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Editor-in-Chief: Prof. R.K. Goena

From Editor's desk

It is my extreme pleasure to present before you the sixth volume of the journal of Punjab Academy of Forensic Medicine and Toxicology at the sixth annual conference of PAFMAT at Hoshiarpur. It is a matter of great pride for the PAFMAT that we are receiving the scientific research papers not only from Punjab but from all over India. It shows the liking and the love which is being accorded to this journal by forensic medicine experts from all over India. In spite of all this we remain committed to report all the activities and achievements of PAFMAT and all its members.

I am particularly thankful to Dr. Jaswinder Singh and Dr. D. S. Bhullar for the generous financial help in bringing out this journal. I convey my sincere gratitude to all the contributors of various articles and papers without which it would not have been possible to bring out this journal. I sincerely hope that this journal will remain the favourite journal of everybody and we will have their cooperation and blessings in future also. I assure everybody that our team will go on working hard to bring further improvements in the quality and style of this journal. I appreciate the efforts of Dr. A.D. Aggarwal in bringing out this volume of the journal.

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Editorial

FUNDAMENTALS OF MANAGEMENT OF SEXUAL ASSAULT CASES

In our country in 2005, 1 crime was committed against women every 3 minutes, 1 molestation case every 15 minutes and 1 rape case every 29 minutes. In the same year 18359 victims of rape reported to the law enforcement agencies. But this is just the tip of the iceberg. Because many cases remain unreported as rape is considered something very personal with their private parts. Moreover many victims of rape do not want to relive the agony of trauma for five hours of ordeal in the hospital, five days of frustrations in the police enquiry and five years of long wait in the courts in most of the cases. Moreover it becomes more difficult for victims to report as the accused in majority of the cases are known to them and there remains a social pressure not to name them. Out of the 18359 reported cases accused were known to them in 15859 cases. Out of this 750 cases were close family members and it needed even more courage to report such cases.

Multi-pronged strategies are needed to improve the situation. We need to improve at every level so that crime against women is reduced. Speedy decisions in the courts are needed like the decision done in one of the courts at Bihar where court gave the judgment in just 2 days after the trial began. Such quick decisions will become a deterrent in the society and will go a long way in preventing atrocities against women. For rapid decisions by the courts; police, medical persons and forensic science laboratories also need to improve so that this becomes possible. They need to improve the facilities so that investigating officer does not have to wait till the dead line for filing the charge sheet in the court.

There is a need of a change of the mindset for the quick and efficient inquiry probably by the female police officers, who are thoroughly trained to tackle sexual assault cases. They should be properly trained for crime scene investigation. If they have a scientific background it will be much better. All the evidence collected at the crime scene in a proper manner will go a long way for the successful prosecution of the cases.

Quick and thorough medical examination is the need of the hour. There is need to reduce the agony of the victims in this process. They need to be told in no uncertain terms that what so ever has happened is not their fault; what so ever may be the circumstances and they need not to have any feeling of shame or guilt or sin. Doctor need not be a moral guide in such situations. I personally feel that when a male doctor condemns the assault it becomes more reassuring to the victim and she will not develop hatred against the manhood which if happens, can pose a lot of psychological problem for the victim in later life. These are the crucial moments in life of the victim and examiner should not give opinions attributing the behavior or dress of the victim responsible for the assault. In order to reduce the agony there should be a special cell in the hospitals which should be away from the scrutiny of common people. There should be facility so that investigating officer can take the statement of the victim there only as she needs not to repeat her story again and again. It is desirable that social worker and psychologist should also be present to provide the necessary help. Treatment or first aid what so ever is required should be provided without delay but care should be taken that valuable evidence is not lost in this process. Presence of a forensic nurse can be of much help in such circumstances. She can take care of collection and preservation of evidence in a very efficient manner. There should be facility for changing of clothes and providing her other clothes in case she needs it as the clothes worn at time may have to be taken as evidence. Medical examination should be done as quickly and as efficiently as possible so that no valuable evidence is lost or ignored in this process. Colposcopic examination of the female genitalia, after staining the vagina with toluidine blue and washing with 1% acetic acid, and photographing the injuries sustained in the vagina will provide visible evidence to the investigating officers and the judiciary. This will be very good evidence which will be difficult to refute.

Under section 164-A of CrPC, women should be examined within 24 hours by a registered medical practitioner preferably in a government hospital and required samples be taken including the one for DNA finger printing. Her mental condition should also be studied and recorded. All this should be done after having her valid consent. All the injuries on the body of the victim should also be recorded and time of commencement of examination and completion must always be recorded. After completion of the report it should be sent to police as early as possible

USA, Canada and South Africa have developed their own kits for sexual assault examination also known as SAFE kits (sexual assault forensic evidence kit) and are being used in those countries with very good results and this has increased the rate of successful prosecution in such cases.

Now it is the time for scientists from all over India to ponder over the sexual assault evidence collection kit program of Centre for Enquiry of Health and Allied Themes. CEHAT have developed this kit for the first time in our country keeping in view the Indian conditions. They have developed this kit and evaluated at local and regional level. Now it is the time to take this development to the logical conclusion by convincing all the forensic Medicine Experts, Gynecologists, police people, judiciary and the planners that this is the necessity of the modern India. Establishment of rape crisis centers in India to tackle all the aspects of investigations, examination and treatment should also be considered by the planners.

Examination of rape victims should be preferably done by female registered medical practitioner as it seems less traumatic for the victims. But in any case examination should not be delayed on this ground only as many valuable biological evidences degrade very quickly. If there are chances of inordinate delay examination may be carried out by male registered medical practitioner if there is no objection by the victim and she consents for the examination by the male doctor. Care should be taken that there is presence of female forensic nurse or female attendant.

All the proper samples should be taken and preserved and quickly forwarded to the concerned laboratories. Slides should be prepared for motile and non-motile sperm examination and examined fresh if possible. Swabs for semen examination should be taken from external genitalia, vagina and cervix. Even if sperms are not found acid phosphatase and semen- specific marker p30 may be quite useful. It is not a must that in all cases of rape injuries will be found and sperms or semen will be detected. Absence of injuries not always indicates consent and absence of semen not indicate absence of sexual intercourse as in many cases there may ejaculation dysfunction during rape. In case injuries or semen are detected they are good positive evidences. If there is history of oral or rectal penetration proper samples should also be collected from there also. If history of kissing or biting is there samples of saliva should be collected by swabs. All the swabs must be dried before they are sent. In case of bite marks photograph of the bite mark with a scale and a coin (preferably ABFO No.2 scale) in the picture must be taken. If there are other stains on the body suitable samples from those sites must also be collected. Samples of scalp and public hair must be taken for comparison purposes. Matted pubic hair and nail clippings also are useful evidences and must be preserved. Any blood or seminal stain on the body must be scrapped and preserved. DNA analysis of semen may provide identity of the accused in many cases. If there is history that victim has been drugged suitable urine and blood samples must also be collected for analysis.

Simultaneously examination of the accused should be carried out as early as possible. We should also take into consideration the latest amendment in the section 53 CrPC. According to this amendment there is need of examination of blood, blood stains, semen swabs in cases of sexual assaults, sputum and sweat, hair samples and finger nail clippings by the use of modern scientific techniques like DNA profiling and such other tests which the registered medical practitioner thinks necessary in that particular assailant. This examination can also be best done by using the same kit with a little bit of modification in the process. This kit will also be useful in other unnatural sexual offences.

If quick and accurate reports from the forensic science or chemical examiners laboratories are not received the whole exercise will become futile. All such laboratories should be provided sufficient staff instruments and funds so that reports in such cases are not delayed. These laboratories should be able to do all tests for semen and not merely report that no spermatozoa could be detected.

The money spent on this program will be useful to society to reduce the most heinous crime on women which not only leaves behind a physically traumatized soul but may leave behind a psychologically wreck and a psychologically scarred victim. There will be a better society to live not only but also for children and men also.

Let us make a historical effort in India for the advancement in examination of the rape victims and provide ultimate justice to them and the society at large by adopting the sexual assault examination kit.

Prof. R.K.Gorea

ESTIMATION OF STATURE AND SEX FROM FOOT PRINT LENGTH USING REGRESSION FORMULAE AND STANDARD FOOT PRINT LENGTH FORMULA RESPECTIVELY

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Abstract

Height and sex from different parts of the body help in solving crime mysteries related to human identity. Similarly, foot or shoe prints if present at the scene of crime may provide clue regarding the height and the sex of the person that helps in establishing partial identity of the suspect.

In the present study, an attempt has been made to derive regression formulae to determine height from foot print length in both sexes individually as well as for the combined data (males and females). An attempt was also made to determine the sex using the statistically derived standard foot print length as a benchmark.

Foot prints of 200 subjects (100 males and 100 females), from among the college-going students of Mangalore, Karnataka, India were studied. Maximum foot print length and the height of each subject was measured. Predictive equations using linear regression were then derived separately for males, females and for the combined data with the purpose of estimating the height when only the subject's foot print length is known. The standard foot print length (obtained from the statistically derived standard foot print length formula) was used as a benchmark to estimate the sex of the individual.

Thus, in the present study, correlation coefficient (r) of 0.698 in males, 0.738 in females and 0.848 in the combined data was obtained between the height and foot print length of the subjects. The standard error of estimate was 4.66 in males, 4.528 in females and 4.778 in the combined data. The standard foot print length obtained was 23.55 cms. The accuracy of sex determination by this method is reported to be 80%.

Key words: anthropology, stature, sex, regression formulae, standard foot print length

Introduction

Every part of the human body is unique in itself. It is amazing to discover that every part of the body is different in its own way from a similar part in another body. There is also a relationship between each part of the body and the whole body.

Nothing exemplifies this truth more than the relationship that various parts of the body have to the stature and sex identity of an individual [1,2].

Many authors have studied the relationship between various parts of the body with the stature and sex [3-10]. Stature

estimation from dismembered body parts can be done based on the ratio of the body part concerned, in relation to the entire body [3]. The relationship between humerus, radius, ulna, femur, tibia, fibula and clavicle with the stature have been topics of research interest for decades [1,3-7]

Morphology of human feet is greatly influenced by the combined effects of heredity and living style of man that determines the size and shape of the feet or footprints and thereby makes them unique data to establish human identity [2,3,8].

Clinicians, anthropologists, anatomists and forensic scientists have studied the various aspects of foot, over a long period of time [1]. Foot or shoe prints, if present at the scene of crime, may provide clue regarding the stature and sex of the person, which may help in establishing the partial identity of the suspect. Moreover, in an aircraft accident it is the feet, which are recovered more intact than other parts of the body, as they are often shoe clad. Hence, feet can be excellent clue regarding personal identity [2].

Researchers have studied the relationship between footprints and stature, using various methods. This study was undertaken with an objective of assessing the reliability and applicability of estimating stature and sex identity by deriving linear regression equations and a standard foot print formula respectively thus providing additional evidence to the foot print study in determining stature and sex identity.

Materials and Methods

Footprints were obtained from 100 male and 100 female participants. The study subjects comprised of participants who were

18-26 years old college-going students of Mangalore, Karnataka, India. Only those students with healthy and normal feet were included in this study.

Kores duplicating ink was uniformly spread on a glass slab using a roller and the subject was first asked to place his/her feet on the slab and then on a plain white sheet of paper. The footprints thus obtained were numbered and filed. After taking the footprints, the sole of the feet were cleaned with cotton wool soaked in acetone. The subjects were advised to wash it again with soap and water. The footprints obtained from the right foot of the subjects were selected for the study (the 0.95-0.99 length correlation between the right and the left footprints, as stated by Robbins' [9] makes it apparent that either foot can be used for estimating stature). Maximum foot print length was measured as a straight distance between the highest points on the first or the second toe (whichever was higher) and the lowest point on the margin of the heel (Fig 1) [4, 9]

Stature of each individual was measured as a vertical distance from the floor to the vertex. The subject was asked to stand bare foot and with the head in the Frankfurt plane. [9]

The data collected was then analyzed using the computer software SPSS version 10.0 and linear regression equations were derived to determine the stature from maximum foot print length. The results obtained were compared with the actual stature of the subjects. This was followed by determination of sex wherein the following formulae was derived to determine the sex from footprint length by calculating the statistical mean as shown below.

$$\text{Standard footprint length} = \frac{(\text{Male Mean FPL} - \text{SD}) + (\text{Female mean FPL} + \text{SD})}{2}$$

All the foot print lengths less than or equal to this standard foot print length were presumed to be belonging to females, while all the foot print lengths greater than the standard foot print length were presumed to be belonging to males. On applying the sensitivity and the specificity tests on the results obtained, the accuracy of predicting sex by this method was determined.

Observations and Results

The mean height and the footprint length of the males were greater than that of the females (Table 1). There was a partial positive correlation between the footprint length and the height of a person for males, females and for the combined data, with correlation coefficient (r) = 0.7 for males, (Fig 2), 0.74 for females (Fig 3) and 0.85 for the combined study population (Fig 4).

The regression formulae derived (Table 2) in the present study, and the results obtained were compared with the actual stature of the subjects. It is evident from the present study that 79% of the stature values predicted by the respective regression formulae in males, 89% in females and 92.5% in the combined population fell within one standard deviation of estimate range of predicted stature.

TABLE 1: Mean and standard deviation (SD) values of height and foot print length for the study data.

| Mean & S.D. | Males | Females | Combined |
|---------------------|--------|---------|----------|
| Height (Measured) | | | |
| Mean (Cms) | 170.04 | 157.84 | 163.94 |
| (S.D) | 6.47 | 6.76 | 9.0 |
| Foot - Print Length | | | |
| Mean (Cms) | 24.67 | 22.43 | 23.55 |
| (S. D.) | 1.15 | 1.17 | 1.61 |

TABLE 2: Regression formulae to estimate height from foot print length, along with the standard error (S.E) of estimate for males, females and the combined population.

| Male/Female /Combined | Regression Formula | Standard Error |
|-----------------------|-----------------------|----------------|
| Male | $Y=72.997 + 3.933x$ | 4.6609 |
| Female | $Y= 59.312 + 4.367 x$ | 4.5825 |
| Combined | $Y=48.132 + 4.903 x$ | 4.7708 |

x = foot print length, Y = height

The Standard Foot Print length as obtained from the respective formula is equal to 23.55 cm. An attempt was made to determine the sex of the subjects using this value. All the foot print lengths less than or equal to this value were presumed to be belonging to females while all the values greater than this were presumed to be belonging to males. On applying the sensitivity and the specificity tests, the accuracy of sex prediction by this method was found to be 80%. In figure 5, the left side (the lower range of foot print length between 20 to 22.9 cm) is predominated by females while the right side (the high range of foot print length, that is, >24.6 cm) is predominated by males. A small range of foot print length, in the centre of the graph, shows almost equal number of males and females, which may justify the 20% error obtained in predicting sex by this method.

Figure 1: Measurement of maximum foot print length

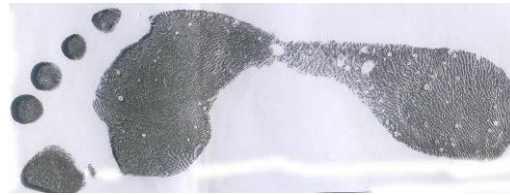


Figure 2: The graph plotted between the footprint length and the height for the male study population

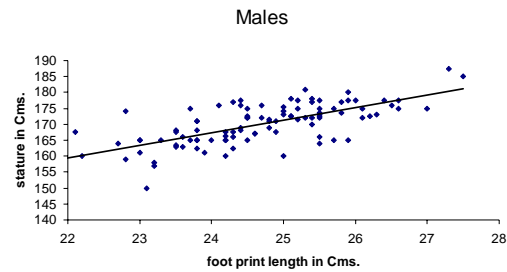


Figure 3: The graph plotted between the foot print length and the height for the female study population

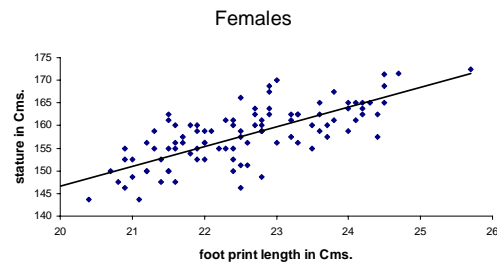


Figure 4: The graph plotted between the foot print length and the height in the combined study population

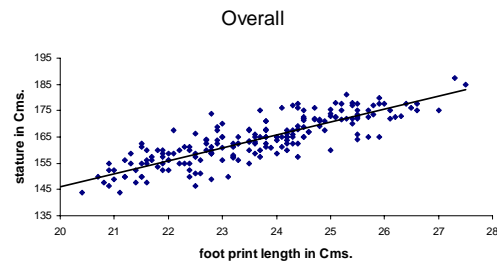
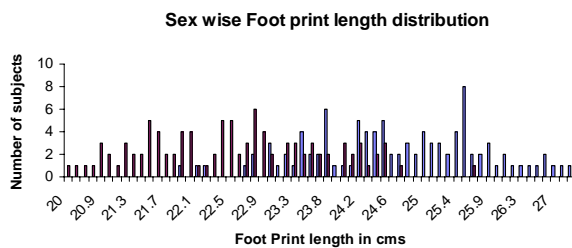


Figure 5: The graph plotted between the foot print length and the number of subjects



The lower range of foot print length (i.e. .between 20 to 22.9 cm) is predominated by females while the high range of foot print length, (i.e. >24.6) is predominated by males. A small range of foot print length, in the centre of the graph, shows almost equal number of males and females, which may justify the 20% error obtained in predicting sex by this method.

Discussion

It was observed that in most of the samples of footprints, there was a difference in the length of right and left footprints. Since the right foot was the dominant foot in the majority of the subjects, it was selected in the present study.

The measurement of the maximum foot print length of the right foot was used for predicting stature, which was then compared with the actual stature of the subject. The results thus obtained were found to obey the normal distribution rule in which 68% of the values are expected to fall within one SD of estimate range [1].

In the past Anthropologists like Topinard, Martin and Robbins developed a 15% foot length to stature ratio and a 14% foot print length to stature ratio [9]. Stature ratio method and multiplication factor method were used by related studies in India [10] However, when these methods were applied in our study, the data showed larger error and thus lesser accuracy in predicting stature from footprints. In a hope to minimize these errors and enhance the accuracy of predicting stature, regression formulae were developed and applied in this study.

Determination of sex in the same study offers us an opportunity to apply the respective regression formulae to the male and female footprints that may lead us towards identification that is more accurate.

Conclusion

The study has revealed a highly significant degree of correlation between the measurements of footprint lengths and stature from footprints of 200 subjects of both sexes between the ages of 18-26 years.

Regression formulae have been developed to predict stature separately for males, females and the combined data along with the standard error of estimate. The results obtained are found to show less error in predicting stature as compared to other conventional methods used earlier.

The percentage accuracy of establishing sex by the standard foot print ratio method is reported to be 80%, which is quite significant for use.

Acknowledgement

We are grateful to all the participants involved in the study for their kind co-operation. We express our gratitude to Mr Kiran, Laboratory Assistant, Department of Criminology, School of Social Sciences, Roshni Nilaya, Mangalore, for helping out with the taking of foot prints.

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FUTILITY OF POSTMORTEM EXAMINATION IN 'BROUGHT IN DEAD' CASES: A RETROSPECTIVE STUDY

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Abstract

This is a retrospective study covering five years duration and analyzing 4271 cases. There were 457 cases in the category of 'brought in dead' (10.7 %). Out of these 457 cases the difference between the cause of death given in police papers and cause of death after post-mortem examination was found only in 8 (1.75 %) cases. This paper therefore raises the question that is it necessary to conduct post-mortem examination in such cases? Can we dispense with the need of PME? Our answer to this question is in affirmative with reasons.

Key words: Post mortem examination, inquest, futility, brought in dead.

Introduction

In Indian set up cases are made medico legal at the time of admission if it is suspected that some law or crime is involved. When such person dies again police is informed and post-mortem examination is conducted on their bodies. In practice, 'brought in dead' cases are also made medico legal and then subjected to post-mortem examination. These cases are made medico legal, as the cause of death in such cases is either unknown or doubtful. [1] We studied such cases with the idea whether post-mortem examination is required or not?

Material and method

It was a retrospective study spanning over five years from year 2000 to 2004. During this period 4271 cases were conducted. Out of these 457 cases fell under the brought in dead category. The study was done in the department of Forensic Medicine, M.P. Shah Medical College, Jamnagar

Observations

The incidence of brought in dead cases was about 10.7 per cent. Most of these cases were males (85.55 %) rest females (14.45 %). Most of these (49.89 %) fell in the age group of 31 to 50 years. Followed by 30.41 % and 14.87 % in the 51 to 70 and 11 to 30 age groups respectively. Only in 8 (1.75 %) cases the cause of death

differed from what was mentioned in police papers. In rest of the 98.25 per cent cases exercise of post-mortem examination did not add any substantial thing.

Out of these 8 cases 5 were males and 3 were females. Six were in 20- to 30 years. All female cases were in this age group. Six cases showed evidence of poisoning.

In remaining two cases alcohol was detected. But the concentration was not fatal.

Discussion

As we know such 'brought in dead' cases are made medico legal more on technical grounds rather than any substantial legal needs. Commonly these cases fall under the category of deaths where either the cause of death is unknown or doubtful. [1] In practice, it is good relatives who take care or want to take care of their sick relatives suffer. Because as soon as the family member falls sick they try to rush him to hospital and the sick person succumbs to his sickness in the way, so the brought in dead cases. In other words good relatives pay the price of their goodness by undergoing the ordeal of inquest and PME. As against that if the sick person dies at home he is cremated or buried in usual manner, as it is not mandatory to obtain cause of death certificate from registered medical practitioner before cremation or

burial under the registration of birth and death Act, 1969 in India.

Submitting such cases for PME creates problem for all concerned viz. relatives, police, medical departments and forensic science laboratory and ancillary services. This becomes more pertinent from our study, which concludes that the discrepancy between the cause of death submitted by police and cause of death derived after this long and tedious exercise of negative autopsy is merely 1.75 per cent.

The question is, is it worth to submit such cases for an inquest and the PME? Our answer to this question is in negative.

Now we try to see some arguments in favour of our above referred opinion.

1. The discrepancy between the cause of death suggested by police and cause of death derived after all exercises is merely in 1.75 per cent cases.
2. In these cases also there is hardly any change in the law. Though the manner of death changed from natural to suicidal in six cases and technically we can say that I.P.C. 309 is applied in these cases but the accused are dead.
3. In two cases, in which alcohol was detected, the reason to hide the history of alcohol consumption may be due to the fact that Gujarat is a dry State.
4. In good number of cases 152 out of 457 we had unequivocal history and case papers of old diseases the victims were suffering. Such diseases were serious enough to cause death.
5. In many other cases also history of few days sickness like fever, toxemia of pregnancy, etc was available but the medical papers were not available with the relatives.
6. When casualty medical officers (CMOs) examined such dead bodies they did not find any prima facie evidence of foul play or injury etc.
7. Accordingly, the police inquest prepared on such dead persons did not point out any thing unnatural.

Seeing above arguments, loading the machinery and harassing the public by making such cases medico legal seem futile.

But then how can we satisfy the purists who want to argue that crimes may go undetected and criminals may go scot-free if such system is adopted.

To satisfy such purists we have to state that the Indian legal system is based on the age-old dictum of jurisprudence that 'let hundred criminals go unpunished but one innocent must not be punished.' By following the system, which we are at present following we are unnecessary harassing 98.25 per cent innocents.

In England, a system is prevailing where the physician who is the in charge of the case can give the certificate of cause of death. He has to only fulfil the condition that he has seen the deceased in last seven days of his death. [2]

Alternatively, can we use the CrPC 174 [3] more meticulously? [3] That means the police are informed in such cases police hold an inquest and finding no prima facie evidence of case being unnatural dispense with the need of the PME?

In Rajasthan we already have a government directive that if there is no suspicion as regard to cause of death in cases of road and rail road accidents there will not be any need to send the body for PME. [4]. If the need of PME can be dispensed with in such cases which are more unnatural and more medico legal why the same can not be practiced in brought in dead cases?

Can we create a system that when a person is brought in dead at the casualty or emergency dept the CMO on duty would examine him and if prima facie there is no unnatural death suspected he certifies the cause of death? Or in addition to CMO hospital duty police and also jointly see such cases and if prima facie no foul play is suspected the body can be releases and cause of death can be given by the on duty CMO.

We have started the debate. Let society finds the final outcome.

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FEW TIPS FOR MAKING GROUND SECTIONS OF TEETH FOR RESEARCH PURPOSE

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Abstract

The importance of dental identification increases within the last years due to mass disasters as a result of natural phenomenon such as cyclones, earthquakes, floods and volcanic explosions and airplane accidents, industrial accidents and terror acts. Teeth are becoming an important part in many fields related to Forensics and many medicolegal solutions are possible just by studying teeth. In my study, I used ground section of teeth to estimate age of person above 25 years and the procedures I adopted and the difficulties I came across while preparing these 'ground section' of teeth are being highlighted in this paper.

Introduction

The need for accurate techniques for age estimation has never been greater than last two decades because of two main reasons related to current socio-political development. The first reason is increasing number of unidentified cadavers and human remains; the second reason is rise in cases requiring age estimation in living individuals with no valid proof of date of birth [1].

There are many methods to look for anatomy of teeth and depending upon method various type of sectioning is adopted. There are several factors which can determine exactly how a tooth thin section is lapped and/or polished, including the shape, thickness and the intended use of the sample.

The mounted crowns were progressively sectioned using a diamond saw and those showing stain penetration were examined. In the western countries where latest instrument are readily available at hand, research in developing country do sometime lack behind due to lack of these instrument or cost barrier.

Similar if section of teeth is to be prepared, there are many methods like microtome section of decalcified teeth and then stained with haematoxylin [2,3]. However some author suggested that this procedure of sectioning is often too harsh for archaeological remains and other researchers have found that decalcification

tends to produce macerated sections in archaeological material [3], thus the purposes of most of the study, the teeth should not be de-mineralized.

Ground sections are the section prepared without using any chemical and thus maintaining normal anatomy and constituent. Usual method adopted and given in various literatures is enlisted below.

For examination of a tooth, the teeth are first soaked in 20% formaldehyde for 24 hours, washed in water. Then sectioned can be made using one of the following methods:

1. Tooth could be sectioned to any thickness by using ultra-microtomes with diamond cutting blades (e.g. Buehler Isomet low speed saw with a diamond impregnated blade)[4]
2. Using burs of various sizes available, teeth can be grinded from both sides equally thus making a thin ground section. However this method had a disadvantage that the use of burs may alter normal anatomy of the teeth.
3. By hand grinding is done manually. Manually grinding was done in two steps, first with rough carborundum stone till a section of 2 to 3 mm was obtained and then on static carborundum stone with hand till the thickness is 1 mm. Grinding was further done using fine carborundum

stone till the section of 0.25-mm thickness was left. Finally cleaned and dried section is mounted on slide using DPX and viewed under microscope.[4]

Main problem faced using the above methods

1. As already said our research is cost restricted, with no such availability of ultra microtones with diamond cutting blades.
2. Burrs had their own disadvantages that they led to some anatomical changes while teeth are grinded.
3. Hand grinded was best suited for our setup as instruments used in this method are low cost as well as easily available but there were some restriction in using this method also. These were that carborundum stone available used by dental surgeon was of 4 to 5 cm diameter and grinding of teeth on this small surface was not possible. Use of hands in grinding was really injurious to the fingers as with the decrease in teeth size, finger was also rubbed on the rough surface which led to the injuries.

To overcome the problem we tried many alternatives and came up with method which is described here. Although this could be not the only alternate method but still it was very helpful for us and helped us to prepare grounds sections of 100 teeth.

Apparatus used

The apparatus used for the study were Extracted teeth (Treated with formalin), Lathe (with two speeds), Rough stone used for sharpening instruments by mechanics (Figure 1), Paris powder



Figure 1

Method used

After extraction of teeth from the socket using premolar extraction forceps, tooth is kept in formalin for about 24 hours. Then tooth is washed with water and ground section was prepared by following method.

Preparation of the ground section:

For making ground section, hand grinding method was used. Hand grinding was done manually first with use of lathe stone fitted on the motor. The tooth was kept along the lateral surface of lathe and the tooth is grinded till it is 4 to 5 mm thick. A constant spray of water as well Paris powder is required to be sprayed on grinding surface while grinding. Paris powder prevents irregular grinding of tooth and water help to cool as tooth get heated up due to friction of grinding. Then further grinding is done at slow speed of lathe till the section of 3 to 4 mm thickness is obtained. After this grinding is done using a stone (Figure1) used by mechanics to sharpen their tools. This stone has two rough surfaces one course and one slightly smooth. Tooth is first grinded on more surface and water as well as Paris powder is constantly poured on this stone while grinding. Tooth is grinded on this surface till the thickness is 1 mm. After this grinding is further done using finely rugged surface of the stone till the section of 0.25-mm thickness was left. Finally cleaned and dried section is mounted on slide using DPX and viewed under microscope.



Ground section slide prepared

Conclusion

1. Dental lathe is useful for the initial grinding of tooth till the thickness of 4 to 5 mm.
2. Rough stone used by mechanic is as good alternate as well cheap alternative for grinding of tooth for making ground section of tooth
3. Although hand grinding is tedious and injurious method but is not replaceable with any method.
4. Instruments used are readily available as well as cost effective too.

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AGE ESTIMATION: A DENTAL APPROACH

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Abstract

One of the interesting applications of forensic odontology is age estimation by means of teeth. Age assessment proves to be a critical factor in the victim identification process. Teeth display a number of observable age related variables and they tend to remain intact under circumstances, which might alter or obliterate the rest of the skeleton. The procedures for age determination are complex. Different methods are used to estimate age. The purpose of this article is to familiarize about different techniques used to by means of teeth.

Key words: Forensic Odontology, Age Estimation, Teeth.

Introduction

One of the interesting applications of Forensic Odontology is age estimation by means of teeth. Teeth may be better preserved than other parts of the body and thus give a better indication of age. It has application in establishing the identity of living or deceased persons. It also has application in living individuals whose chronologic age is under dispute. Dental age is one of the few measures of physiologic development that is uniformly applicable from infancy to late adolescence.

Historically age assessment using teeth was first published by Edwin Saunders [1] in 1837, who claimed that teeth provided the most reliable guide to age compared to age estimation from height which was a standard method used during that time.

Dental age estimation methods [2]

Various methods are utilized for determination of age from dentition. These may be described in four categories namely, clinical, radiographic, histological, physical and chemical analysis.

i) **Clinical or visual method:** Visual observation of the stage of eruption of the teeth and evidence of changes due to function such as

attrition can give an approximate estimate of age.

ii) **Radiographic method:** Radiography can provide the gross stage of dental development of the dentition.

iii) **Histological method:** Histological methods require the preparation of the tissues for detailed microscopic examination, which can determine more accurately the stage of development of the dentition. This technique is more appropriate for post-mortem situations. It is also significant in estimation of age of early development of dentition.

iv) **Physical and chemical analysis:** The physical and chemical analysis of dental hard tissues to determine alterations in ion levels with age have been proposed. While these techniques, as yet, are not of great value to the forensic odontologist, future developments might provide an adjunctive means of collecting evidence of value in the dental context.

Factors used for the age determination using dentition [3]

The factors are:

1. The appearance of tooth germs
2. Earliest detectable trace of mineralization
3. Degree of completion of the unerupted tooth
4. Rate of formation of enamel and formation of the neonatal line
5. Clinical eruption
6. Degree of completion of roots of erupted teeth
7. Degree of resorption of deciduous teeth
8. Attrition of the crown
9. Formation of physiologic secondary dentin
10. Formation of cementum
11. Transparency of root dentin
12. Gingival recession
13. Root surface resorption
14. Discolouration and staining of teeth
15. Changes in the chemical composition of teeth

Age estimation using the dentition can be grouped into three phases

Age estimation in prenatal, neonatal and early postnatal child [3]

Age estimation in this group of individuals can be very accurate. Histological methods are used to assess the stage of tooth development during the premineralisation period. Mineralization of deciduous dentition commences from two or four months in-utero. Some of the histological methods can detect early mineralization 12 weeks before being detectable in the radiographs.

The neonatal line [3] is considered as an indicator of birth. Neonatal lines are present in both enamel and dentin of deciduous teeth and permanent first molars which indicate the development during the transitional period between intrauterine and extra uterine environments. So it can be used to assess the amount of pre and post natal enamel formation. In the dentin incremental lines [3] of Von Ebner and contour lines of Owen are present. These lines are used to estimate age of the neonates or foetus at death.

Incremental lines of Retzius are caused by variation in the rhythmic mineralization of enamel prisms. These rhythmic patterns may be altered by various external factors such as metabolic

disturbances so that the lines may appear closer or the rest periods may be prolonged.

Stack has provided a regression line of weight of growing dental tissues against the age [3]. By weighing the teeth specimen, age of unknown can be obtained from 5 months in-utero to postnatal age till 7 months.

Certain drug like tetracycline, elements such as lead, strontium and fluoride will produce characteristic incremental lines. These incremental lines will help to determine the age at death. These lines can be studied by taking ground section of the teeth.

Age estimation in children and adolescents

Tooth eruption and tooth calcification are the two events that can be used to measure dental age in children and adolescents. Radiographical evidence of formation of crown and root completion has been utilized for this age group.

Schour and Massler's chart [4] was the first attempt to study dental age estimation. This chart permits direct comparisons with radiographs. Demirjian et al developed an age estimation method [5] that made use of a scoring system. In this method, seven mandibular teeth on the left side were divided into 8 stages and maturity score was evaluated.

Age estimation can be measured using mandibular third molars [6] in which formed part of root were digitized but the precision of the age estimation was slightly inferior compared with the standard method.

Age estimation in adults

Most of the methods used in adults use various regressive changes of hard and soft tissues of the teeth.

Gustafson [7] (1950) studied the changes occurring in individual teeth and succeeded in estimating the age with some accuracy. He used 6 dental changes connected with aging namely, attrition, apical migration of periodontal ligament, deposition of secondary dentin, cemental opposition, root resorption and transparency of the root dentin. Age was estimated using the formula.

Age = $11.43 + 4.56 \times$ where x is the total score. It was found that an increase in the total score corresponds to an

increase in age. The average error with this method was 3.6 years.

Johanson⁸ modified Gustafson's method by multiple regression analysis and proposed a more accurate formula for age estimation with a standard error of 5.16 years.

Deposition of secondary dentin [9] can be assessed using periapical radiograph to estimate age. Pulp diameter to crown diameter ratio and pulp / root length, pulp / root width was measured.

The extent of racemization [10] of aspartic acid in coronal dentin of normal permanent teeth can be used to estimate the age of an individual at the time of death. As age advances L aspartic acid will change into D aspartic acid.

An interesting method using intensity of fluorescence [11] in dentin and cementum, which shows strong correlation between age, deepening of colour of the tooth and increase in intensity of fluorescence. The colour changes in the cementum and dentin are caused by infusion of decomposition products from erythrocytes.

The incremental lines [12] of cementum will help to determine the age of adults. A major disadvantage of this method is the necessity to extract or section the tooth. It is not practical among living individuals.

Root dentin starts to become translucent due to the increased intratubular calcification. Dentin translucency [13] will increase with age. Disadvantages of this method include underestimation of age in older age groups due to slowing down of dentin sclerosis and irregular junction at translucent and non translucent zones will make difficulties in measuring the length.

Kashyap and Koteswara Rao [14] omitted periodontosis and root resorption from Gustafson's method and calculated the index values of various parameters undergoing regressive changes. Their modified method gave an error of + 1.59 years and Spearman coefficient value of 0.998.

Age estimation from adult tooth is more accurate with modified Gustafson's method when multiple factors are used.

Conclusion

Age estimation presents a complex problem and requires considerable experience in recognizing significant changes and allowing for their variability with in any particular population. Teeth are particularly useful in age evaluation because they display a number of observable age related variables and they tend to remain intact under circumstances which might alter or obliterate the rest of the skeleton.

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DONATION OF BODIES FOR CADAVERIC DISSECTION IN MEDICAL COLLEGES

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Abstract

The body donors club is still in budding stage and the body donation programmes are yet to gain the required popularity in India. In most of the medical colleges unclaimed bodies from the municipalities or the government hospitals reach the dissection hall. Dissection classes are being aborted in many medical courses because of lack of availability of cadavers. In this article we will review the anatomical body donors' programmes in France, Germany, USA, U.K., Turkey and Thailand. Death provides many of us with a one-time chance to make a valuable gift to humanity. The need for donations is great, and the gift is valued and honoured beyond measure. Body donation is also a modern expression of solidarity. A wider change in general populations' attitude toward body donation is the desired goal.

Key Words: Cadaver, dissection, gift, body donors.

Introduction

Burial or cremation of a dead body is the symbol of leaving a world of living. The decision to donate their body after death for any reason causes people to face the idea of mortality. The thought of being dissected in Anatomy laboratory by medical students is also not easily accepted [1]. The meaning of the aforementioned decision is to stay as dead body in the world of living. These conflicts indicate the value of dead bodies as a gift for medicine, science and education [1].

The anatomy dissection laboratory is a unique experience where medical students begin the transition from layman to physician, and may be a student's first experience with death. Attitudes developed there may influence interactions with future patients and their families [2]. Hence, despite all controversy and ongoing debate on the issue, dissection on cadavers is a landmark, to recognize emotional issues that students may confront and to guide them toward becoming humane physicians [2].

Donation is a clear will made by people free and informed [3]. Ronn Wade,

who is the director of the Anatomy Board of Maryland (U.S.A.) and oversees the Maryland body donation program, says, the donors want to promote learning and this is the legacy they can leave behind for the next generation. Body donation programmes may help people in planning the end of their lives [4].

Ethical issues pervade anatomical study, as Anatomy deals with the structure of the human body, and it is the human body and human tissues that are central to bioethical questions concerning human life in both health and disease, at its beginning and end and in research and clinical practice [5]. Debate will continue on ethical uncertainties over the use of human cadavers for teaching and research purposes [6-8].

In the following sections we will discuss the body donor programmes of some countries with different cultures focusing the dissection of cadavers by medical students, so that it can be applied effectively at wider scale in our country.

France

A body donation centre was created in Paris in 1953 with the purpose of obtaining bodies for dissection. These days in France teaching and research in anatomy is mainly based on cadaveric dissection, and the unclaimed bodies are no more the origin of cadavers, but body donation programs [3]. Body donation is most often by altruism and is regulated by various acts where the rule is to consider unembalmed material as contaminated biological hazard [3].

Germany

In Germany the body donation programs rather than unclaimed bodies are source of the origin of cadavers for the purpose of anatomy teaching in medical schools. In 1982, a body donation program was founded by Dr. von Hagens for origin of plastinated specimens for medical exhibitions. Since 1993 it is managed by the Institute for Plastination in Heidelberg, Germany, and at present the current donor roster has 6,800 living donors, most of them German.

U.S.A.

The Anatomy Board of Maryland's (U.S.A.) Body Donor Program maintains a list of about 70,000 donors and receives some 1,500 bodies each year. The University of Massachusetts Medical School donor program was started by late Dr. Sandy Marks in 1971, and has 4,500 people on the donor waiting list. Whereas the State's three other medical schools-Boston University, Tuft and Harvard-each has a smaller body donor program than UMass [4]. Willd Body Program by Department of Anatomy, University of California, San Francisco, is committed to excellence in research and education, including the study of gross human anatomy in medical schools. In recent years the demand for the cadaver-based courses in human anatomy has expanded as more and more professional schools list such courses as an admission requirement. There is no upper age limit for whole body donation, nor does amputation preclude acceptance. Medical conditions that would prevent acceptance as a donor include: Creutzfeldt-Jacob disease, hepatitis, HIV, and tuberculosis. Extensive trauma at the time of death, advanced decomposition, or extreme obesity would

also make the remains unsuitable for anatomical study. After the individual's death, the nearest living next of kin can also donate the body.

Dluzen et al [9] reviewed and evaluated Body donation files from the Department of Anatomy at North-eastern Ohio Universities College of Medicine from the 569 donors who had contributed to the body donation program for cadaveric dissection. from 1978-1993. They concluded that the donors were predominantly male (58%), although there was a clear trend for increasing numbers of females over the latter period of the program. Donors were almost exclusively white (98%) with an average age at death of 73 years (range 18-98 years) [9]. The combination cardiovascular (46%), cancer (27%), and pulmonary dysfunction (16%) accounted for nearly all deaths of our donors, whereas approximately half of the donors (49%) were married and they had completed an average of 12.5 years of education [9].

U.K.

Richardson et al [10] reported a survey in the UK of potential whole-body donors for anatomy dissection in medical schools. 218 people (age range 19-97 years) were served a postal questionnaire, who answered giving information about themselves, their reasons for donation, attitudes towards the dead body, regarding funeral preferences and medical giving and receiving. Motives included altruism, the wish to avoid funeral ceremonies, to avoid waste, and in a few cases, to evade the expense of a funeral [10]. 44% of the total respondents understood that their bodies would be used as teaching material, whereas 42% answered for experiments. Out of total respondents majority 69%, believed in one or more supernatural phenomena, while only 39% said they were religious [10]. Regarding final disposal 69% requested cremation after dissection; on the other hand only 2% wanted to be buried. The idea of giving money incentives to promote body was overwhelmingly rejected [10].

Turkey

In Turkey, insufficient number of cadavers is available for anatomy education these days. Where the decreased number of

unclaimed bodies and very few cadaver donations are factors contributing to the present situation [1].

Sehirli et al [1] surveyed and evaluated the attitudes of anatomists toward cadaver donation and reported that 20.5% of the respondents had already donated their organs, whereas 15.7% were planning to donate their bodies, on other hand 63.9% did not consider donating. Psychological reasons (43.4%) were the principle reasons of the respondents to object the body donations, while other main reasons were the anxiety of disrespectful behaviour to cadavers (26.5%), the unacceptability of donation by family (26.5%), to be dissected by a colleague (15.7%), and religious beliefs (3.6%) [1].

Thailand

In Thailand, where the cadavers are acquired through unnumbered voluntary donation, body donors attain the highly regarded status of *ajarn yai*, great teacher [11]. This respect to teachers is formalized in a ceremony called *waikhru* (honour the teacher) which takes place annually in Thai schools and universities [11]. The status of *ajarn yai* is mainly conferred by two ceremonies, the dedication ceremony some days before the medical course session and the cremation ceremony at the end of the course, these occasions seem to be a powerful means to define the atmosphere and an ethical framework for dissection courses in Thailand [11]. Booklets are distributed that include the donor's pictures, their address, a short curriculum vitae, and words of condolence and gratitude from the faculty and students [12]. Conceptualizing the cadaver as a teacher is the motive behind the custom, as the cadaver is closure to a respected non-medical person than to a medical object in the dissection hall. At present we are not in a position to judge whether the Thai approach will produce the better doctors in the end, but we do think that it allays some of the ethical difficulties in dealing with human cadavers [11]. Indeed medical practitioners face many ambiguities, including the need to show both detachment

and empathetic care in the treatment of the patients [13].

Finally, before ending this discussion, we will like to share our warm experience of an old healthy man who donated his body to the Anatomy Department of I.M.S., B.H.U., Varanasi, India. He was so enthusiastic and determined that before he died; he regularly visited for many years, along with greetings and sweets to the department, just to ensure his fantastic contribution to the medical world.

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THE CRIMINAL LAW (AMENDMENT) BILL, 2003 AN OVERVIEW

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Abstract

The Indian law is about 150 yrs. old, that too on the lines of the English and the Mughal law. With the advancement of the society, the Indian law needs up gradation to over come the hurdles in the legal system. For this purpose, the Parliament made a department – related Parliamentary standing committee on home affairs to review the legal system and submit its report about the amendments in the law. The standing committee summated the one hundred and eleventh report on the criminal law (amendment) Bill 2003 of which few suggestions are discussed.

Introduction

The Criminal Law (Amendment) Bill, 2003 seeks to amend the Indian Penal Code 1860 (IPC), the Code of Criminal Procedure, 1973 (CrPC) and the Indian Evidence Act, 1892 to improve upon the existing criminal justice system in the country, which is besieged by huge pendency of criminal cases and inordinate delay in their disposal on the one hand and very low rate of conviction in cases involving serious crimes on the other, by focusing upon following key issues of criminal justice system: -

- (i) Witnesses turning hostile
- (ii) Plea-bargaining
- (iii) Compounding the offence under Section 498A, IPC (Husband or relative of husband of a woman subjecting her to cruelty) and
- (iv) Evidence of scientific experts in cases relating to fake currency notes.

Recently, a few media-hyped cases like Jessica Lal, Best Bakery and many more have made urgency for the amendments in our law. The department related Parliamentary standing committee on home affairs prepared one hundred and eleventh report on criminal law (amendment) bill 2003 which was constituted on 5th August 2004, which presented the bill to Rajya Sabha on 2nd March and was laid on the table of Lok Sabha on 4th March 2005.

The three Acts which are proposed to be amended are considered to be the bulwark of criminal justice system of the

country. The proposed amendments are based on the recommendations contained in various Reports of Law Commission and Committee on Reforms of Criminal Justice System.

Witness Turning Hostile

The criminal justice system is evidence based. False and fabricated evidence in the court leads to poor rate of conviction in criminal cases resulting in large scale acquittal. The Committee is made to understand that conviction rate in criminal cases is as low as ten percent due to perjury. Perjury is committed by the witness on his/her own volition or under threat/allurement/inducement of third party.

A witness may give false statement at the initial stage of investigation or may make false statement at subsequent hearing under threat/inducement. Punishment exists for the witness who makes false statement, under Sections 193 to 196 IPC, but punishment for the person who threatens/induces the witness is not provided in the IPC. Punishment to the witness making false statement is imprisonment of seven years or more with/without fine

The Bill proposes to introduce imprisonment for a term up to seven years with fine or both for the person who threatens/induces the witness to make false evidence (proposed Section 195A).

(i) Summary Trial for Perjury

Thus, to check the witness turning hostile either out of his own volition/consideration or inducement/threat, summary procedure for trial of such witness has been provided and the maximum punishment for imprisonment has been extended from the existing three months to not less than three months but which may extend to two years with fine, under proposed Section 344A.

To check the witness turning hostile, host of measures have been proposed through the amendments to the CrPC.

(ii) Forwarding of statement made to Police Officer to the Magistrate

Under Section 161 (3) of CrPC a police officer can reduce into writing summary of statement made to him/her during the course of investigation which has no evidentiary value in the court of law and which is also not required to be signed by the witness. However, under Section 164, a person can make statement before the Magistrate for any offence which has evidentiary value. Thus, the existing procedure leaves scope for the witness to change his/her statement made to the police officer in the court of law.

As per the amendments proposed to Sections 161, 162 of CrPC and insertion of Section 164A into the Code, the following provisions would be put in place in the criminal justice system:-

- (a) Police Officer has to acknowledge statement made to him/her by the witness and signed by the latter for the offence for which punishment is less than seven years and quickly transmit the same to the Magistrate; and
- (b) Recording of evidence of material witnesses by Magistrate for all offences punishable with death or imprisonment for seven years or more during investigation.

It is pertinent to note that the signed statement made to police officer would not have evidential value in the court of law which may help check perjury. Therefore, punishment for perjury is intended to be enhanced under proposed Section 344A of CrPC. Further, for cognizable offence punishable with seven years imprisonment, the Magistrates are empowered to record statement of the material witnesses instead of police officer.

Plea Bargaining

“Plea Bargaining” or “mutually satisfactory disposition” in criminal cases in its general sense refers to pre-trial negotiations between the defendant (accused) through his/her Counsel and the prosecution (complainant), during which the accused agrees to plead guilty in exchange for certain concessions by the prosecutor. Thus, plea-bargaining can be described as an agreement by an accused to plead guilty in return for the promise of some benefit.

The concept is in vogue in several western countries for a long period and in the United States of America for a century, where over ninety five percent of criminal cases never go to trial because of the bargaining struck between the prosecution and the accused’s attorney well before the trial commences. So much so in American Criminal Justice, plea-bargaining is the norm rather than an exception. This helps in getting rid of weak prosecution cases and lesser number of trials, thus making available more time to the courts for other cases.

The Law Commission in its 142 Report, considered the concept of plea-bargaining to overcome the problem of mounting arrears of criminal cases and was of strong view that plea bargaining can be made an essential component of administration of criminal justice. It adduced following five reasons as expressed by a large section of public opinion in support of this provision:-

- (i) Most people arrested, are guilty anyway; why bother with a trial;
- (ii) Why waste public money;
- (iii) “Plea bargaining” is a compromise; both sides give a little and gain a little;
- (iv) Trials consume time and cost; and
- (v) It is best (for both sides) to avail it since on the one hand there is always a chance that even if the accused is guilty and the evidence is adequate there is a chance of a slip up. On the other, the accused saves time and money and earns a concession in the form of a less serious offence or sentence.

It is pertinent to note that the proposed plea-bargaining is not a replica of the system prevalent in USA. Under the scheme available in USA, the settlement is out of court whereas in India it is proposed to involve the court as adjudicator between

the accused and the prosecutor by providing time and opportunity to them to decide quantum of concession mutually and fix a date for hearing thereafter. Further, the Court has to judge whether the application for plea-bargaining has been made voluntarily or not. The distinction between compounding of offence and plea-bargaining of offence is that conviction is exempted in the former situation and lesser conviction/punishment is awarded in the latter situation.

It would not be available for habitual offenders, serious socio-economic offences, offences against women and children and other offences punishable with imprisonment of seven years or more.

Compounding Of Offence in Section 498A of IPC

Section 498A is intended to protect the women from cruelty of husband or his relative. It has been widely reported that this provision has been misused and is also harsh as it is non-bailable and non-compoundable. It is desirable to provide a chance to the estranged spouse to come together and therefore it is proposed to make the offence under Section 498A IPC, a compoundable one by inserting this Section in the Table under sub section (2) of Section 320 of CrPC, wherein it can be compounded with permission of the Court. The provision has been recommended by the Law Commission.

Evidence of Scientific Experts in Cases Relating To Fake Currency Notes

Presently only officers of the Mint or India Security Press, Nasik can give opinion on fake currency notes. Evidence from other scientific experts suffers from legal infirmity as they are not included in Section 292 of Cr. PC. The provision in the Bill is based on the recommendations of Ministry of Finance.

Suggestions

On the issue of witness turning hostile, it is mentioned that the witness can be misused against influential people to settle political/caste rivalry and pointed out that no safeguard is available in the Bill to protect such misuse, instead it emphasized

on the enactment of a separate law on protection of witnesses and better facilities to the witnesses in the court of law.

Amendment of Section 162 and insertion of Section 164A in CrPC may lead to some shortcomings.

- (i) Such power may be misused by Investigating Officer (I.O.) by forcing the witness to sign the statement without knowing fully the implication of it. Furthermore, police officer may force the witness to sign on blank paper which can be manipulated by the former later on.
- (ii) I.O. has discretion to decide who would be material witness in a criminal case, where punishment is more than seven years. The professional/fictitious witnesses available in police station can be turned as material witness by the police, which may increase corruption.
- (iii) Since the power available with the police officers is already being misused, it was apprehended that enhancement of power of the police may lead to more misuse and resultant corruption.
- (iv) Punishment for making false statement in the Court of Law is equal for both the witness as well as the offender. Therefore, the punishment for the person who threatens/induces the witness should also be equal with the offender under proposed Section 195A.
- (v) If an innocent person is convicted and executed in consequence of false evidence given by the witness, the person who threatens or induces the witness to give such false evidence should be punished either with death or with some stringent punishment
- (vi) Provisions under proposed Section 195A are bodily lifted from Section 503 of IPC without the element of *mens rea* which should be reflected in the proposed Section
- (vii) As to signing of statement by the witness before the police officer, it is very difficult to understand which part of the statement is voluntary. Thus, it is suggested that the witness may not be required to sign his statement before police as there would be

- enough scope for convicting him for perjury
- (viii) A person in police custody has the fear of arrest and element of coercion which may not allow him to understand the implication of the statement made and signed by him. The accused can be one amongst the material witnesses. In that case, the requirement of signature on the statement made to the police officer may lead to self-incrimination of the accused which is unconstitutional {(Article 20(3)}
 - (ix) While recording the statement of witness, the witness may be allowed to sign the statement in the presence of his counsel
 - (x) If the witness is not satisfied with the recording of statement by the sub-Inspector, he may be given a chance to approach the Inspector/SHO for review of the same
 - (xi) If the witness feels that the statement has been got signed under duress, he can approach the Magistrate within specified time frame for instituting an inquiry
 - (xii) Recording of statement by the Police in the case of serious offences, sometimes also requires secrecy but by taking everybody to the Magistrate, secrecy of investigation will be lost
 - (xiii) Recording of statement under Section 164 CrPC by an independent body or agency consisting of retired Judges, high ranking police officials will have more probative value than recording of statements of witnesses by Magistrate and it will certainly save the time of the Magistrate
 - (xiv) The Magistrate may be required to remind the witness about oath to speak truth which would act as a deterrent to him which is not within the ambit of the Bill
 - (xv) Maximum punishment under proposed Section 344A of CrPC has been prescribed as seven years; there should be mention of some minimum punishment (three months)
 - (xvi) Apart from obtaining the signature of the witnesses on the statement, signature of two independent witnesses authenticating the recording of statement should also be taken,

which would add weight to the value of the statement

There is over emphasis on confessional statement and under emphasis on various aspects of investigation. Systematic changes in police administration and investigation procedure are the need of the hour since the entire foundation of criminal justice system is based on investigation. It was suggested to develop forensic evidence in a big way for improvement of investigation.

On the issue of plea-bargaining, it is felt that the provision was absolutely unnecessary as there were other provisions (Section 320 coupled with Sections 357, 358 and 359) in CrPC under which compromise and compensation could be made/given in criminal cases. Furthermore, it would give enormous power to public prosecutor, who is considered to be the agent of the state, which can be misused by him and may lead to corruption.

It was pointed out that if the quantum of concession was mutually accepted by both the parties, and was not acceptable to the Magistrate, trials would commence. In that situation, the extra judicial confession made before the public prosecutor can be used against the accused, which may prejudice the delivery of justice.

Considering the fact that most of the victims being illiterate may not understand the process of plea-bargaining and may go for plea-bargaining under pressure for which suitable safeguards may be provided in the Bill

Welcoming the measure, changes may be for out of court settlement, which would save the time of the Court. The public prosecutor, who is considered to be the agent of the State, may be empowered to deal with the counsel of the accused directly without the intervention of the Court

On the issue of compounding the offence under Section 498A IPC

- 1) Most of the cases instituted under Section 498A are done in conjunction with Section 405 of IPC. The latter Section makes the offence compoundable up to Rs. 250/- and Section 498A is proposed to be

compoundable. Therefore, reconciliation between these two Sections is urged.

Since offences against women are not covered under plea-bargaining, making Section 498A compoundable may contradict the provisions of plea-bargaining. Therefore, compounding offence under Section 498A is opposed.

- 2) Three Sections viz 304B, 376 and 498A are provided in IPC specifically for the women. Dilution of Section 498A would defeat the purpose behind its incorporation. Thus, vehement opposition of the compoundability of Section 498A.

On the issue of evidence of scientific experts since science of identification of handwriting is imperfect, the right of cross Examination of Examiner of Questioned Documents by the accused should not be taken away. Therefore, inclusion of Examiners of Questioned Documents under Section 292 of CrPC. the proposed Bill touches upon only the fringe areas of criminal justice system. They were also of the view that piecemeal reforms have been sought to be introduced in the criminal justice system in the face of a large number of recommendations made by several Commissions and Committees, which have not been implemented.

However, these amendments in the Criminal Law are in the preview of the Parliament of India. These are a few views and suggestions of the authors and the bill is under the consideration of the Parliament.

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ROLE OF FORENSIC MEDICINE IN MASS CASUALTY INCIDENT

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Abstract

During a multiple-casualty incident, a large casualty caseload adversely affects the quality of trauma care given to individual patients. From a trauma care perspective, the goal of the hospital emergency plan is to provide severely injured patients with a level of care that approximates the care given to similar patients under normal conditions. Therefore, the realistic admitting capacity of the hospital is determined primarily by the number of trauma teams that the hospital can deploy. Effective triage of these casualties is often not straightforward, with high over triage rates. Simplified triage algorithms may be a practical alternative to more elaborate schemes. The concept of minimal acceptable care is the key to a staged management approach during a mass-casualty incident. However, any plan without provision for the dead during a mass casualty incident will obviously be found lacking, leaving a massive and unprepared crisis.

Keywords: Mass casualty incidents (MCI); Triage; Concept of minimal care; Autopsy; Evidence collection and preservation.

Introduction

Mass casualty incident (MCI) / Disaster is an event, which causes a great loss that may be in the form of human lives or infrastructure. Disasters causing mass casualties can be classified as: 1) Natural Disasters that may be either due to geological causes like earthquakes, landslides, tornadoes, etc., or medical causes as seen in the epidemics. 2) Man made disasters, as for example, accidents like airplane crashes, collisions of train's etc., or warfare and terrorism. With development and modernization the major causes for mass casualties have shifted from natural to the man made causes [1].

Commonly encountered disasters, not only cause trauma and death of the victims and damage to the infrastructure and property but also cause immense emotional turmoil to the victims and their families. Part of the reason for this emotional trauma has been the inability of man to alter the grim survival outcomes for the victims. In most of the cases, however, the inability to save victims is not from a lack of medical services but from the exhaustion of resources due to the bulk of casualties that occur simultaneously [2]. These bulk of patients needing immediate treatment overwhelm the already overworked Emergency

departments in a developing country like ours, which struggles to provide adequate treatment even in normal circumstances.

However a substantial loss of human lives is potentially salvageable by organizing an efficient and highly coordinated system run by professionals who are trained in the field of disaster medicine [3], but the attempts to bring such a system into actual practice continue to meet innumerable hurdles like:

1. Lack of trained personnel for initial triage and stabilization because of the missing concept of pre-hospital care system. Unfortunately, even today in India it is the common man who comes to the rescue of victims and obviously, for a common man scoop and run and dump the victim in the Emergency department of a hospital is the top priority.
2. Lack of adequate transport facilities for mass transport (July 11, 2006 after the serial bomb blasts at Mumbai people were seen rushing the victims to the nearby hospitals by auto-rickshaws and any other available means of transport except the ambulances).
3. Lack of foresight at the organizational level is the most important deterrent in the conception of such a system [4]. Despite drawing many grandiose plans,

the management of mass disaster in India has always been akin to something like 'locking the stable after the horse has bolted' i.e., never up to the expectations of the public. Analysis of the cause, review of the plan and prevention of recurrence has never been able to come up from the back seat. This is not due to lack of capabilities but due to failure on the part of policy makers who have not been able to recognize and utilize the expertise of our professionals for the job they are trained for. This short-sightedness has led to many serious but preventable socio-economic problems in the recent past. Instead of tackling the problem eye to eye leaving behind any inter-professional differences and making the best use of various professions that may be helpful in the management of mass disaster for the overall benefit of the public, these plans often tend to overlook many crucial disciplines. In fact, in many of these 'Standard Mass Disaster Plans', the role of Forensic Medicine Expert is often ignored or even if it is mentioned, provision of logistic support is never a priority for the policy makers, obviously without any thought as to how crisis could be managed with the hands tied. It is not just making tall claims, but the fact is that forensic medicine expert has a pivotal role to play and is indispensable in the mass casualty incidents on the pattern of forensic physician and pathologist in Europe and the US.

The percentage of salvageable victims varies with a number of disaster and individual characteristics, e.g. Cause of injury, pattern of injury sustained, site of disaster, location of victim, etc. This scenario underlines the importance of a system for disaster mitigation and hence a coordinated approach of various medical disciplines including forensic medicine in the larger interest of the community.

Hospital Response in MCI like explosion by terrorists

While the attackers attempt to increase the number of casualties and the severity of injuries, the injuries sustained by the victim depend on the proximity of the victim to the explosive device, the angle at

which the victim stands in relation to the centre of the explosion, and the height of the explosive device in relation to the victim. The circumstances associated with these attacks also influence management and decision-making. The uncertainty as to the arrival of additional victims, the mayhem associated with the arrival of anxious family members, the florid scenes associated with these injuries, and the risk of second / subsequent explosions etc, all tend to intensify the chaotic atmosphere of the Emergency Departments and therefore, underline the importance of forming a plan at the hospital level designed to deal with these circumstances.

Mass casualty incidents (MCI) are primarily regarded as organizational and strategic problems rather than trauma care issues. According to this view the same level of care is to be provided to victims of a MCI as would be to similar cases under normal conditions. This however has not been shown to be the case as the medical resources are soon saturated by the large caseload that occurs in a MCI [2-5]. In fact the quality of trauma care in MCI declines with the increase in caseload. It has been documented that in a typical MCI only 10-15% of the survivors are severely injured while the rest suffer from mild to moderate injuries thus stressing for the need to triage so that standard level trauma care can be diverted to those severely injured, as these are the potentially salvageable lives that would be lost in the normal course of events if resources were evenly distributed amongst all victims [6].

A specialist team headed by the emergency physician or surgeon outside the emergency department complex, best carries out such a triage of all victims. Conventional triage schemes [7] lead to unacceptably high over triage, as there is no means of distinguishing patients needing immediate treatment from those who don't, by means of a rapid cursory examination. According to a retrospective analysis of a series of terrorist bombings by Frykberg [8] linear relationship was observed between the over triage rate and mortality of severely injured casualties. Thus a simple triage scheme that only divides victims into those requiring advance trauma care or those who don't need such immediate treatment is a useful alternative. Another triage scheme

based on the need for immediate or delayed surgical intervention has been developed and used successfully by the surgeons of the International Committee of the Red Cross [9]. This underlines the importance of establishing a relatively simple triage system, which is highly specific for identifying the critically injured group of the victims. However many questions regarding triage of victims are variable and need to be addressed according to the situation. For example, which critically injured victim to be triaged to the expectant category and for who to allocate an exclusive trauma team would depend on the caseload as well as the position of the victim in the train of continuous casualties being transported to the emergency department [10]?

The level of care to be provided to non-critically injured victims varies according to caseload as well as the stage of the MCI. During the period of evolution of the incident, when new casualties are still arriving, only bare minimum care may be provided to the above-mentioned set of patients. This not only conserves hospital resources for any more critically injured victims who may arrive in due course of time but also provides symptomatic relief and reduces risk of complications in the moderately injured [11].

It is here that the services of additionally deployed personnel can be utilized as they are seldom of help in providing advanced trauma care. Once the flow of victims has stopped more definitive treatment can be provided. However, what constitutes minimally acceptable care needs to be clearly addressed. Each hospital should have a special program dedicated to disaster preparedness. The hospital capacity is not to be determined by number of hospital beds or staff but by the number of the trauma teams that the hospital is able to deploy [12, 13-16].

The actual success of the hospital response in case of a MCI depends on the integrated functioning of a team of medical and paramedical personnel consisting of emergency physician, the triage officer and the team in-charge of the Emergency Department. They should undergo specialized training where they face actual situations so as to sharpen their decision-making skills. Such training may be provided by specially designed war games [17]. There

has also been stress on shifting the managerial responsibilities from single command to a dual command. An emergency physician heads the overall medical and administrative aspect while a trauma surgeon supervises the trauma teams. Distribution of the workload according to specialties of the commanding doctor leads to an increased efficiency and hence overall lower mortality in victims of a MCI [18].

In analyzing the approach we must consider the following: (A) many hours and sometimes days are required for the situation to stabilize and eventually normalize; (B) treating teams are physically and emotionally exhausted from the continuous workload, especially when repeat attacks occur within days; and (C) repeated reassessment by the treating teams and Surgeon-in-charge to ascertain that all patients receive optimal care is fundamental. In these circumstances, a strong personal commitment by the treating teams is pivotal to success. Depending on the magnitude of the attack, this commitment may be required to last from several hours to several days.

Handling the dead

Majority of those involved are unaware of the importance of preservation and examination of the dead, and still continue to have the age-old casual attitude. The consequences of this grave omission will not only cause untold anxiety and misery to the bereaved families but also seriously jeopardize the investigation. Sometimes, even the plan may become useless, as in case of tragedies where there are several hundred corpses, a plan without any provision for the dead will obviously be found lacking, leaving a massive and unprepared crisis.

Apathy towards this critically important aspect may be due to lack of insight, logistic constraints, ignorance etc. but whatever the reason is, one should not forget that, the manner in which a society deals with its dead reflects its attitude to the sanctity of life and the rights of the individuals. Our honour to the dead is a reflection of our respect for the society in which we live. Needless to say, the examination of the dead is for the benefit of the living. Furthermore, there are many

social, legal & medical reasons as to why it is necessary to preserve and examine the dead and the role of Forensic Pathologist in the management of Mass Disaster needs to be highlighted for the benefit of Planners and the society:

1. Establishment of identity of the victim: Identification is not just tightening of mere bureaucratic 'loose ends' but gives cognizance of the fundamental human right to have an identity both in life and in death. In a more pragmatic context, the identification of the dead is essential for life of others to proceed and return to normalcy. In almost every disaster, there is an urgent and pressing need to identify the victims. Most people will find little difficulty to establish the identity from the morphological manifestation of an intact body. This seemingly simple process becomes much more complex and difficult to recapture the living appearance of an individual from mutilated, charred or skeletal remains that may be partial or intermingled, as are usually encountered in mass disasters. In such a case, forensic pathologist can help in establishing the identity of the victims from the morphology, anatomy, individual peculiarity, fingerprinting, DNA profiling etc. The importance and necessity of establishing the identity are:
 - a. It is not uncommon that despite having learned about the involvement of loved ones in the tragedies, emotionally traumatized bereaved family often fails to identify their loved ones, which may be due to disfigurement and mutilation of the body, putrefactive changes after death etc. One can imagine how much anxiety and suffering the next of kin would face in such situations. For instance, there is a strong desire on the part of the vast majority of people that their loved ones be identified and fulfil the rightful funeral rituals as per religious and cultural practice rather than to be interred in a mass grave as is necessary, if identification cannot be effected.
 - b. Sometimes the relief following identification can be short-lived if another bereaved family also claims the same body. Involvement of Forensic Pathologist in the mass disaster management can help ascertain the identity and thus prevent occurrence of these painful situations.
 - c. The settlement of the following mundane but pressingly practical issues such as: inheritance of property, access to bank accounts, pensions, insurance, etc depends on the formal identification of the deceased, recorded in a certificate of death.
 - d. Civil court action and litigation relating to issues of liability, e. g., on the part of an airline contributing to a disaster, needs the identity of the deceased to be formally corroborated. Similarly, if the incident happened at the workplace, litigation relating to health and safety concerns in the workplace can be initiated only with the formal identification of the deceased.
 - e. In case of any suspicion of breach of guidelines, regulations or laws by the person at the wheel or the controls at the time of the mishap e.g. any suspicions as to whether such persons were in intoxicated state can be ruled out only after formal establishment of their identities. For initiation of criminal investigation, identification is an essential prerequisite.
 - f. Formal identification will enable the authorization for legal disposal of the remains - the first step to be taken to cope with their tragic loss.
2. Reconstruction of the mutilated remains to make them presentable to the relatives of the deceased.
3. Proper preservation and handling of the remains by skilled personnel will prevent loss of crucial evidence, check introduction of artefacts and prevent further putrefaction and also reduce health hazards that follow most of the mass disasters.
4. To determine the cause of the disaster by collecting evidence such as: bomb or detonator fragments that may be embedded in the bodies, toxicological evidence for any evidence of intoxication of the key victims, pathological evidence

to see any disease conditions in the key victims that could have contributed to the disaster [19]. In case of impending epidemic as well as in tragedies resulting from biological or chemical sabotage, the Forensic Pathologist can help in the detection and diagnosis of the causative agent, which in turn would enable the concerned authorities to take necessary preventive measures.

5. To assist in reconstructing the cause of the disaster. This can be achieved by: establishing the cause of death, particularly of the key victims such as pilots, drivers, human bombs etc., studying the nature and pattern of injuries sustained by the victims to see whether the injuries take the pattern that conforms to other similar incidence and studying the position of the remains in relation to the wreckage at the site of the tragedy.
6. Establishment of the period of survival of the victims, which is deducible by studying the time since death is required in case of presumption of survivorship. Also it can be helpful to determine whether there was any lapse in the search and rescue operation, and accordingly from these findings, necessary corrective measures can be incorporated in the plan.
7. Evaluation and analysis of the data during the course of medico-legal investigation can be utilized as a tool for development and improvement of safety measures, including the workplace e.g. seat belts, airbags, head rests, helmet, leg guards, laminated windshield etc were all developed and improved over the years by studying such data and most of these safety measures have been made mandatory in many countries.

Conclusion

It is difficult to get most people to consider the unthinkable, yet unimaginable mass casualty incidents will always occur. This inevitability of MCI should not give rise to a fatalistic attitude, for that removes the need to plan and prepare. Today, mass casualty management itself is considered as a discipline. It requires the cooperation and coordination of various professions such as administration, police, medical, forensic

experts, fire service, civil defence, public work services (including water and power supply, transport and telecommunication etc), seismologists, hydrologists, geologists, NGOs etc. All these disciplines and professions are essential at different levels in the course of management. In India, there is a dire need to incorporate forensic medicine specialist on the pattern of western countries where Forensic Pathologist plays an integral role in the management of mass disaster. He is a key member in both Disaster Victim Identification as well as Disaster Investigation teams.

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CONTINUED MEDICAL EDUCATION (CME) PROGRAMMES SOME OBSERVATIONS

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Abstract

The basic aim of CME programmes is to improve practice and update knowledge and skills. The rationale for time limited certification to encourage doctors to learn and keep them up to date and to identify who meet or do not meet the standards of specialty boards has fuelled a multibillion-dollar enterprise in some of the western countries. In the light of world scenario on CME programmes, CME credits under MCI Regulations are being discussed in this paper.

Key Words: CME Programmes, professional competence, Self Directing Learning, board certificated, legislative, Portfolio-based learning, PC Diary, CME info.com,

Introduction

According to MCI Regulations-2002, Section 1.2.3, a physician should participate in professional meetings as part of CME Programmes for at least 30 hours every 5 years organized by reputed professional academic bodies or any other authorized organizations. CME programmes should be mandatory or voluntary phenomenon for the medical professionals is a subject of discussion and much controversy and the quality of medical education is being questioned and debated all over the world. The basic aim and objective of CME programmes is to improve practice and update knowledge and skills. The rationale for time limited certification to encourage doctors to learn and keep them up to date and to identify who meet or do not meet the standards of specialty boards has fuelled a multibillion-dollar enterprise in some of the western countries. In the light of world scenario on CME programmes, CME credits under MCI Regulation are being discussed in the form of some observations in this paper.

Definition

Davis defines continuing medical education programme as “any and all the ways by which doctors learn after formal completion of their training” Grant and Stanton distinguish between continuing medical education and continuing professional development. Continuing medical education is seen as representing a

more teacher based didactic style whereas continuing professional development implies a more learner centred and self directed approach to learning.

Aims and Objectives

The challenge of maintaining professional competence in an environment characterized by rapid organizational change, information overload and increasing public expectations and demands is forcing doctors to think hard about medical education. People expect their doctor to meet set standards and the issue of professional accountability is crucial for doctors and if they do not update their professional knowledge and skills to improve practice, it is right of the public to expect these doctors to be identified and removed from practice.

Medical Student / Medical Professional

Although a division of medical education into stages – undergraduate, postgraduate and continuing medical education (CME) seems sound from a regulatory and legal perspective, there are no fundamental differences in the way people learn across the continuum. The student is often told what to learn but the qualified doctor is responsible for directing his or her own lifelong learning i.e. “Self Directing Learning” a process in which learners take the initiative for increasing self and social awareness, critically analysing and reflecting on their work defining their

learning needs, formulating goal, identifying human and material resources for learning, choosing appropriate learning strategies and reflecting on and evaluating their learning

Mandatory / Voluntary

In the United States, most boards (licensing authorities) issue specialists with time-limited certificates. The need for doctors to get recertified every few years to retain their "board certificated" status has fuelled a multibillion-dollar enterprise. This consists mostly of didactic courses offered to doctors in need of credit hours to meet recertification requirements. The rationale for time limited certificates is twofold- firstly to encourage doctors to learn and keep up to date and secondly to identify those doctors who continue to meet the specialty boards standards and those who do not. In Europe, participation in CME programmes is largely voluntary but both the European Union of Medical Specialists and Standing Committee of European Doctors have adopted charters, which state that doctors have an ethical obligation or duty to undertake further education. The European Union of General Practitioners, "recognizing that moral responsibility alone is insufficient," has suggested that doctors should be given incentives to participate in CME activities. The impact of credit hours of traditional courses on the quality of practice is however disputable and traditional CME may have impeded development of more effective ways of promoting continuing learning. In one study the number of reported continuing education hours was found to correlate positively with lower competence. The most important issue in continuing medical education is the quality of the education programmes on offer, not whether they are voluntary or mandatory.

Motivation for continuous learning

What is it that keeps the doctors striving to maintain their competence throughout decades of professional life? The driving force among the outstanding doctors interviewed in different working environments by Manning and DeBakey was "their pride in performance-a desire never to be (or to be seen as) professionally inadequate. Similarly, in the physician change study the desire to be more competent in the delivery of health care to

patients was the key force for change; regulations had little impact. Strict legislative and regulatory measures are thus not likely to be an effective way of maintaining professional competence.

Portfolio-based learning

Ten years ago it was shown that doctors could meet specialty board requirements for recertification by setting up their own learning plans. The Canadian Maintenance of Competence Programmes (MOCOMP) a portfolio-based documentation of individual learning takes it further. It acknowledges that learning that learning takes place daily in the practice environment and it provides a system for documenting such learning. To facilitate entries and comparison with peers a computerized diary (PC Diary) has been developed. In Britain, a working group appointed by Royal College of General Practitioners has recommended portfolio-based learning. In the Sheffield region such a programme has already been developed; it consists of personal education plan, a portfolio to document progress towards attainment of the plan and mutual support through a co-mentoring group.

Systematic Review

To improve clinical performance & patient outcome, systematic review of methods of CME have been recommended and classified as-

- (a) Most Effective-learning linked to clinical practice, interactive educational meetings, outreach events and strategies that involve multiple educational interventions
- (b) Less Effective-audit, feedback, local consensus process, influence of opinion leaders
- (c) Least Effective -lecture format teaching and unsolicited printed material

CME info.com

These are the self-study multimedia continuing medical education and board certification programmes brought to the doorstep of the learners i.e. learning at own place in the comfort of home, office or car. There is no travelling, no expensive air or hotel bills, and no loss of income or time for practice.

CME Claim

The Medical Council has prescribed 30 hours of continued medical education for every medical professional in five years meaning a physician should at least spend one minute daily in medical education programme. In his daily practice an allopathic practitioner spends sufficient time for medical education by reading medical news in news papers, health magazines and bulletins, medical journals, watching medical education programmes on television and listening radio news, meeting medical representatives of different pharmaceutical companies coming with new products, daily discussion with professional colleagues, teaching medical students and clinically problem solving during treatment and care of patients. The medical professionals can claim that they are already following the MCI regulations and there is nothing to panic for these regulations

Conclusions and recommendations

1. The primary purpose of CME is to maintain and improve clinical performance
2. Effectiveness of CME in changing clinical behaviour has come under closer scrutiny as reaccreditations and quality assurance programmes have increased
3. CME for general practitioners should be

- largely based on the work they do
4. A doctor's desire to be more competent in the delivery of health care is the most important motivating factor for continuous learning and change
 5. CME must be planned to meet the needs of doctor and based on both self assessment and peer review
 6. Medical colleges and societies need to improve their educational competence to be able to deliver high quality CME
 7. More programmes should be linked to the workplace; they should include group based activities and use quality improvement tools
 8. CME must become a more visible, integrated and well planned activity for which both protected time and adequate funds must be provided.

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REVIEW OF INTERMEDIATE SYNDROME IN ORGANOPHOSPHOROUS POISONING

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Abstract

Organophosphorus poisoning is a significant cause of morbidity and mortality in developing countries including India. In addition to the conventional presentation of organophosphorus poisoning, there exists a clinical variant known as Intermediate syndrome which is a very common cause for the development of respiratory failure. The cardinal features of this syndrome are cranial nerve palsies, weakness of neck flexors, proximal muscle weakness and respiratory muscle paralysis which usually develops between 24 to 96 hours of ingestion of the poison. Mortality can be reduced by early recognition of the syndrome and prompt ventilatory support.

Key Words: Intermediate syndrome, organophosphorus, poison.

Introduction

Organophosphorus compounds are extensively used as insecticides in agriculture. Organophosphorus poisoning is a significant cause of morbidity and mortality in developing countries including India.

The toxicological effects of the poison begin with in a short period after consumption, and become more severe after few hours.

In addition to the conventional presentation of organophosphorus poisoning, there exists a clinical variant known as Intermediate syndrome which is a very common cause for the development of respiratory failure.

Discussion

The term intermediate syndrome was first coined by Senanayake from Sri Lanka in 1987[1], but intermediate syndrome was first described by Wadia as type II paralysis in 1974 [2].

It was called as Intermediate because it appears after the acute cholinergic phase but before the expected onset of delayed neuropathy. The cardinal features of this syndrome are cranial nerve palsies, weakness of neck flexors, proximal muscle weakness and respiratory muscle

paralysis which usually develops between 24 to 96 hours of ingestion of the poison [3].

The mechanism of intermediate syndrome is not clear. It was felt by some authors that it may be due to the nicotinic signs of acetyl cholinesterase inhibition [4].

According to the views of Gadath and Fisher [5] the manifestations are due to nicotinic paralysis. They felt that the organophosphorus poison stored in the adipose tissue after absorption got liberated from there and act on the nicotinic receptors. In these patients there is a rapid regeneration of enzyme acetyl cholinesterase resulting in recovery from neuromuscular blockade. Later, the release of a previously inactivated cholinesterase inhibitor results in the paralysis.

Sedgwick and Senanayake [4] gave a hypothesis that the down regulation of acetyl choline receptors could explain the syndrome and neurophysiological findings of Intermediate syndrome. These receptors have a half life of 10 days before undergoing inactivation with in the muscle fibres. Down regulation of acetyl choline receptors in the presence of acetyl cholinesterase inhibition would be expected to cause a different syndrome from myasthenia gravis. Any liberated acetyl choline is likely to have time

to activate one or more receptors once or even several times before it diffuses away. Even though the half life of acetyl choline receptors is 10 days, the reason why intermediate syndrome appears within 24-96 hours following the consumption of poison may be that the heavily activated receptors become desensitized rendering them more readily endocytosed.

The incidence of intermediate syndrome varies from 5.4% to 47% in various reported works [6-8]. It is observed that this syndrome predominated in males and in the third decade of life [1, 6].

Agents commonly causing Intermediate Syndrome are fenthion, monocrotophos, dimethoate, methyl parathion, diazinon, Ethylparathion, Malathion, and sumthion [2,6-8].

Most of the patients have weakness of neck flexor muscles as the initial manifestation followed by weakness of facial, respiratory and limb muscles. During the recovery stage, the cranial nerve palsies improves first, followed by improvement in respiratory and limb muscles [1,6].

Gross reduction of serum cholinesterase in all patients with intermediate syndrome is noted [6]. Respiratory failure is one of the dreaded complications and requires mechanical ventilation. Oximes do not have any role in the management of intermediate syndrome [9,10]. Mortality varies from 10.5% to 41.6% [1,2,6].

The high incidence of intermediate syndrome in organophosphorus poisoning emphasis the need for careful monitoring of these patients. They should be kept under strict observation for a period of 7 days in the hospital to detect the development of intermediate syndrome. Mortality can be reduced by early recognition of the syndrome and prompt ventilatory support.

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MEDICAL TERMINATION OF PREGNANCY BY AYURVEDA PRACTITIONER - NEGLIGENCE OR CRIME?

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Abstract

A 32 year old female dead body was brought for post mortem examination. She had undergone an abortion by a BAMS doctor and discharged from hospital. After three hours she developed pain in abdomen and bleeding per vaginum and died within an hour. This is a unique case of criminal abortion by an Ayurveda practitioner for discussion.

Key words: Negligence, Criminal abortion, MTP

Introduction

Doctor population ratio in urban context in India is 1:3500. The Medical Termination of Pregnancy (MTP) Act was implemented in India more than three decades ago to curb the high number of clandestine abortions and reduce the high rate of maternal deaths caused by such abortions. The act thus came into existence to ensure women's access to safe abortion services by bringing medical termination of pregnancy into institutional settings where adequate equipment, medical supplies and specially trained personnel are in position.

Law in India permits a MBBS (having necessary training) to perform MTP. In MTP Act 1971, the provisions are extremely liberal for any women to obtain termination of pregnancy. It has laid down certain conditions under the umbrella of which any women who is willing to get rid of unwanted pregnancy can fit her in any one of the conditions and obtain termination of pregnancy.

Ayurveda and Unani system of medical practice prohibits the degree holder to perform MTP by surgical intervention.

An interesting case is presented here in which a female underwent abortion and died after a few hours of the procedure. The doctor, a BAMS is being investigated for causing death by doing criminal abortion.

Case report

A female aged about 32 years, married for 12 years, survived by a four year old female child was admitted to the clinic of a BAMS doctor for abortion, she was having

four and a half months amenorrhea [about 18 weeks].

On 28-05-2004 at 1 P.M the pregnancy was terminated by the doctor and the patient was sent back to her home by 2 P.M. After about 3 hours, at 5 P.M. patient complained of severe pain in lower abdomen and bleeding per vagina. She was rushed to the clinic of the same doctor, was admitted and at 6 P.M she died there only.

Next day on 29-05-2004, the autopsy was delayed as the investigating officer was refused by the doctor to give the treatment record of the deceased. Later on the doctor agreed to co-operate and issued one prescription written by her mentioning the treatment given to the patient which was as follows:

Only emergency treatment given -
Inj. DNS, Tab Metspas, Tab Rantac
150

Nothing was mentioned regarding the procedure done on the patient, although it is evident from investigation that doctor had performed medical termination of pregnancy on the said patient.

The body of the deceased was brought for medico legal autopsy to the Department of Forensic Medicine and Toxicology, Surat. The detailed post-mortem findings revealed presence of petticoat, under pant and a piece of cloth over the genital, wet with blood.

Conjunctiva pale, no discharge coming out from the mouth, nostrils or ears.

Rigor mortis was present all over the body and faint post-mortem lividity was appreciable over back of the body.

Fingernails of both hands were bluish discoloured, and multiple injection marks were visible over front of right elbow.

On examination of genitals vagina had multiple abrasions over posterior fornix. Vaginal canal had multiple contusions.

Internally, external and internal Os of cervix showed presence of multiple lacerations; uterus was hypertrophied, measuring 15cms x 12cms x 2cms. Whole uterine cavity was severely bruised and congested with lacerations at middle of the inner surface of size 3cm x 1cm. and cavity contained clotted and fluid blood about 500 ml.

Remains of foetal skull bone and facial bones were present inside the cavity. Placenta was absent. In addition multiple unidentifiable bone chips (fragments) of size varying from 0.2cms x 1cms to 0.1cms x 0.1cms were present in the uterine cavity. On examination of the foetal skull and other features it appeared to be of six months gestational age.

Both ovaries and fallopian tubes were congested, remaining viscera were pale.

The viscera including the uterus were preserved and sent histopathological examination and chemical analysis to know the physiological status of the uterus and rule out any poisoning. This is especially relevant in this case as in our country poisons such as calotropis; oleander, abrus precatorious etc are used locally and systemically for producing abortion.

Discussion

The MTP Act defines the place, person and the conditions under which a pregnancy can be terminated. Under the act, abortion can be provided only by a registered medical practitioner (with a degree in allopathic medicine) who has the necessary qualification, training and experience in performing MTP and only at a place which has the facilities, meeting standards specified in the Rules and Regulations of the MTP Act. Thus, abortion carried out by persons and at places not registered or certified under the MTP Act is illegal. Furthermore; if the period of pregnancy is between 12 – 20 weeks, two doctors must concur that there is an indication. Over the years, there has been an increase in the number of legal, that is,

registered health facilities to provide MTP – from 1,877 in 1976 to 8,722 in 1995-96.

The commonest cause of death in criminal abortion is sepsis; other causes are reflex shock, haemorrhage and pulmonary embolism.

The criminal liability of the doctor depends mainly on establishment of the fact:

1. Whether a BAMS is empowered to perform MTP.
2. The age of the foetus was approximately 6 months, did she took opinion of second doctor.
3. Was the product of conception evacuated completely?

So, it becomes crystal clear from the judgment delivered by Supreme Court of India in civil appeal no.89 of 1987, on 8th Oct 1998 in which Ayurveda doctors (Integrated) practicing modern scientific medicine were told that they should practice modern scientific medicine only if there names were registered in the State Medical Register within the meaning of MCI Act 1956, and there isn't any State Act by virtue of which any person, Ayurvedic doctor or Integrated doctor could register in State Medical Register and practice Modern Scientific Medicine.

Hence, after June 16, 1964, no state govt. had power to declare any person as Registered Medical Practitioner to practices Modern Scientific medicine on the basis of Rule 2-ee-(iii) of Drug Act 1945, other than person holding basic MBBS. In other words Rule 2-ee-(iii) becomes inoperative after June 16, 1964. That means only doctors having basic MBBS degree are Registered Medical Practitioner for the purpose of the Drug Act 1945. In fact the drug authorities were duty bound to order chemists not to issue allopathic medicines to any patient on the prescriptions of any doctor without MBBS degree since June 16, 1964.

The term RMP or Registered Medical practitioner cannot be used by anyone except doctors having basic MBBS degree. Hence the term "Medical" refers to only Modern Scientific Medicine.

So it all leads to the conclusion that there is no scope for a person enrolled on central register of Indian medicine or state register of Indian medicine (both registers are meant for Ayurveda, Unani, Siddha and Integrated doctors) to practice modern Scientific Medicine in any of its branches

unless that person is also enrolled on a State Medical Register, within the meaning of MCI Act, 1956.

In the present scenario, eradication of quackery seems to be difficult for two main reasons; one being their mammoth number and second being the absence of a single law exclusively to be used to punish the quacks are weak and cumbersome. Moreover the offence of quackery is non-cognizable offence and the punishment prescribed is also very meagre. The people friendly attitude of quacks makes them very dear to public. Vote seeking politicians who are short-sighted about their power are encouraging quacks.

Certain efforts can be made at different level that may help eradicate the quacks. The Anti-quackery steps by the Govt. can be in the form of extensive publicity in print media, electronic media and through Gram Panchayats. Government qualified doctor can be involved in identifying quacks in their area and report to District Health Officer. Drug controller and inspector must be directed to advise chemists not to dispense drugs to the prescriptions issued by the quacks.

Pharmacy councils should see that only B.Pharmacy graduates sit at every medical shop supervising the sales of modern medicines, because almost 90% of medical stores are run by persons who are not qualified pharmacists.

The public should be educated about the hazards of quackery, informed about the status of adequate availability of medical personnel and creating general awareness.

In the present case the BAMS doctor is clearly not empowered to perform MTP which she did and her prescription did

not show that another doctor either BAMS or MBBS was consulted for second opinion.

Leaving apart the legal provisions the case is an exact example of 'Res Ipsa Loquitur' as the foetal skull and other parts present in the uterine cavity reflects the incompetence of the doctor.

Conclusion

An interesting case is reported in which death of a pregnant woman occurred few hours after getting a criminal abortion done. All facts of the case point towards the negligent act and malicious intent of the doctor.

The investigating officer as well as autopsy surgeon must remember the case an example and can do well under the provisions of law to prevent such occurrence to happen by prosecuting the doctor for causing death of a human being for no fault.

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CASE REPORT – DEATH DUE TO BATTERING OF CHILD

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Abstract

A Caffey syndrome is well established offence. Mostly it is not reported. Here is one such case which was detected on autopsy.

Keywords: Caffey syndrome, Autopsy.

Case Report

Caffey syndrome is well known condition but hardly any case comes to the surface in India. The victims of this menace are either illegitimate children or due to addiction by the parents/ father. There are many conditions which are well established basis of Caffey syndrome. One such case was brought to the mortuary of Medical College Amritsar. The police have alleged the cause of death as natural disease but on autopsy following findings were observed. On 14-04-05 a dead body of about 03 years male child moderately built, moderately nourished was brought to mortuary at 11:20 AM. Post mortem staining was present over the back. Rigor mortis was present in toes and fingers. The following injuries were observed on the dead body.

1. Multiple reddish blue contusions were present in an area of 6 x 4 cm on right side of face of size varying from 1.0 cm to 2.0 cm in diameter. On dissection infiltration of blood was present in the soft tissues.
2. A reddish blue contusion was present in an area of 5.8 x 3.9 cm over left side of face over the malar region. On dissection infiltration of blood was present.
3. Multiple reddish blue contusions were present in an area of 10 x 7.8 cm over the front chest on both sides of size varies from 1cm to 2.4cm in diameter. On dissection infiltration of blood was present in subcutaneous tissues.
4. Multiple reddish blue contusions were present in an area of 11x 10cm over the front of abdomen around the umbilicus.

Size varies from 1cm to 2.5cm in diameter. On dissection infiltration of blood was present in subcutaneous tissues.

5. A reddish blue contusion of 7 x 6 cm was present in right popliteal fossa.. On dissection infiltration of blood was present.
6. Multiple reddish blue contusions were present in an area of 10.5 x 8.4 cm over the back of chest near the midline size varies from 0.5cm to 2.1cm in diameter. On dissection infiltration of blood was present.
7. Multiple reddish blue contusions size varies from 0.5cm to 2.4cm in diameter were present in an area of 10.5 x 8.8 cm over the back of abdomen. On dissection infiltration of blood was present in subcutaneous tissues.
8. Multiple reddish blue contusions size varies from 1cm to 2.5cm in diameter were present in an area of 10 x 6 cm over the back of left buttock and left thigh. On dissection infiltration of blood was present.

On dissection of cranial cavity:

Subgaleal haematoma was present over frontal, both parietal region and occipital regions.

On dissection of abdominal cavity:

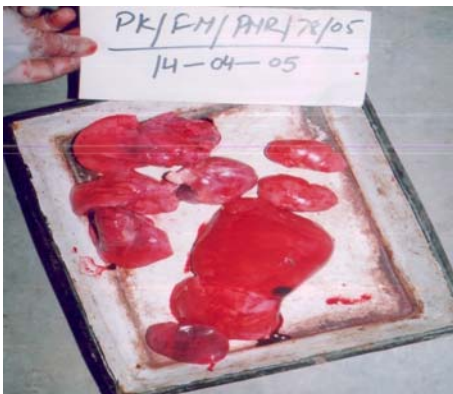
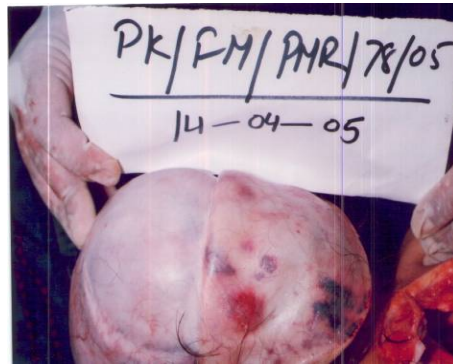
On opening 150 cc of fluid and clotted blood was present in peritoneal cavity. About 160 cc of retroperitoneal as well as mesenteric collection of blood was present. Superior surface of liver shows subcapsular haematoma in an area of 6 x 5 cm in the right lobe.

All the injuries were ante mortem in nature and as a result of blunt force. The cause of death in this case was shock and haemorrhage due to blunt trauma over the abdomen and back described as injuries 4 & 7 which were sufficient to cause death in an ordinary course of nature.

The case is open and does not need any clarification because the history of this case was that the victim was the son of a couple who were living in a poor socioeconomic state. The wife ran away with

her paramount and the husband was infuriated from the circumstances and resorted to repeated thrashing of the child which ultimately led to death of the victim. The post-mortem report was explained to the police but Investigating Officer was not interested to register any offence against the family as he was not able to investigate the case properly. Such kind of crime hardly is reported and goes undetected.

Photographs of the case:-



AN UNUSUAL CASE OF PAIN ABDOMEN

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Abstract

A young woman aged 25 years with two children and wife of army personnel came to the military hospital with alleged history of pain abdomen since early morning. There was no history of vomiting and diarrhoea. Patient was treated conservatively, but died within an hour. The body was sent for post-mortem examination to Mortuary, Government Medical College, Patiala. On opening the abdomen, the abdominal cavity was found containing 3.5 litres of blood and all the abdominal viscera were examined and found to be normal. Uterus was found to be having through and through perforation in its right postero-lateral wall caused by a pointed object.

Key words: Uterus, Perforation, Haemorrhage.

Introduction

Pain abdomen can be due to multiple factors like appendicitis, colitis, amoebic liver abscess, gallstones, ectopic pregnancy rupture and some complications of the abortion. In spite of the MTP act 1971 in force, still a number of illegal abortions are taking place. These are mostly done by unqualified medical practitioners and in the villages even by quacks. Most of the illiterate persons willing for abortion visit these unqualified practitioners due to easy approach, low cost and for secrecy. These days, the unmarried girls who get pregnant, also fall pray to these unscrupulous elements. If everything goes well, there is no problem. But in the hands of these unqualified practitioners, the chances of complications are more and in extreme form death may ensue and then the problem may arise both for the kith and kin of deceased and for these unqualified medical practitioners.

Case History

The deceased was a 25-year-old female, wife of army personnel. She was married for the last seven years and had two sons aged 5 years and 2 years.

As per the history given by her husband, she was perfectly well the pervious day and on next day at 6 AM, she complained of pain abdomen and some uneasiness. She was taken to the army hospital by her husband at 6.35 AM.

As per the record of the army hospital, on examination, she was restless,

her general condition was fair, and she was afebrile. Pallor was present. Injection ranitidine was given and blood samples were taken for Hb determination and other investigation and patient suddenly collapsed at 6.50AM and declared dead.

The body was brought for post-mortem examination on the same day. On external examination, there was nothing abnormal, except marked pallor of the body. On internal examination, all the body organs were found extremely pale, all the chambers of the heart and big vessels were empty and abdominal cavity was full of blood (about 3.5 litres).

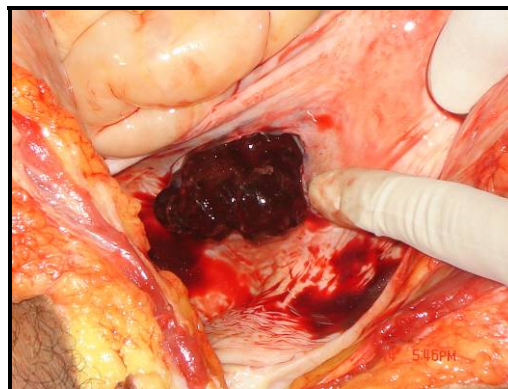


Figure 1: Blood visible on opening abdominal cavity.

On examination of the uterus, it was found enlarged in size measuring 13cm x 9cm x 4cm. The endometrium was found to be eroded and there was through and

through perforation in the right postero-lateral wall below the right fallopian tube.

Discussion

Perforation of the uterus though rare, still is not an uncommon complication of abortion. In the present case, the patient's chief complaint as per her husband was pain abdomen and due to obvious reasons, they do not give any history of abortion. The cause of death as mentioned in the PMR was haemorrhagic shock due to perforation of the uterus by a pointed instrument and the uterine finding i.e. the size of the uterus and eroded endometrium suggested attempted abortion. If the patient had provided the proper history and got the proper medical treatment in time, she could have been saved.

Conclusion

The need of the hour is to make the MTP act more people friendly. Therefore, the patients can approach the qualified medical practitioners without any hesitation and seek proper medical treatment and thus a number of life's can be saved.

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Figure 2: The volume of blood removed from abdominal cavity.



Figure 3: The perforation in the uterus.

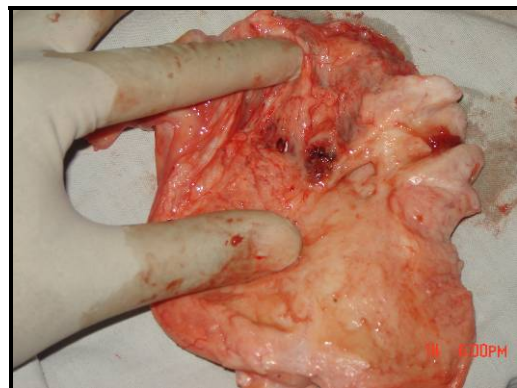


Figure 4: The uterus opened up to showing the perforation and erosions.

AN UNUSUAL CASE OF HOMICIDE BY RADIOACTIVE MATERIAL

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Abstract

November 23 2006, opened a new chapter in toxicology. For the first time, in the history of poisoning it got documented that radioactive substance being used for homicide.

The death of ex-Russian KGB Spy, 43 yrs old, Col Alexander Litvikenko, by radioactive substance, in London's University College Hospital, on November 23, was an eye opener, and created a storm in medical fraternity. Radioactive substance is normally used in nuclear medicine for diagnosis and treatment like radioactive iodine used for thyroid diseases or radioactive thallium used as tracer during heart scan. BA substance is also used as a weapon of mass destruction; however it 'as never used earlier for homicide. The case is discussed in detail.

Key Words: homicide by Radio Active material, spy death.

Case Report

On November 01, Ex-KGB Spy, who was given political asylum in Britain, met some one, identity withheld, at the *Iitsu Sushi* restaurant of London. It is believed he was poisoned there, which eventually killed him on November 23. [1]

History & Findings

On November 19 BBC News flashed a footage showing a very thin built, grossly emaciated person. He seemed aged. There was no hair in his head. For routine activities he was taking help of others and needed support for standing. He was breathing independently with no oxygen mask. No per-enteral fluid was administered to him. He was found talking to a lady attendant, supposed to be his wife. As per report his condition was "serious but stable".

As per history given by Alexander Litvikenko, 43 years, several hours after having food at *Iitsu Sushi* restaurant at London he felt sick. In two weeks time he was seriously ill and had to be admitted in hospital when he began to vomit violently. [2]

Doctors treating him, based on clinical findings thought he was poisoned by radioactive thallium salt. Radioactive thallium is commonly used in hospitals, as a tracer during heart scans. Radioactive thallium is a tasteless, odourless, colourless

and deadly. It can be slipped into food to kill a human in short time, in a very small dose. It causes internal haemorrhage and gastroenteritis. Eminent toxicologist who visited Alexander Litvikenko in hospital suspected radioactive substance was used. However the level of thallium detected in patient was not to the level of toxicity. Ultimately tests have detected Polonium-210 in Alexander Litvikenko body.

Mode of Action by radioactive Substance on human Body

Radioactive material emits three major types of radiations in form of Alpha particles, Beta particles and Gamma particles in addition to hundreds of other radiations. Alpha particles are least penetrating; Beta particles can penetrate a depth of few centimetres, whereas gamma has highest penetrating power and very deadly. [3] The damage to human body is essentially caused by damaging the cells and causing their death. Radioactive materials are found in powder or liquid forms. [4]

Acute Radiation Syndrome

Exposure to nuclear radiation is followed by symptoms of nausea, vomiting and fatigue, which last for 2-3 days. This is followed by latent period of variable duration [up to 3 weeks] when there will be no major

symptoms. After this, symptoms of haemorrhage and secondary bacterial infections like fever, abscess formation and red spots over the body appear. In case of mild exposure, the recovery commences after about 3 months. In case of severe exposure, death ensues within 24 to 48 hours. [5]

Findings on Post-mortem examination

Probable PM Examination would have shown the following features, absence of hair over the body including scalp. Gross emaciation, signs of infection over the body due to absence of immunity. Internal findings would have been gross necrosis of almost all viscera bleeding into various organs. Small haemorrhage under the skin and intestine.

Discussion

Though radiation injury is common finding in a nuclear disaster, like seen when atom bomb was hurled on Hiroshima on 06th Aug 1945 and 09th Aug 1945 in Nagasaki which had killed almost a population of 5 lakh and similar number injured. In the Chernobyl accident in USSR, on 26th April 1986, 46 million Curies of Radioiodine was released accidentally, which took many lives. [6]

The effects of nuclear radiation are as follows:

- a. Immediate cause of death – The death from radiation sickness is slow and painful. The initial symptoms include nausea, vomiting, diarrhoea, loss of appetite and malaise. After 2-3 weeks of radiation exposure there will be an increased tendency of bleeding in various organs. Small haemorrhages

appear under the skin. Spontaneous bleeding from mouth and intestine is common. Loss of hair manifests after 2 weeks. Eventually the radiation kills white cells of blood leading to reduction in body resistance. It gives a picture of an AIDS patient. Ultimately overwhelming infection develops leading to the death. [7]

- b. Long term effects to the survivors are leukaemia, thyroid cancer, breast and lung cancer, stomach and colon cancer and multiple myeloma. 'This is because of genetic mutation.

It is unlikely that radioactive substance will be used routinely for homicidal purpose because it is very difficult to procure. A radioactive reactor is required to manufacture radioactive substance. However, whenever there is a motive to use this substance, it becomes available either the state helps like the above case alternatively; it can be obtained through unfair means like stealing. Thankfully the world is still in safe hands as far as radioactive material is concerned since strict norms are maintained in cases of radioactive substances

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ROLE OF SUPERIMPOSITION TECHNIQUE IN PRACTICE OF FORENSIC MEDICINE

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Abstract

As mostly observed nowadays, the skeletal remnants are being recovered from ditches, open fields and areas of garbage's and wastes and hence the question arises as to how to proceed with such cases. Therefore identification of the deceased is the first step to move the investigations in right direction. The presented case report is an attempt to analyze the role of photographic superimposition that is useful when the skeletal remains are likely to belong to a particular missing person, and photographs are available.

Key words: Skeletal remains, Identification, Superimposition.

Introduction

Superimposition comparisons have developed into a useful tool for assessing identification of unknown skeletal remains. These techniques fall into three general categories: Photographic, Video and Computer added. All three have been modified several times since their first appearance in the scientific literature, and several variations within all three categories are used for identification purposes today. All these methods indicate the mandatory use of skull for comparison.

The first documented use of photographic superimposition in a medico-legal context has been attributed to Glaister and Brash for their analysis of the 1935 Buck-Ruxton case. The superimposition evidence in that case was allowed by the court as supporting evidence in the identity of the unknown skulls. In same manner three high profile cases also included the famous superimposition comparisons used to aid in identification of the remains of Hitler, Bormann and Mengele.

In India the technique of photographic superimposition is employed in situations in which investigation has suggested the likelihood that a set of remains relates to a particular missing person for whom photographs are available, but positive identification has not yet been established. In such case images of skull can be compared with the submitted photographs to establish the probability of

identification. Generally this technique is best used for exclusion, but a positive identification is possible if the morphological features are unique and it becomes more valuable when it is coinciding with other data of identification. Now these days' results of comparisons are improving day by day by the use of digitized images on a computer.

Case history

One skeletal remains was recovered from the out skirts of Junagadh (Gujarat) with blue pent, brown handkerchief and an empty bottle of wine. The case was referred to the Forensic Medicine department, PDU medical college, Rajkot for post-mortem examination as unknown skeletal remains. After assembling and reconstructing the bones into a skeleton, we came to the following conclusions:

1. All the bones belonged to one and the same individual.
2. The skeleton was that of a male as determined from the contour and configuration of the skull, mandible and pelvis, which were available.
3. From the extent of fusion of the skull sutures, the fusion of the iliac-crest with the general consistent appearances in the pelvis and long bones it was opined that his age must have been about 30+/-5 years.
4. Owing to fairly advanced stage of putrefaction it was opined that death could have taken place 2-8 weeks

before starting the post-mortem examination.

5. After making due allowances for missing soft tissues and bones the height was determined as 162-164 cm (5.40-5.47 feet) by using Pearson's formula. The height was also estimated to be the same 162-164 cm from the entire femur of the right side, which was available.
6. An X-ray examination of certain bones showed that there were old healed fracture of lower third of the left forearm bones with shortening effect which was noticed on comparison with opposite forearm bones (as shown in photographs).
7. Cause of death could not be ascertained because there was no evidence of fractures or injuries, which would have in a living person, prove fatal. The chemical analysis report was negative.

Establishment of Identity

1. An FIR was registered in concerned police station by the relatives of the suspected for the missing of a male person of 40 years of age with alcoholic habits from the last 28 days. On the behalf of this information the police informed the relatives of suspected missing person.
2. The body was in a state of skeletonisation and not identifiable, even by the relatives. But the wife of victim identified the clothes present over the body, as they belonged to her husband. The empty bottle of wine found near the dead body was also supporting the same history.
3. Time since death given was coinciding with duration of missing of suspect.
4. The height and age corresponded almost entirely with that of the suspected person.
5. Old healed fracture of left forearm bones with shortening effect was an important clue, which was coinciding completely with past history of fracture of forearm bones in an accident, for which the victim took required treatment of almost 1 month.
6. The skull and mandible was sent for superimposition with available photographs to establish the identity by the superimposition technique and to remove any doubts regarding the

identification initially based on clothes and history only. Superimposition of the photographs of the skull on life-size photographs of the head of the person was found to tally in every respect.

Discussion

Identification means determination of individuality of a person, which may be complete or incomplete. Complete identification means the absolute fixation of individuality of a person while incomplete (partial) identification implies ascertainment of only some facts about the identity while others remain still unknown. The most successful approach utilizes close co-operation between the investigating agencies, forensic experts and other interested parties (family & friends) with pooling of efforts and information.

Identification of an unknown person or a dead body is the duty of the police, but a forensic expert can guide the investigating officer in right direction using his specialized knowledge.

The use of superimposition comparisons continues to be valuable in forensic identification. Advanced technology is poised to take superimposition studies to a new level. Today, the issue of reliability in superimposition comparisons for making positive identification is commonly debated among researchers involved in superimposition analysis. Debate continues as to which technique provides the best indicator of identity. It is likely that each technique has unique advantages and disadvantages.

This case illustrates how modern techniques can be used in the photographic superimposition of skeletal remains. In particular this method can be useful in cases when there are limited resources, and when more expensive and rigorous methods for positive identifications, such as DNA fingerprinting, are not a feasible and accessible option.

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Short Communication

COMPLICATIONS OF ABORTION

The common understanding that surgical abortions in the first trimester of pregnancy are safe is not quite correct.

The gouging of the uterine wall and the resulting growth of scar tissue that often takes place after surgical abortion makes the womb that much the less hospitable for a woman's subsequent child. Accordingly, there is a tendency for a subsequent premature birth following first-trimester abortions. (Cervical and uterine anomalies are other risk factors for premature birth).

A women undergoing abortion **must** be informed that premature birth is associated with cerebral palsy for children and breast cancer for mothers. Abortion's connection to premature birth is not surprising since a violent interruption of a natural reproductive process is likely to harm the reproductive system.

It is also very likely that the abortion of a woman's first child makes her more susceptible to breast cancer. Breast tissue is only matured from cancer-susceptible tissue into cancer resistant tissue during the last eight weeks of a full-term pregnancy. During this time, women receive protection from oestrogen overexposure experienced during the first two trimesters of pregnancy.

Dr. C.K.Parikh
USA

LETTERS TO THE EDITOR

Dear Sir

Let me congratulate you on bringing out 5th annual issue of Journal of Punjab Academy of Forensic medicine and Toxicology. The sincere effort done by you for such academic activity will go a long way in cultivating academic and research culture among youth joining the discipline of forensic medicine as well as update the knowledge of those presently working the specialty in the ongoing developments in the general and in the Indian Scenario particular.

In view of the ongoing terror related activities in India I request you to invite and publish some articles on mass causality management that I feel this is an area where the discipline of forensic medicine needs to contribute a lot to update the knowledge of experts working in the field.

Dr. Dasari Harish

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Dear Sir

I have gone through the contents of the paper titled profile of poisoning cases reported by state chemical laboratory Punjab contributed by Dr. DC Sharma and Dr. DS Bhullar to the journal of Punjab Academy of Forensic Medicine and

Toxicology volume 5, page 22. It was interesting to note that a very similar pattern prevails in Simla and the surrounding areas of HP particularly Kangra Hamirpur and Una belt. It is suggested that such data from other states of India particularly the western and southern states should be published in the journal for the general interest of those working in the discipline of forensic medicine and toxicology

Dr. HS Sekhon

Associate Professor and Head
Indira Gandhi Medical College
Simla

Dear Sir

I have gone through the editorial published in the volume 5 of the Journal of Forensic Medicine and Toxicology on Legal Aspects of Telemedicine – Telemedical Jurisprudence. The idea projected is innovative and at the same time an eye opener. I request you to publish more details regarding the applicability of telemedicine in the practice of forensic medicine and toxicology particularly when the consultation is sought by the investigation agencies.

Dr. BR Sharma

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