô by the health authorities.

What I have mentioned above are some of the major advances and achievements in forensic medicine over the past 3 decades. But there are also areas of decline over the same period. I remember the early period of my career as a JMO, when I appeared in court to give evidence. At that time there were special seats for medical officers in the well of the court to the left and close to the judgeôs rostrum. Today there are no such seats. Even as the Chief consultant JMO, Colombo I often stood at the entrance door of the court for want of a chair, for several hours waiting for my case to be called and walk away disappointed when the case is postponed. In the good old days the moment the judge spots a doctor in the well of the court, his/her case is called and evidence recorded without delay or postponed promptly if either prosecutor or the defence was not ready for trial.

All what I have written above as the retired Chief Consultant JMO, Colombo are in the best interest of the medical profession, legal profession, the judiciary and all other institutions responsible for the proper administration of justice in Sri Lanka. This was infact my óDream goalô during my career as a Judicial Medical Officer for over 3 decades.

A NATIONAL DNA DATABASE FOR SRI LANKA

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Many countries facing rising tendencies of crime continuously consider methods to combat them. A speedy and efficient criminal justice system with improved methods of policing, using modern crime investigation techniques, efficient prosecuting service and an independent proactive judiciary are the hallmarks of a country geared to reducing crime.

Quick identification of a criminal plays an essential role in an effective criminal justice system. To identify people various scientific methods have been used since 1880s. One was anthropometry - the measurement of the human body. Alphonse Bertillon, an official at the Paris police prefecture, recorded eleven anthropometric measurements. The results were recorded on a printed card and were filed according to which category they fell into for the measurements. When a suspect is found all eleven measurements were recorded and the existing criminal records for a card containing very similar measurements were searched and matched. Anthropometric identification was rapidly adopted by prisons and police departments worldwide by 1890s [1].

Scientists realized that fingerprint patterns were probably inherited by the late nineteenth century. Sir Francis Galton, one of the pioneers of the modern system of fingerprint identification, classified all fingerprint patterns into three groups: arches, loops, and whorls. In 1892 he published a study of the frequency with which these three pattern types appeared among various races [2] [3]. Fingerprints, computerized or not, are still used in identification.

Criminal identification changed dramatically in the last few decades as a result of a single experiment.

At 9:05 am on 10 September 1984, Alec Jeffreys of the University of Leicester was looking at the X-ray film image of a DNA experiment. It unexpectedly showed similarities as well as differences between the DNA of different members of his laboratory technician's family. Jeffreys realized within about half an hour the possible scope of DNA fingerprinting, which uses variations in the genetic code to identify individuals. After he published the findings and interpretations his technique became a widely used tool to solve crime all over the world [4] [5].

A DNA (Deoxyribose Nucleic Acid) profile is a "genetic fingerprint", unique to each person. They can be identified from analysis of cells, including from tiny samples of blood, semen, saliva, skin or even sweat.

DNA fingerprinting was first put to use by Jeffreys in an immigration case to confirm the identity of a British boy whose family was originally from Ghana. The DNA results proved that the boy was closely related to the other members of the family, to the great relief of the mother [6].

DNA fingerprinting and mass DNA screening was first used as a police forensic test to identify the rapist and killer of two 15 year old, Lynda Mann and Dawn Ashworth, who were murdered in Leicestershire, in 1983 and 1986 respectively. Colin Pitchfork was identified

and convicted of murder after samples taken from him matched semen samples taken from the two dead girls [6]. He was arrested in 1987, and sentenced to life imprisonment after admitting both murders. If not for the DNA, an innocent man who was the main suspect would have inevitably been convicted.

As reports from world over emphasised the value of DNA profiling in criminal justice, in mid nineties I gave a proposal to establish a DNA laboratory for crime work in Sri Lanka to a Secretary of an important and relevant Ministry. Regrettably, no action was taken by the authorities. While efforts were being made some academics to establish a laboratory in the Faculty of Medicine, University of Colombo, a DNA laboratory was opened in the private sector. Subsequently, the Faculty of Medicine, University of Kelaniya has developed facilities for DNA profiling.

I used DNA profiling to express an opinion in a case of disputed paternity in early nineties when a father wanted to know whether the 2 year-old daughter was his, or his wifeôs boy friend. Mother, who admitted to the extramarital affair, was not sure! With the consent of parents, blood from all three was sent to a laboratory in Australia for DNA profiling. Fortunately, the daughter, to whom the father was very attached to, was proved to be his.

In a criminal case, DNA profiling was used for the first time in Sri Lanka when six family members (the father, mother, three daughters and the son) were murdered in Hokandara, a small town near the capital, in late nineties. One of the alleged murderers was also found dead at the scene of the crime. Three other suspects were arrested the same day. Bloodstains from the clothes of three suspects were typed for DNA revealing an identical pattern, indicating that the blood was from one individual. An identical DNA profile was also observed for the murdered son [7] [8].
Although the link between the suspects and the victims were made, and DNA evidence was presented at the trial, as there was adequate circumstantial evidence, it is not clear whether DNA evidence assisted the court to convict the suspects.

In 2008, there were 60870 grave crimes reported to the police in Sri Lanka. Of this, there were nearly 1500 homicides, 400 attempted homicides, over 450 unnatural offences/grave sexual abuse cases and over 1500 rapes in 2008 [9].

Considering the statement made by a former Inspector General of Police a few years ago, only 4% who committed these crimes are eventually convicted in Sri Lanka. The other murderers, rapists and robbers escape punishment and have many opportunities to commit these crimes again.

National DNA databases (NDNADs) have been created in several countries. The United Kingdom was the first European country to establish a NDNAD in 1995. The Netherlands and Austria (in 1997), Germany (in 1998), Finland and Norway (in 1999) have started databases and many others are preparing databases [10].

In the United States of America (USA), DNA database laws authorizing the creation of DNA databases rapidly spread through all fifty states during the 1990s [11].

When the idea of NDNAD was put forward in 2001, Professor Sir Alec Jeffreys, who has considerable concerns over civil liberty issues, stated that he was in favour of this as the potential of this database to prosecute serious crime, to save the lives and the misery of future victims is very substantial [12] [13].

The police in England and Wales now have the worldôs biggest per capita DNA database and takes mouth swabs from everyone they arrest. They now hold samples from some 5.3million people - whether they have been convicted of an offence or not - nearly nine per cent of the population.

The value of having a NDNAD include,

(a) Identifying criminals by matching crime scene and other evidence
(b) Exclude the innocent, saving them and their families from physical and mental distress.
(c) Shortened police investigation and trial hearings saving time and resources.
(d) Saving cost for investigating additional crimes committed by perpetrators.
(e) The deterrent effect on criminals of a NDNAD.
(f) Identification of disaster victims even if the victim does not have a DNA sample on file in a database.

I wish to present 4 cases to highlight the value of a NDNAD.

Case 1

On March 3, 1986, Debbie Smith was abducted from her home in Williamsburg, Virginia, USA. She was robbed, and raped. The subsequent police investigation reached a dead end. Nine years later, on July 26, 1995, the newly-entered DNA profile of a prisoner, Norman Jimmerson, matched the semen collected from the rape kit. Jimmerson was subsequently convicted and sentenced to two life sentences plus 25 years with no chance of parole. Debbie Smith testified after the conviction, ñ...Finally, I could quit looking over my shoulder. No longer did I have to drive around in circles hoping a neighbour would drive by so I could get the courage to get out of my car to go into my own front door if no one else was home. Unfamiliar noises no longer left me panic-stricken... Suicide was no longer a consideration. And finally, my husband is grateful that I donôt wake him up anymore in the middle of the night with the ear-piercing screamsò (14).

Case 2

16-year-old Colette Aram was abducted, raped and strangled and her body was dumped in a remote field in 1983, when she was walking to her boyfriend's house in the Nottinghamshire village of Keyworth, England. A DNA profile of the suspect was created in October 2008 from samples taken from the scene and a local pub the suspect visited straight after the murder. Police regularly ran the profile through the national database for a match. But detectives had to wait another six months for the breakthrough that they needed.

In June 2008, a 20 year-old man was arrested for drink-driving and gave police a sample. When experts carried out a familial DNA search it showed a near identical match to Colletteôs killer. Police then investigated his family and his father Hutchinson was arrested. He blamed the murder on his dead brother. After he was told that detectives had his brotherôs DNA and it was not a match for the crime scene, Hutchison admitted guilt. After a trial at Nottingham Crown Court he was convicted and jailed.

Colletteôs case achieved huge publicity after being the first ever to be featured on the BBC programme ñCrimewatchò, in June 1984. This monthly live programme, which I had the privilege to see live broadcasting in a BBC studio in nineties, informs the public about unsolved crime. It requests information and witnesses to contact the programme direct or the police (15) (16).

Case 3

Nine-year-old Imraan Vohra last seen leaving his school in Preston, Lancashire, in July 1985. His body was found raped and strangled in undergrowth of a nearby park two days later. During a lengthy police investigation, more than 6,000 people were contacted, 2,500 statements were obtained and hundreds of items of evidence stored on a computer database. Over the years swabs and stains of Imraanôs trousers were regularly examined using new DNA techniques as they became available. Eventually a complete DNA profile of the

suspect was obtained. A familial search pinpointed a family member of the suspect who lived more than 150 miles away from the crime scene. The suspect was identified 24 years after the murder as Robert Morley, a father of seven. Morley had died of lung cancer in 1997. His DNA was matched with a biopsy sample retained in a hospital (17).

Case 4

On May 1, 1990, Roy Criner was convicted of the 1986 rape and murder of Deanna Ogg and sentenced to ninety nine years in prison in the USA. Seven years later, a DNA test conducted on the semen left on Oggôs body did not match that of Criner. However, a state district court decision to grant Criner a new trial was overturned in a five-to-four decision by the Texas Court of Criminal Appeals. Their theory was that Ogg might have had consensual intercourse prior to being raped and that Criner might have worn a condom or not ejaculated! Three years later, a cigarette butt from the crime scene was tested. It contained DNA from Ogg and the individual who was the source of the semen on Oggôs body, not Crinerôs. In July 2000, the Texas Board of Pardons and Paroles, at the request of the prosecutor, recommended that Criner be set free (18).

The last case highlights the potential of DNA to identify, even after a conviction, an innocent person by demonstrating that crime scene evidence from the perpetrator of the crime does not match the individual convicted of the crime. There were over 140 convict exonerations in the USA that have resulted from postconviction DNA analysis since 1989. Unfortunately, postconviction exonerations have received far more media publicity, but far less policy action. (19)

It is now time to consider developing a NDNAD in Sri Lanka to use DNA profiles in crime investigation. The Government of Sri Lanka (GOSL) must accept the usefulness of a NDNAD and speedily enact necessary legislation. NDNAD laws should consider provision of adequate resources devoted to the databases, criteria for inclusion/exclusion of individuals in the database, criteria for search, and to establish the NDNAD.

To establish the NDNAD, the GOSL should either establish a separate independent authority with wide powers and resources, or consider an existing institution, such as the Department of Government Analyst or a University. Unfortunately in the present climate, the police should not be considered capable to handle and receive public confidence to establish the NDNAD in Sri Lanka.

It is necessary to obtain equipment and train scientists abroad where NDNADs are well established. A foreign grant may be necessary for this purpose

Although nobody contests today the rewards of a NDNAD in the fight against crime, human rights and fundamental liberties of each individual has to be legally safeguarded, because these databases could be used not only for criminal identification but also to determine an individualôs racial and ethnic heritage, to assess predispositions to certain diseases or behaviours. Therefore, when establishing and maintaining a NDNAD, interests of the society and individual should be clearer balanced. This is because of the possibility of such a database may expand to include millions of individuals who have never been not convicted of any crime.

DNA evidence, like other types of forensic evidence, is subject to laboratory error, pro-prosecution/pro-defence bias, and overstatement of the scientific certainty of conclusions. Therefore, it is absolutely essential that precautions should be taken to ensure that DNA evidence receives ongoing scrutiny from the courts, the bar, and the scientific community. As Cole has stated, ñIt should not be a black box whose conclusions are treated as unassailable, error-free gospel.ò (13)

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SOME COMMON PIT-FALLS IN THE PRACTICE OF FORENSIC MEDICINE IN SRI LANKA. A REVIEW OF INTERNATIONAL LITERATURE

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Introduction

Forensic Medicine can be defined as the ñbranch of medicine where medical knowledge, attitudes and skills are applied for the execution of justiceò. This essentially includes Clinical Forensic Medicine and Forensic Pathology, in addition to several allied fields. Forensic Pathology deals with autopsies while examination of patients for medico-legal purposes (including complainants and suspects of assaults, sexual offenses, child abuse, victims of accidents, examination for drunkenness, misuse of drugs, torture and human rights violations, refugees, international war crimes, care for detainees, impaired motorists etc) comprise the bulk of the work load in Clinical Forensic Medicine.

Sri Lanka is one of the few countries in the world, where the same medical practitioner plays a duel role as a Forensic Pathologist as well as a Forensic Physician. The author wishes to critically evaluate some established practices in Forensic Medicine (clinical and pathology) in Sri Lanka in the light of international literature and practice.

Detention and confidentiality

Forensic physician should exercise great care over confidentiality when examining persons who are detained/ in custody. The detainee must understand and agree to the nature of activities that would be performed by the examiner before any medical information is gathered (in the form of history, examination and investigations). It is essential to take the medical history in strict confidence, and insist on a neutral chaperon during physical examination which is considered the internationally accepted practice.(1) Not obtaining the consent from the examinee, non-provision of adequate information to constitute the ñinformedò nature of the consent (introducing yourself as the judicial medical officer, explaining the pure legal nature of the relationship with the patient, the possibility that the information thus gathered be sent to the courts of law, the possibility that the same information given by the examinee be used against himself, the right of the detainee to remain silent and disallow physical examination and if so the presumptions driven by the courts etc), obtaining history before obtaining the consent, obtaining unnecessary details during history whose confidentiality cannot be assured due to the legal obligations, documentation of unnecessary information on the Medico-legal Examination Form (which is sent to the Police-but not to the courts), conducting the examination in the presence of the police officer producing the detainee are some of the deviations from the ideal, encountered not uncommonly in Sri Lanka.

Injury assessment, documentation and interpretation

Allotting a specific time frame to the infliction of an injury is one of the most frequently requested and most contentious issues in forensic medicine. Bruises often become more prominent sometime after infliction-few hours or even days. On occasion, a recent deep bruise may be mistaken for an older, more superficial lesion. The larger the bruise, the longer it will take to disappear. Many bruises exhibit multiple colours. The only substantial study correlating the bruise evolution and its colour change showed that a bruise with a yellow colour was more than 18 hours old and that red, blue and purplish black colours could occur anytime within one hour of bruising to resolution (up to 21 days in the study) (2) (3). Thus, there is common consensus among the forensic community in the UK, Australia, Canada and the USA that the colouration of bruises and the progress and change of colour patterns cannot be used with sufficient accuracy to time the injury. It is equally accepted that estimation of bruise age from colour photographs is also grossly imprecise.

In contrary to this, it has been noted that too much reliance is paid in Sri Lanka on the colour and appearance of bruises in the estimation of time of infliction of injuries.

Concussion

This is an extensively studied topic in neurophysiology due to its direct relevance in sports medicine and legal medicine. Concussion is a state of transient paralysis of cerebral functions and it is further subdivided in to different stages by three world authorities on this topic : American Academy of Neurologists(AAN), Cantu, and Colorado. According to Colorado and AAN classifications, milder forms of concussion (Grade I and II) can well occur without the person loosing his consciousness. In this case, though he has not lost his consciousness, and though he behaves apparently normally, his neurological status is not normal and thus he is not in a fit state to participate in sports events or even his occupation for varying periods of time, until recommended by a neurologist. (4) (5).

This concept does not seem to have been properly understood by those who practice Forensic Medicine in the South East Asian region as they tend to stick themselves to a very crude and rather dangerous generalization as the definition of ñconcussionò which reads as follows: *"transient loss of consciousness, immediately following blunt trauma to head, with spontaneous recovery and without any demonstrable macroscopic brain lesions, usually followed by retrograde amnesia.".* This definition only represents the most severe form of concussion and acts as a source of miscarriage of justice. It is both unfair and unsafe by those who have been really concussed following a head injury without loosing consciousness.

Care for the detainees

This is a highly developed branch in clinical forensic medicine in countries like the UK, USA and Australia. Forensic physicians show high level of professional priority in the care of the detainees. The health and welfare of the detainee is paramount while any forensic considerations are of secondary importance. The physician should be independent, professional, courteous and non-judgmental. Advise on administration of medication, conditions of detention(food, ventilation, adequate rest, toilet facilities, temperature, illumination, humidity), medical problems(epilepsy, asthma, heart diseases, diabetes, head injuries, general injuries, infectious diseases etc), mental health issues(general psychiatric illnesses, substance misuse, deliberate self harm, claustrophobia etc), personal safety issues, intimate body searches/drug searches, forensic sample collection, fitness to be interviewed, fitness to be detained, charged,

discharged, released or transferred, etc are some of the main considerations of a forensic physician in the care of detainees.(6)(7)(8).

It is highly questionable whether the majority of medical practitioners practicing medico-legal work in Sri Lanka understand that they too owe the same obligations towards detainees, when they are examined for ñfitness for detentionò.

Fitness for interview / risk of false confessions

Guy Norfolk has first proposed a definition for *fitness for interview* which was approved by the UK parliament and included in the 2003 Police and Criminal Evidence Act (PACE) codes of practice. In short it states that:

A detainee may be at risk in an interview if it is considered that:

(a). Interview can significantly harm the mental and physical state of the detainee

(b). Anything the detainee says in the interview might be considered unreliable in subsequent court proceedings due to his physical or mental state. (9)

Part (b) of this definition has the intention of preventing false confessions during police interrogation which will be triggered as a combined effect of the conditions of detention, characteristics of the interrogation and the vulnerability of the accused. (10) (11).

In the UK it is the statutory duty of the forensic physician to consider various vulnerability factors of the detainee associated with false confessions during examination of fitness for detention. These include alcohol, drug abuse, mental illnesses, intellectual impairment, physical illnesses (diabetes, epilepsy, head injury, migraine, dementia, hypothyroidism etc), extreme age, suggestibility and excessive compliance. (12)

In Sri Lanka we hardly ever attempt to access the vulnerability of the victim to produce a self-incriminating statement during police interrogation, while we assess the ñfitness for detention.ò

Traffic medicine

Driving a motor vehicle is a complex task requiring a fair level of physical fitness, accurate perception and correct judgment. All of these factors may be affected by a variety of conditions such as alcohol (acute intoxication, chronic abuse, simple withdrawal and complicated withdrawal) drugs (such as cannabis, opiates, sedative hypnotics, cocaine, amphetamines, antidepressants, over the counter preparations, poly drug use) medical conditions and their treatment. Cardinal medical conditions include Cardiovascular diseases (acute myocardial infarction, ischaemia, hypertension, dysrythmias) Epilepsy, Diabetes (due to hypoglycaemia, retinopathy, insulin dependency, peripheral vascular disease etc) and Vision and eye disorders (absence of one eye, visual field, colour vision, and acuity).

In the UK, Driver and Vehicle Licensing Agency(DVLA) has made an ñAt-a-glance guide to current medical standards of fitness to driveò (13). Similar documents are found in other countries including Australia. (14)
In Sri Lanka when an impaired motorist is brought before a medico-legal doctor, little attention is paid on most of the above conditionhs other than alcohol.

Alcohol

In Sri Lanka, the police may produce a person before a government medical officer to be examined for drunkenness, mainly under the Motor Traffic Act and Offenses Committed Under Liquor (special

provisions) Act. Patients will also be examined for drunkenness when they are subjected to a medico-legal examination following assaults, accidents etc. The same will be done when they are suspected to have been reported to work/duty while under the influence of liquor. In these circumstances, the medical officer resorts only to a pure clinical examination (without testing blood or other body fluids for alcohol) and documents his findings either as ñbreath smelling of liquorò or ñunder influence of liquorò on the Medico Legal Examination Form (MLEF) issued by the police.
In the post-mortem examinations, blood is collected and sent usually to the Govt. Analyst for estimation of alcohol levels.

There are a number of issues which we should properly understand when dealing with matters related to alcohol, if our aim is to prevent injustice, both in clinical forensic medicine as well as in forensic pathology.

Firstly, the smell of liquor is not due to ethyl alcohol but due to other additives present in the drink, which are known as congeners. Their metabolism is different from that of alcohol and ***the smell can be present long after the entire amount of alcohol ingested had been eliminated from the body***. Vice versa, certain beverages will not give a smell at all. Thus, there is very poor co-relation between smell in breath and alcohol in blood. (15) It is unfortunate to say that we still rely too much on the smell of liquor for medico-legal purposes.

Secondly, when we attempt to diagnose ñunder influence of liquorò, Diagnostic Criteria for Alcohol Intoxication-DSM-IV should be adhered to. (16) Accordingly, the following four criteria should be fulfilled.

1. Recent ingestion of alcohol
2. Clinically significant behavioral or psychological changes.
3. One or more of the following features- slurred speech, in-coordination, unsteady gait, nystagmus, impaired attention and memory, stupor or coma.
4. Exclusion of other medical or mental disorders.

It is again highly debatable whether this is done in actual practice.

Thirdly, although there is general agreement on the sequence of clinical effects caused by ingestion of alcohol, the blood alcohol concentrations at which these effects occur vary enormously in different subjects-the variation being most marked between habituated and non-habituated drinkers. (17) One may be óperfectly normalô with a blood alcohol level of 250mg/dl while another would be óquite drunkô with only 60mg of alcohol in one dl of blood. Thus it is clearly non-scientific if a doctor predicts before a legal forum, the possible degree of impairment of an individual known to have a particular blood level of alcohol. The author would like to designate this as a classical example of ñforensic witchcraftò practiced by some doctors as well as clinical toxicologists. The same is true for post-mortem blood samples-one should not attempt to deduce the level of impairment the deceased possibly had before death by looking at the post-mortem blood alcohol figure.

Fourthly, back calculations of blood alcohol levels at the time of a particular event, using the Widmark Formula are only crude generalizations and should not be considered as proof beyond reasonable doubt. (18)

Fifthly, nystagmus should not be considered as an absolute proof of alcohol intoxication. Positional Alcohol Nystagmus I (PAN I) occurs during acute elevation of blood alcohol, usually within the 1st thirty minutes of ingestion. PAN II occurs within 5-6 hours of drinking. Medical officer should be able to differentiate PAN I from PAN II depending upon the direction of the fast phase of nystagmus. Horizontal gaze nystagmus (HGN) may be detected in several pathological conditions including

ingestion of drugs such as ketamine, ecstasy, phencyclidine, barbiturates and volatile substances. (19) (20) Thus, the reliability of nystagmus evidence is not currently a settled proposition in the scientific community. (21)

Sixthly, we should be conscious of the two major differences of alcohol measurements made in the hospitals (clinical samples) and in forensic laboratories. Results are expressed as grams/dl in forensic labs while the same is given in mmol/l in hospitals. The more important difference is that serum is taken for clinical samples while whole blood is used for forensic samples. Serum contains 92% of water while plasma water content is 80%. As alcohol is only contained in the water compartment, the alcohol concentrations measured in serum/plasma will be approximately 14% higher than that measured in whole blood. (22)

Sexual assault examinations

Few important points are only briefly outlined as follows:

a). In the UK and Australia, the forensic physician is discouraged to obtain too detailed a history from the complainant, as it will jeopardize the case at the trial. No history about the alleged incident is obtained from the suspect. (23) In Sri Lanka it is encouraged to obtain an extensive and exhaustive history from both the suspect and the complainant in the language they understand best. Theoretically this can add bias to the examination findings of the physician, cause problems in the processing of evidence at the trial and also raise issues regarding the confidentiality of the intimate information.

b). 360nm wave length ultra violet light source (Woodôs lamp) is no more considered as of any use in detecting seminal stains on skin or clothing. (24). Instead, a high- intensity light source of variable wave lengths used with goggles to block the excitation light (Polylight) is useful in the detection of seminal stains.

c). It is never necessary to pluck pubic hair. (23).

d). In an alleged case of fellatio, petechial haemorrhages and confluent bruising may be seen on the hard and soft palates. The forensic physician should be able to exclude alternative explanations such as infectious mononucleosis, local trauma, paroxysms of vomiting, coughing, sneezing, playing wind instruments, tumors and bleeding diathesis before confidently attributing them to the alleged sexual act. (25)

e). Currently accepted method of examining/sampling of female genitalia in alleged rape, formulated by experienced forensic physicians in the UK in 2003, does not include insertion of examinerôs fingers in to the womanôs vagina to access the hymenal orificial diameter. (23) This rather unrewarding and embarrassing practice should be strongly discouraged though it is still in use among a fair number of doctors engaged in medico-legal work in Sri Lanka. It is common sense that any attempt to measure a stretchable body part by insertion of fingers is non- scientific.

f). On the basis of current literature, ***only*** the complete transections in the lower margin of the hymen are considered to provide confirmatory evidence of penetration of the hymen- by penis, finger or other object. (23). Do we readily appreciate this concept in Sri Lanka?

g). It is generally accepted that due to hymenal elasticity, post-pubertal females can experience penile vaginal penetration without sustaining any hymenal deficits. (26)

This makes the mythical concept of ó*virgo intacta'* null and void. Again, do we readily acknowledge this?

h). Pre-pubertal, non-oestragenized hymen appears thin and translucent. This should not be misinterpreted as ñattenuation due to chronic abuseò in a female child of suspected sexual abuse. (27)

i). It is imperative to sample the vagina, vulva and perineum separately, even when only anal intercourse is alleged, to exclude the possibility of gravitational leakage from the vagina to account for semen in the anal canal. (23). How frequently do we do this?

j). Great caution must be paid in the interpretation of blood in the female genital tract. It is a known obstetric fact that traces of uterine blood can be present at anytime of the menstrual cycle. (28) Further more, currently there is no accepted method of differentiating between traumatic and uterine blood. (29)

k). Linear vestibularis, a congenital white line present in the fossa navicularis, should not be mistaken for a scar-specially in the small children. (30)

l). It is commonly accepted in the developed world that it is impossible to reach a conclusion regarding the erectile efficiency of a male, based on the age alone. The expert opinion of a urologist must be sought. The forensic physician should not trespass the premises of the urologist by attempting to answer this question. (31)

m). Penile erections may result from tactile stimulation of the penis, scrotum and rectum-this should explain why a male can experience involuntary penile erections while non-consensual anal intercourse. (31)

n). It should be emphasized that nonconsensual anal penetration can occur both in children and adults without producing acute or chronic injury. (32)

o). Reflex anal dilatation in an examinee or a dilated anal opening in a dead body has no forensic significance. (23)

Conclusions and Recommendations

The ultimate goal in Forensic Medicine is to lay a solid, evidence-based, scientific background to help the judicature to meet the justice. The concepts and practices are ever changing with the advancement of science and invention of new knowledge. Forensic practitioners in this region of the world should take extra pain to keep abreast with the new knowledge and international practices and standards. This is doubly true for Sri Lanka where the bulk of the medico-legal work is carried out by ordinary medical officers with no special training or post-graduate qualifications in Forensic Medicine.

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A CAFÉ CORONARY DEATH DUE TO A 'BANANA'

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Abstract

Café Coronary syndrome which was first reported as sudden collapse at restaurants while dining was found to be due to fatal occlusion of upper airway by large pieces of food. Many of those individuals had consumed large amounts of alcohol prior to the incident. However, same condition has also been noticed among institutionalized elderly with dementia and psychiatric conditions. This is an un-witnessed death of a café coronary syndrome , where a 70 year old man after having dinner with his children previous night found dead next day morning in his bed. At autopsy a blob of mucoid secretions were found at right nostril and a piece of banana weighing 21g was found impacted within the laryngophrarynx, occluding the air way. He was edentulous. This case highlights the need of being aware of the condition especially in the elderly with mastication problems due to lack of teeth and other deglutition problems.

Introduction

Café coronary syndrome introduced in 1963 by Haugen referring to obstruction of the upper airway by a bolus of food witnessed by others is not only limited to elderly but also to the very young and neurologically impaired persons in institutions. [1][2][3]. Many of these witnessed cases can be saved with proper, prompt emergency care while awareness of the condition can minimize the deaths that are not witnessed. The case on discussion highlights the need of being aware of the condition especially those elderly who lack teeth or those who tend to gulp food without mastication.

Case report

70 year old edentulous man had dinner with his children previous night and retired to his room with a banana, given as his desert, stating that he would eat it later. Next morning he was found dead in his bed with some secretions from nose and mouth. Resuscitation was not attempted. The deceased was an active man who was engaged in farming, but occasionally complained of a chest pain aggravated with exertion. He was a non smoker and a teetotaler.

At autopsy, a blob of mucoid sections, mixed with food particles were found at right nostril, (image 1) while a large piece of banana (7.2cm x 4 cm) weighing 21g was found firmly lodged in the laryngopharynx. (Image 2) It was moulded to the shape of the laryngeal anatomy. The broken surface was facing the epigllotis and extending up to vocal cords obstructing the lumen completely. There was a contusion measuring ½ cm x ¾ cm in the posterior surface of epiglottis, surrounded by congestion of the blood vessels. When the main piece of banana was dislodged from its position small pieces of banana were found in right aryepiglotic fold (Image 3 & 4). The banana piece also had the indentation of the epiglottises. The trachea

and the bronchi contained mucoid secretions mixed with food, but these were not extending to bronchioles. The stomach contained 400ml of partly digested food. There were 3 smaller pieces of banana in the stomach. Lungs were normal. Moderate atherosclerosis was present within major vessels but coronaries ostea were patent with minimal atherosclerosis. No other significant underlying diseases were present. Blood was not tested for alcohol as the deceased was a teetotaler.

Figure - 1

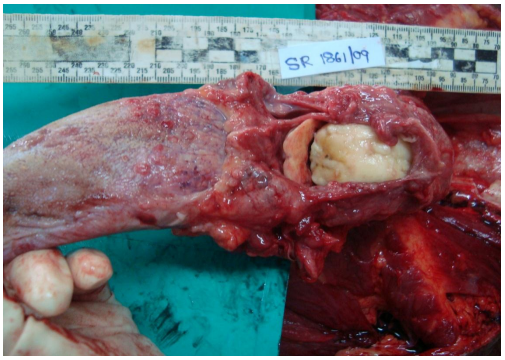

Figure - 2

Discussion

ócholingô or obstruction of upper air, i.e between pharynx and bifurcation of trachea is a well known phenomenon in forensic literature for many centuries and asphyxiation of food has been recognized as a cause of sudden accidental death. [4][5] Café coronary syndrome or death due to acute obstruction of upper air way by impacted food while eating was first described in deaths at restaurant where the

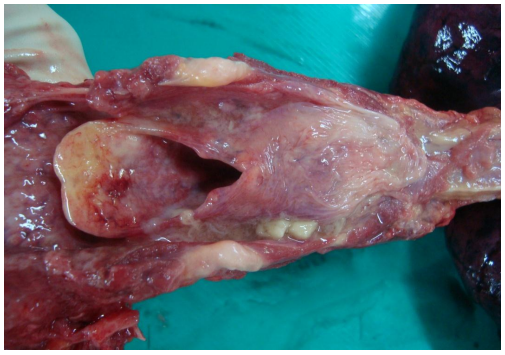

Figure – 3

Figure - 4

victim collapsed in front of others most of the time trying to swallow a piece of meat. [1]. However, later rare variants have been reported such as coprophagic café coronary [6] and therapy related café coronary.[7]

Although, old age, inadequate mastication due to poor dentition/denture and alcohol consumption were well known predisposing factors, sedatives drugs and anti-parkinsonism drugs were also found to have an increased predisposition. [8][9]. However, reported predisposing factors for children were inadequate dentition for the food provided and lack appropriate eating skills [10],[11].

Mittlman and Wetli in their study of 141 autopsy cases state the commonest type of food involved in ófree roaming adultsò was meat while in ñinstitutionalized adultò commonest agent was soft friable snack food like bananas, bread and peanut butter. Berzlanovich et al in a 273 autopsy population also showed a similar trend where significantly higher asphyxiation of

soft/slick foods (p <0.007) with agomphiasis (p <0.002), occurring frequently during lunch in more elderly population in contrast to choking of large pieces of foreign material (p <0.002) with higher rate of blood alcohol concentration (p <0.001) in younger elderly group. [12]. Children show a different trend compared to elderly where commonly asphyxiated food item being hot dogs followed by various items including candy, popcorn to toy rattle and tissue paper. [13].

One of the important issues a pathologist should be aware of diagnosis of café coronary is the exclusion of an aspiration. A simple test of litmus on the acidity will solve the issue indicating the secretions found in the lower respiratory tract were not coming from the stomach.

Conclusion

Eating smaller portions, prior munching, crumbling of the food, avoiding gulping quickly are some measures that edentulous elderly must be aware of if we are to prevent deaths from café coronary syndrome. However, if such situation occurs awareness of emergency treatment manures like Heimlich maneuver will save many of these lives. [14]

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ARSON AND PSYCHIATRY

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Fire, one of the four mighty elements of life, along with earth, air, and water, has long been one of the most destructive, fascinating, and useable forces for those who would wreak havoc on the lives of others. A pervasive and significant public health problem for many families, arson-related fires cause the loss of lives, suffer burns and injuries as a result of these crimes.

Fire setting (Arson) by adult psychiatric patients is a symptom found in many primary disorders. It is rarely a reflection of the classic disorder, pyromania, as historically defined.[1] Arson is a major source of property damage, injury and death. Many people who commit arson have extensive psychiatric histories and symptoms at the time of their fire-setting.[2.] There are fire setters who are free from psychiatric illnesses, stars fire for financial reasons and as revenge as well. Here we report two cases where arson is seen in the context of inward psychiatric care.

Case one

A nineteen-year-old young man, ex-army person, presented with a history of destroying ones kitchen, and his belongings, without any apparent reason by fire. He has a history of Cannabis abuse for two years and alcohol abuse for the similar period, had a stress related to the refusal of his romantic proposition.

He believed firmly that his persecutors had done a malevolent charm, and made him consume Kabara* oil to make his destruction. As a remedy, the patient had burned coconut shells and had been inhaling the fumes. He believed that fumes will cause the oil to be excreted with his sweat. He burned towels, as he believed that this would prevent the Kabaras to come to his village and prevent the villages from extracting more Kabara oil from these alligators and further making him to consume. He used kerosene oil to burn his kitchen and did not give any explanation for this specific act, but laughed. When questioned, indicated some unspoken rationale. This amounts to a bizarre delusion. He also believed that twinkling of stares indicated that his girlfriend is in communication with him suggesting a delusional perception. He believed that his thought were known to others suggesting thought broadcast.

Due to his bizarre delusions delusional perception and delusion of thought broadcast, we could diagnose him as Schizophrenia. His persecutory delusions indicated him of having paranoid Schizophrenia.

Case Two

Fifty years old housewife, a diagnosed patient with paranoid Schizophrenia, burnt two houses, was suspicious and found wondering away from home. Her compliance was poor for medication.

She had been hearing voices from the walls of the houses. She also believes that there

are cameras hidden inside these walls, which broadcast her behaviour to others. Due to these beliefs she had burned two houses by actively putting kerosene and burning them down. As the owners knew her illness, she had not been taken to police, but brought to hospital. She was diagnosed to have a relapse of Schizophrenia.

Discussion

Progress in the understanding of individuals who commit arson has been a slow but steady course over the past two decades. Broadly, causes for arson include, psychotic illness, learning disability, alcohol abusing, and mood-disordered and juvenile conduct disorder.[3] There are clinical-legal relevance of this condition.

Fire setting in childhood and adolescence is associated with the more severe end of the conduct-disorder continuum and is considered to be poorer prognostic of later pathology.[4]

There are other causes for juvenile fire setters such as schizophrenia, organic mental disorder, posttraumatic stress disorder and severe mental retardation in this age group. There are rare cases reported as temporal lobe epilepsy with the involvement of the amygdala to explain arson in children [5]

A study examining mental health records and/or prison files of 283 adult arsonists revealed 90% of arsonists had recorded mental health histories. Of those 36% had the major mental illness such as schizophrenia or bipolar disorder while 64% were abusing alcohol or drugs at the time of their fire setting. Pyromania was only diagnosed in 1% of the cases. Different motives for setting fire included being angry and delusional.[2]

Both cases reported here were diagnosed as schizophrenia. They both committed arson under a delusional mind. These patients pose a risk to the society and self and hence were treated at a secure unit. Both patients gained full recovery on antipsychotics medication. They both could not remember the act of arson. This could be seen as repression, a psychological defense mechanism, operating to reduce the anxiety, associated with such destructive act.

There are forensic implications of their acts of arson. For both patients Mc Nortonôs rules could be applied, which states that his act is rational, taking into account of his delusional system and prove the absence of *menssria* (the guilty mind)[7]

They could be defended by the legal provision of ñunsound mindò at the time of offence. This states that patient was laboring under such a defect of reason, from the disease of the mind, as not to know the nature and the quality of the act he was doing, or, if he did know it that he did not know what he was doing was wrong.[9]

In a longitudinal study revealed that 4% were re-convicts of arson. [8] Half of them were convicted of other crimes. An important guideline is that a person convicted of arson a second time is at a greater risk of further offences.[8]Antisocial personality disorder, mental retardation persistent social isolation evidence that fire setting was done as a sexual gratification increases the risk of repeating the act.

Arson involves the destruction of property. Under such circumstances if the property has been insured against fire destructing one might expect the insurance company to pay you the damage. Ironically if the act is categorized as arson, then in most parts of the world one cannot claim the damage.
This should not be seen as medicalising a social problem. . There are fire setters who are free from psychiatric illnesses, stars fire for financial reasons and as revenge. They are refereed as ñMotivated Arsonò and should be denied the legal providence as stated above.

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ESTABLISHING LIP PRINT ANALYSIS / CHEILOSCOPY IN SRI LANKA AND IT'S FORENSIC USE

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External surface of the lip has many elevations and depressions forming a characteristic pattern called lip prints, examination of which is referred to as cheiloscopy or lip print analysis. The approach is very similar to that of fingerprint analysis. The pattern of lip print is unique to an individual: the very factor used in forensic personal identifications.

The biological phenomenon of systems of furrows and prints on the red part of the human lips was first noted and described by anthropologist R.S. Fischer, in 1902. However up until 1950s they were not assumed to have any forensic use.

Y.T Suchhihashi and T.Suzuki examined persons lip prints at the department of forensic odontology at Tokyo university and established that the arrangement of lines and prints on the red part of the human lips is individual and unique for each human being. Since then, this technique has been used worldwide in order to incriminate or discriminate a suspect from a crime when and where lip prints were available. These studies motivated crime scene investigators to look for lip prints in addition to finger prints in crime scenes.

So far, in Sri Lanka, there is neither a case report involving a lip print nor there is any research publication concerning lip prints. It may not be because there were no lip prints in our crime scenes that they were not recorded, it may be that the officers were unaware of an existence of such a technique and were unaware of detecting or the use of such.

Lip prints can be found literally in any object in contact with the lips. Most commonly in glasses, cigarettes, food items etc. However one needs extra efforts to make lip prints visible. There are several techniques to visualize a lip print similar to those used to visualize fingerprints. Further, there has been instances where lip prints could be directly used as they appeared colorful with lipstick in clothes!.

There have been many forensic case work elsewhere, where the lip print evidence were used in court room. However unfortunately to date this technique was not available for Sri Lanka.

The results present in this paper are preliminary findings of an ongoing study. A sample of 25 volunteers 15 males and 10 females were instructed to imprint their lip prints in a white color A4 paper kept horizontally in a laboratory table. They were given instructions as to how the impression should be made. The technique used here was the simple ñlip stickò method to obtain the lip print.

Once the prints were made they were analyzed visually and with the use of a hand lens for their lip print type. The lip print types were identified and documented.

This study not only establishes initial idea about lip print patterns in the Sri Lankan population but also establishes the method for forensic use. This study continues with a larger sample at present.

1	1 1!
1	1

11 11	111
11	11

1 11	1 11
1 111	1 111

Identified Lip print patterns in the sample

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SUICIDE WITH MASSIVE DIGOXIN OVERDOSE (A CASE REPORT)

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Introduction

Cardiovascular drugs are among the substances most often implicated in poisoning in the elderly[1]. Digoxin is a steroid glycoside which is widely used in the treatment of cardiac failure, atrial fibrillation, atrial flutter, and paroxysmal supraventricular tachycardia. Although digoxin intoxication is a common problem in clinical practice because it is therapeutically effective within a narrow dose range, massive intoxication with digoxin following a suicidal attempt is a rare event. This case report illustrates a massive digoxin overdose in a suicidal 51-year-old man, in which measurement of serum digoxin concentration far exceeds the values so far reported in the literature.

Case report

A 51-year-old general practitioner was admitted to the hospital unconscious and was pronounced dead immediately. It was revealed that the deceased had threatened to commit suicide during a heated family argument just one hour before admission to the hospital. Apparently he had swallowed twenty, 0.25 mg digoxin tablets that he had in his practice. The incident was witnessed by family members.

A medico legal autopsy was performed and the main findings included congestion of brain, lungs, and kidneys and a partially digested rice meal in the stomach. There were no identifiable tablets inside the stomach but dissolved tablet particles were seen. Myocardial and coronary artery diseases were excluded. The other organs were unremarkable. Blood, stomach contents and liver were analysed for digoxin levels.

This analysis revealed digoxin concentrations of 7 µg/ ml, 1 µg/ g and 137 µg/ g in blood, liver and stomach contents respectively. These results were verified by repeated analysis.

Discussion

The effects of cardiac glycosides are direct stimulation of the myocardium, increased myocardial excitability and automaticity leading to cardiac arrhythmias, depression of conducting tissue and increased vagal activity. Cardiac glycosides inhibit the enzyme sodium potassium ATPase. Inhibition of this enzyme by cardiac glycosides is dose related and at high concentrations interference with sodium, calcium and potassium transport is probably responsible for digoxin induced arrhthymias. Anorexia, nausea, vomiting, supraventricular tachyarrhythmia and atrioventricular block are suggestive of digoxin toxicity. The elderly experience adverse effects of digoxin more readily. This results largely from a decline in renal clearance with age.

After ingestion, digoxin is absorbed quickly and peak plasma concentration of digoxin is reached in 30-60 minutes. It will begin to have an effect on the heart within 1-2 hours following oral administration. Digoxin distributes widely throughout the body specially in heart, skeletal muscles, liver and kidneys.

Digoxin has a narrow therapeutic range. The mean therapeutic serum concentration of digoxin ranges from 0.5 to 2 ng/ml. Digoxin toxicity starts at a serum level of 2.0 ng/ ml.[2] It is common with up to 20% of hospitalised patients receiving digoxin showing some evidence of toxicity.[3] A significant increase in mortality was correlated with an increasing serum digoxin level up to 50% at a level of 6.0 ng/ml and more.[4]

Suicide with massive digoxin overdose is a rare event. In 1971 Smith and Willerson reported a postmortem serum digoxin level of 42ng/ml in a case of suicidal digoxin intoxication.[5] Likewise in 1973 Hobson and Zettner reported 25ng/ml [6] in 1975 DiMaio et al reported 38.6 ng/ml [7], and in 1994, Dunn et al reported 169 ng/ml.[8] In this case, the serum digoxin level is extraordinarily high. This is likely due to ingestion of large number of digoxin tablets.

Acute massive digoxin overdose in this patient would have caused life threatening arrhythmias mainly atrioventricular conduction disturbances which led to immediate death. Also refractory hypokalaemia can contribute to the cause of death in digoxin poisoning.[9].

The cause of death was concluded as digoxin intoxication. The history of this case and autopsy findings led to assume a suicidal mode of death. It appears that the deceased made use of his professional knowledge to choose a drug which is not usually used in cases of attempted suicide. Thus, the first ever case of suicide with massive digoxin intoxication is reported in Sri Lanka. Blood digoxin concentration in this case far exceeds the values so far reported in the literature and indicates ingestion of extraordinary amounts of digoxin.

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A CLINICAL CASE OF AN 'ALLEGED ASSAULT' : ARE THEY FABRICATED INJURIES?

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Introduction

Self inflicted injuries which are usually non fatal may be motivated by some form of gain. The fabrication of injuries to simulate an assault is seen among the self inflicted injuries. In such cases with the difficulties that sometimes arise in determining whether injuries are self inflicted or not, the finding of symmetrical ómirror image injuriesô provides compelling evidence of self mutilation unless a plausible alternative explanation is available.(1) We report a case of fabricated injuries where the victim tried to implicate a group of individuals alleging assault.

Case report

A 23 year old right handed painter gave a history of óabductionô and óassaultô by a group of 6 unknown people while he was traveling in a motor bicycle. While in their custody he was punched, slapped and several cuts and scrapes were made with a knife used by them. He was kept in detention for about 3 hours and later dumped in an isolated area. On the same day he was admitted to a tertiary care hospital. He was under duress with the wedding arrangements in the near future. There was no history of psychiatric disorder or addiction to drugs and alcohol.

Medico ï Legal examination revealed multiple, parallel, over lapping, obliquely placed linear superficial abraded injuries.

on right cheek over an area of 14 cm x 3 cm.(Figure 1) Similar type of injuries were present on the left cheek but less prominent. (Figure 2) There were 3 parallel linear superficial cuts with surrounding red flush on the anterior aspect of left upper chest. Multiple comparable superficial cut injuries were seen on the flexor aspect of left forearm and right forearm. (Figure 3, 4) The left arm mostly on the lateral aspect showed multiple superficial cut injuries. (Figure 5)There were no other injuries or scars found on the body which included the posterior aspect of the body. (Figure 6) The injuries were examined almost 27 hours after the infliction and the appearance of them were compatible with the time interval. The details of the clothing worn at the time of incident were not available.

Legends

Figure 1 - Right cheek showing Multiple superficial, parallel obliquely placed abraded injuries

Figure 2 - Left cheek showing superficial, obliquely placed abraded injuries

Figure 3 - Left arm with multiple superficial cuts

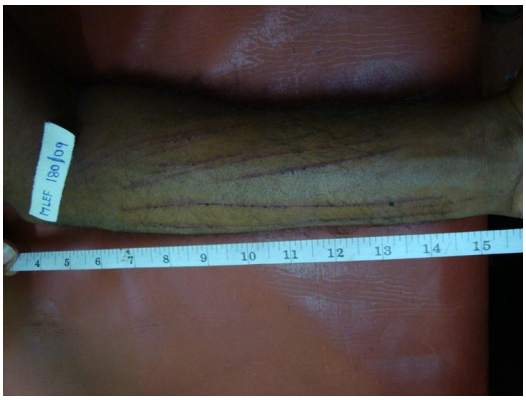

Figure 4 - Left forearm with multiple, linear, superficial cut injuries

Figure 5 - Right forearm with linear superficial cut injuries

Figure 6 - back of the body devoid of any injuries

Discussion

Self infliction of injuries among males is seen in Sri Lanka especially among drug addicts, detainees and mental patients. Self inflicted injuries, usually non fatal, may be motivated by some form of gain. The most common is fabrication of an injury to simulate an assault. (2) The underlying motives for fabricated injuries vary from arousal of sympathy to that of hate. There are several etiological theories for self harm behaviour such as past trauma, invalidation, sexual and physical abuse, neglect and neurochemical changes. (3)In this case the victim never gave a history of self infliction

of injuries or motivation to do so. Though he gave a history of kicking and slapping by 6 people there were no injuries on the body similar to imprint slap marks or contusions caused by the shod foot. The injuries which were present were superficial and involving the accessible parts of the body. There was symmetrical involvement of both cheeks and fore arms. The most common type of injuries was superficial cuts. The injuries on the cheeks appeared like superficial abrasions. According to the history given by the victim the weapon involved is a penknife. The mechanism of causation of abrasions by a penknife could be due to a lesser force or the abrasions were actually very superficial cuts. The fingernails of the victim were trimmed at the time of examination. The inaccessible parts of the body especially the back was free of any injuries.

When ever there is no history of self infliction but there is an allegation of assault and if the forensic pathologist had reasons to believe that it was self inflicted to fabricate injuries, then he had to decide on the circumstances based on the injury pattern. In this case the injuries were mostly on the left side corresponding to the right hand usage of the victim and avoiding sensitive areas. (2, 3) Further the superficial abrasions on both cheeks and superficial cuts in forearms appear as closer to identical images in their superficiality involving the skin, position of an oblique placement and type of injuries as superficial cuts and abrasions.(1)All the injuries were present only over in accessible parts of the body. Even though the mechanism of infliction is most likely due to self infliction the motive behind is to allege a group of individuals of assault and thus resulting in fabrication of injuries. Literature survey revealed similar cases of fabricated injuries where the motive was to mimic violence and simulation of an assault. In one instance an individual had even tried to inflict gunshot injuries to fabricate violence. (4), (5), (6). There was another case where the victim had tried to self strangulate to fabricate injuries. He initially claimed that he was gagged, tied and robbed. But later he admitted that he had fabricated the injuries. (7)Though the fabricated injuries are common phenomenon of self inflicted injuries, the symmetrical involvement of body parts especially the cheeks are less common. In comparison to the self inflicted injuries for suicidal purposes the fabricated injuries in the face are very superficial avoiding sensitive areas like eyes, nose, lips and ears. (2)

Given the difficulties that arise in determining whether these injuries are self inflicted or not, the findings of typical characteristics of self-infliction as described above and the absence of defense injuries in the palmer aspects of hand further supports the conclusion of fabricated injuries. (8), (9), (2)

Acknowledgement

The authors wish to extend their sincere gratititude to Dr L.B.L de Alwis for his effort in going through this paper and the valuable guidance given to publish this case report.

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ESTABLISHMENT OF DNA BASED HLA TYPING IN SRI LANKA FOR FORENSIC AND TRANSPLANT PURPOSES.

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Introduction

Major Histo Compatibility Complex (MHC) mapped to locate in the short arm of the chromosome 6 of the human being, contains a group of genes that code for proteins (antigens) expressed in a variety of cell types known as Human Leukocyte Antigens or HLA. This MHC/HLA system is involved in the immune system. It is a highly polymorphic DNA (Deoxy Ribo Nucleic Acid) system : the very reason for its use in forensic crime and paternity work in addition to detect tissue compatibility in transplants.

This system has been in use for some time in the rest of the world as a supplement to STR (Short Tanderm Repeat) analysis in forensic work. This molecular approach has been used in crime investigations, establish identity, establishing familial relationships etc in forensic case work. Also, DNA based HLA typing has been an accepted routine procedure in transplant work.

Although there is evidence that this molecular based techniques were used elsewhere since early nineties. Up to this study established it, this test was not available in Sri Lanka. The patients had to spend a lot of money in getting this test performed in foreign countries for transplant purposes.

Therefore the aim of this study was to establish this test in Sri Lanka for an affordable price. It was identified that the established protocols available in the international literature were costly when tried them in the local laboratory. Therefore it was decided to optimize the test for a Sri Lankan laboratory by modifying the available protocol.

Materials and Methods

Genomic DNA of the venous blood drawn from consenting participants were extracted using established Chelex 100 method.

The required primers (both forward and reverse) for HLA DQ 1 were bought from a commercial provider.

The total PCR volume was made to 10 micro liter in order to reduce cost per test but maintaining quality. The other constituents in the PCR mix were also designed to suit 10 micro liter.

Adequate amount of master mixture for several assays were prepared and stored.

The Master mixture consisted ;

10 * PCR buffer 1.0 micro liter
2mM d NTPs 1.0 micro liter
Primer (forward) 0.5 micro liter
Primer (reverse) 0.5 micro liter
Distilled water 3.5 micro liter

The PCR mix contained the following in addition to the above ingredients of the master mix.

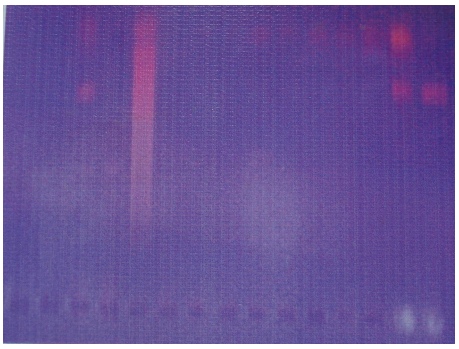
Test DNA 1 micro liter
Taq DNA polymerase ï 2.5 micro liter

Subsequent to extraction of DNA using Chelex 100 method, the DNA was

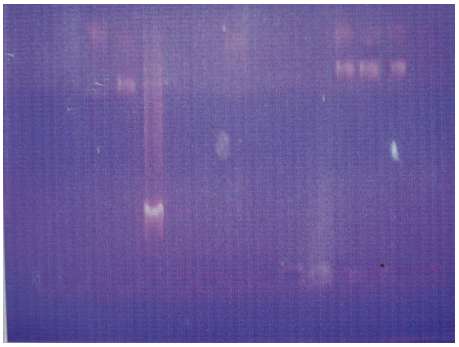
subjected to a PCR (Polymerase Chain Reaction) using above PCR mixture. And the PCR was subjected to 30 cycles (3 temperatures) in a Gene Amp PCR system 2400 (Perkin Elmer) under following PCR conditions. Each cycle consisted of 94 degree Celsius denaturation for 20 seconds, annealing at 65 degree Celsius for 50 seconds and extension at degree Celsius for 20 seconds. The samples were amplified along with a positive and negative control.

Subsequent to PCR the products were subjected to 2% w/v agerose gel electrophoresis and the band patterns were visualized via UV illumination. The presence or absence of band patterns were interpreted. A positive control, a negative control were also run with the test sample.

DNA based HLA typing



Case 1



Case 2

Discussion

The original method established by Olerup et al in 1993 were modified and optimized to suit Sri Lankan financial and laboratory needs. By using Chelex 100 extraction method a significant amount of cost reduction could be made. Chelex method is reliable low cost and requires a little amount of test sample. These were the advantages of this modification. By using 10 micro liter PCR reaction mix in place of a 25 micro liter mix a significant cost reduction could be made: the amount of taq polymerase, primers and other expensive consumables were less. This test is fast and the results can be made available the same day.

Conclusion

Thus the, DNA based HLA typing of HLA DQ1 test was established in Sri Lanka in 2006. This test has been available and in use since 2006 for Sri Lankans for forensic and transplant use. This test is available at a low cost and the results can be ready in one day.

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A SUDDEN UNEXPECTED DEATH OF A CHILD A RARE CAUSE

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Introduction

Sudden unexpected natural deaths in adults are usually attributed to cardiac causes and Ischemic Heart Disease is the leading cause in the older age group. In children, the scenario is different and most cardiac deaths are due to congenital cardiac abnormalities which occur approximately 1% of live births.(1) Therefore it is understandable the rarity of other fatal conditions which include cardiomyopathies, valvular heart disease and electrical abnormalities of conduction system resulting sudden cardiac deaths.

Diverticular Disease of Heart or Congenital Cardiac Aneurysms have been considered to be a rare entity causing sudden cardiac deaths.(2) But a recent research has shown that its occurrence can be higher and can be demonstrated by cardiac imaging techniques.(3)
The failure to appreciate the true occurrence is thought to be due to the silent nature of the entity. But it can have fatal consequences (4)(5) Then such cases invariably end up in the Forensic Practitionerôs hand. That is the very reason should the Forensic Practitioner be aware of its existence. It is also important for the forensic pactitioner to distinguish congenital aneurysms from aneurysms caused by other pathologies such as ischemia, trauma, inflammation and rubella though it will be difficult at times.(2) (6) (7)

Case Report

The deceased was a six-year-old girl and the 3rd of the family of three children. She had been a healthy child without any known disease or complaints except a heavy weight falling on the body exactly a month ago and an attack of chicken pox several months ago. She had been hospitalized following the accident when a barrier at road side has collapsed on her while passing it. At that time her main symptoms were dyspnea for about 10 minutes and loss of consciousness. After admission her vital parameters were normal. She has undergone X-ray of chest which had appeared unremarkable. She had not been subjected to ECG examination and had been discharged on the 2nd day on analgesics. Thereafter she had been symptom free for one month.

On the fateful day around 7.30am she, has had the usual cup of milk tea prepared by her mother. Little later, she has tried to reach for a bun on the table and suddenly collapsed supine on cement floor without striking against anything. Then the child had developed a fitting attack and soon became motionless. She was rushed to a leading childrenôs hospital that was reachable in 15 minutes. The doctor of the Out Patient Department initiated cardiopulmonary resuscitation with cardiac massage and intubation but pronounced her dead on admission in a while. As the cause for this sudden death was not clear, the inquest was held and the body was sent for postmortem examination in the same evening.

On external examination, the body was cold and in full rigor mortis. The deceased was fairly nourished and 121cm in height. Little amount of whitish froth was noted at nostrils. There were no injuries except 1cm laceration in the inner aspect of lower lip with intact frenulum. The body was free of old scars. The scalp, skull and brain were unremarkable and neck dissection did not revealed any abnormality or injuries. There was no evidence of hemo-pneumothorax or adhesions in chest cavity or pericardium. The pericardial sac was found distended with blood. On opening of pericardial cavity, 150 ml of clotted and liquid blood could be evacuated. There was a vertical rupture approximately 7mm with necrotic margins found left to the anterior descending branch of left coronary artery in the upper part of the anterior wall of the left ventricle (Fig 1). Further dissection of the left ventricle revealed that the rupture was communicating with a cavity approximately measuring 1.2cm x1cmx 1cm in the myocardium which in turn communicating with the left ventricular cavity with a narrow ostium among trabeculae.(Fig 2) (Fig 3). There was another similar unruptured cavity with blood clot found close to the apex of the heart in the anterior wall of left ventricle (Fig3). There were no other abnormalities found in great vessels, coronary arteries, cardiac valves or chambers. The stomach contained 100ml of creamy white liquid without remarkable smell. The rest of the organs were unremarkable.

The histology of the lesions showed extensive mature fibrosis with out mucosal lining or inflammatory changes. The fibrous tissue was only seen in relation to the lesions.(Fig 4) Ruptured margin had necrotic tissues. Clotted blood with out organization was seen in the unruptured lesion. (Fig 4) Histology of the rest of the heart and the other organs were unremarkable.

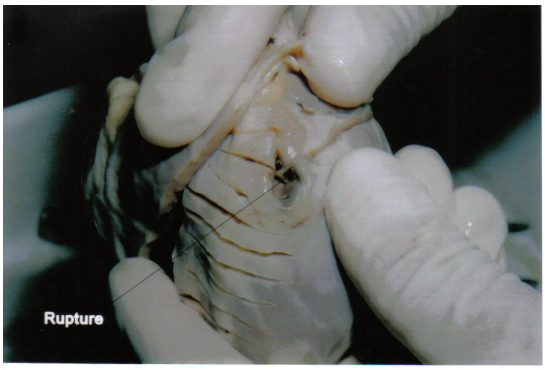

Figure - 1

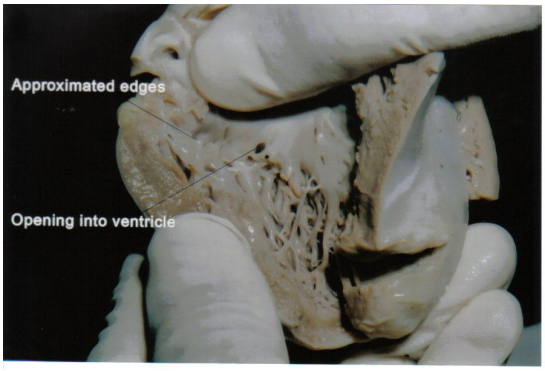

Figure - 2

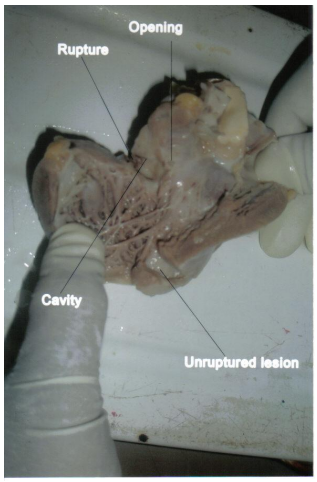

Figure - 3

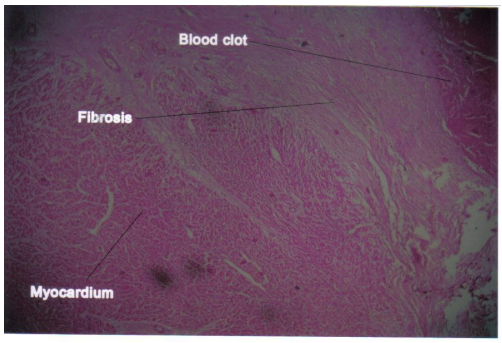

Figure - 4

Discussion

The main non traumatic cause of hemopericardium in adult population is myomalasia cordis following infarction.(8) But spontaneous hemopericardium can be caused by ruptured lesions other than infarctions and those lesions includes Hydatid cysts, Foregut cysts(9) and Diverticular Disease or Congenital Aneurysms of the heart.(2)(3)

Out of these, hydatid cysts are the commonest.(9)(10) They can cause cardiac tamponade if ruptured.(10) Those cysts can be shelled out easily from myocardium.(10) Appearance and histology of the case under discussion is unlikely to be a case of hydatid cysts.

Foregut cysts are developmental abnormalities arising from primitive foregut. They are divided into bronchogenic cysts or enterogenic cysts according to their origin. They usually contained sebaceous or necrotic materials. The surrounding area can have fibrosis. They have mucosa akin to respiratory or gut mucosa.(11)(12)

Cardiac diverticulum is a congenital abnormality of unkoun eatiology. (2) They can be fibrous or muscular. The muscular varity is usually associated with other midline congenitla abnornmalities.(2) They have to be differenciated from poorly compacted ventricular myocardium.(3) The communication of a muscular diverticulum with ventricle is narrow. They can remain silent or can cause complications such as arrhythmia , cardiac rupture or heart failure.(2) The fibrous varity is usually occurening as a sole pathology and occurs at the apex or base of the heart. They usually have a wider neck. (2)(6)They have to be differenciated from cardiac aneurysms of secondary origin such as trauma, ischemia, rubella and inflammatory causes (2) (6)

This case had extensive mature fibrosis around the lesions. There was no histologically demonstatable lining in the cavity. They had narrow communication with ventricular cavity. This is in contrast to the fact that fibrous diverticulae usually have a wide communication.(2) Their appearance and histology are in favor of cadiac diverticular or cardiac aneurysms. It is said that these two terms are used interchangeably. But it is more scientific to use the term ñdiverículumò when the communication with the ventricular cavity is narrow.(6) Other congenital abnormalities are common with muscular diverticular disease of the heart.(6) Occurrence of fibrous diverticula as the sole lesion causing fatal hemopericardium has been reported.(5)But before coming to a diagnosis of congenital fibrous diverticular disease or aneurysm, it is necessary to exclude causes which can result in similar lesions. Those causes include trauma, mycotic lesions, syphilis, rubella myocarditis and congenital abnormalities in coronaries and major blood vessels causing myocardial ischemia.(2) (6). In the case under discussion there were no pathologies which could have caused secondary aneurysms detected. History of blunt trauma to chest a month ago raise the possibility of cardiac aneurysm following myocardial damage (6)(7). But had she have extensive damage to myocardium at that time, it is unlikely for her to be free of symptoms and sign on admission after trauma and until a month after that. On the other hand localized nature of fibrosis and its maturity are more in favor of lesions occurring before the traumatic incident one month back. The narrow neck, the appearance of cavity and the typical locations are more in favor of congenital diverticulae than traumatic aneurysms (3). Therefore it is prudent to diagnose the case as congenital fibrous diverticular disease of the heart. The narrow neck of fibrous lesion makes the case more specific.

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