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Journal of Indian Academy of Forensic Medicine

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From the Editor's Desk

Warm greetings of the New Year to one and all form the office of Editor. Many of the learned members enjoyed the deliberations at " **Forensic Medicon-2009**" at Nagpur. The striking feature of the gathering was a reasonable number of postgraduate students, who are the promising future of discipline and shining stars of the academy.

As compared to previous year the first number of the current year is published almost in time. In addition to diverse themes in original work, case reports and review articles, two renowned experts have contributed on the "virgin" aspect of day to day medicolegal work and the Right to Information Act. I hope it will open up a plethora of debate among the fraternity and in turn some practical guidelines will surface in the interest of medico legal practioners, of course complying the lax loci.

C B Jani

Editor

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Editor

Guest Editorial

The RTI Act and medical profession

The Right To Information Act, 2005 (RTI Act) is intended to provide for setting out the practical regime of right to information for citizen to secure access to information under the control of public authority in order to promote transparency and accountability in the working of every public authority, the constitution of a central information commission and state information commission and for matter connected there with or incidental there to.

In chapter I of the Act, various terms i.e. “information”, “public authority”, “record” and “third party” etc. has been well defined with reference to other provisions of the act.

While professing medicine a Register Medical Practitioner (RMP) may come across medical as well as medicolegal case. In first situation, it is the patient who discloses his health details in form of history, physical examination and investigations. In the later situation such exercise is under taken by RMP on requisition by police or court as a competent authority to order medico legal examination with or without consent, as the case may be.

As far as medical case is concerned S. 2.2 of the Indian Medical Council (Professional Conduct, Etiquette and Ethics), Regulations, 2002, states that “Confidences concerning individual a domestic life entrusted by patients to a Physician and defect in the deposition or character of patients observed during medical attendances should never be revealed unless there revelation is required by the laws of the State.” The similar spirit of ***“Profession Secrecy”*** is also reflected in various provisions of The Medical Termination of Pregnancy Regulations, 1975, in which record-having details of the aborted women have to be kept **SECRET**. Whenever there is conflict between two persons worth civil or criminal trials, one of the parties may be eager to procure as many as of information about other party with intention of strengthening his side or weakening opponent’s side. Thus, his spouse or its counsel may demand information pertaining to a particular person.

For example, in one case of suicide by female,(u/s 306 of IPC)the defense lawyer procured some medical records pertaining deceased from a psychiatrist (private practitioner)about her treatment under provisions of RTI Act and produced the treating psychiatrist as defense witness, of course to link the mental ill health and suicide by the deceased. [U/s 231 of Cr.P.C. in a trial before a court of Sessions, judge shall proceed to take all such evidence as may be produced in support of the prosecution and subsequently u/s 313 of Cr.P.C. accused is allowed to explain any circumstances appearing in evidence against him]. Under the circumstances, treating psychiatrist was just to share patient information as per S. 2.2 of IMC Regulations 2002, which states that information can be reveled if required by the laws of State.

Similar circumstances may arise in a medicolegal case where the accused or his legal representative may ask for any information of the case and as per Ss. 6 (2) of RTI Act “an applicant making request for information shall not be required to give any reasons for requesting the information or any other personnel details except those may be necessary for contacting him.” Though, the decision of entertaining such applications has to be taken by “ State public Information Officer” or his subordinate, the Forensic fraternity shall have knowledge of some relevant sections of narrated as follows:

Exemption from disclosure

8(1) Notwithstanding anything contained in this Act, there shall be no obligation to give any citizen,

b] Information which has been expressly forbidden to be published by any court of law or tribunal or the disclosure of which may constitute contempt of court.

h] Information which would impede the process of investigation or apprehension or prosecution of offenders.

Severing the part of information

10(1). Where a request for access to information is rejected on the ground that it is in relation to information which is exempt from disclosure, then, notwithstanding anything contained in this Act, access may be provided to that part of the record which does not contain any information which is exempt from disclosure under this Act and which can reasonably be severed from any part that contains exempt information.

Notice to third party

11(1). Where a central public information officer or a state public information officer, as the case may be, intends to disclose any information or record, or part of thereof on a request made under this Act, which relates to has been supplied by a third party and has been treated as confidential by that third party, the central public information officer or state public information officer, as the case may be, shall, within five days from the recipient of the request, give a written notice to such third party of the request and of the fact that the central public information officer or state public information officer, as the case may be, intents to disclose the information or record, for part thereof, and invite the third party to make a submission in writing or orally, regarding whether the information should be disclosed, and such submission of the third party shall be kept in view while taking a decision about disclosure of information.

Provided that except in case of trade or commercial secrets protected by law, disclosure may be allowed if the public interest in disclosure outweighs in importance any possible harm or injury to the interest of such third party.

Denial under good faith

21. No suit, prosecution or other legal proceeding shall lie against any person for anything which is in good faith done or intended to be done under this Act or any rule made there under.

Summarily, any information [here, related to MLC and medical case] desired by an applicant-making request to "State Public Information Officer" and in turn to be disseminated by a RMP in medical case or in medicolegal case shall be entertained in the light of above among other provisions of the Act. The provision the of the Act are general and not specifically expressed for medical profession and hence subject to interpretation by legal authorities in case of contested interpretation as the case may be. In developed countries like USA, there is a separate chapter on "Confidentiality of Medical Information Act" in California Civil Code Section 56-56.16, having categorical emphasis on physician-patient relationship and confidentiality of medical information. It is the right time that Forensic fraternity shall gear up themselves to frame and suggest a uniform guideline in accordance with the present provision of the Act or even suggest unequivocal amendments in the Act referring to medical information.

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Originals and Papers

A comprehensive study of motorcycle fatalities in South Delhi

C. Behera , (Lt. Col.) Ravi Rautji ** , Sanjeev Lalwani*** & T. D. Dogra *****

Abstract

Ninety four cases of motorcycle fatalities received from South Delhi were studied during April 2007 to March 2008 at All India Institute of Medical Sciences, Delhi. Data was analyzed with regard to the age and sex of the victim, pattern of injury, use of helmet and presence of alcohol in victim, cause of death, time of accident, mode of transportation of the victims to hospital, and offending vehicles. The cases represented 5.38% of all autopsy cases during the study period. In 93.6% cases victims were male as compared to female 6.4%. Commonest age group involved was 21-30 years (44.67%). Head injury, including cervical spine injuries, was the most common cause of death (74.47%). Heavy motor vehicle was the offender vehicle in maximum number of cases (34.04%). Most of the deceased on motorcycle were drivers (78.72%), out of which only 54.05% wore a helmet at the time of accident. None of the pillion riders were found wearing a helmet at the time of the incident. Only six cases (6.38%) were found positive for alcohol.

Key words: *Motor cycle, accidents, injuries, alcohol*

Introduction

A motorcycle or motorbike is a single-track, two-wheeled motor vehicle powered by an engine. According to NCRB India, 2005 report[1], 16108 people died due to motorcycle accident, which constitutes 16.4% of all vehicular accidents. Among all Motor vehicles fatalities, motorcycles are the most dangerous type of vehicle to drive. Motorcycles often have excessive performance capabilities, especially rapid acceleration and high top speed. They are less stable as compared to other vehicles in emergency braking. Motorcyclists are more prone to crash injuries than other vehicle drivers because they are unenclosed, leaving the rider vulnerable to contact with hard road surfaces.

A fatal outcome is more likely to be associated with a larger engine capacity motorcycle, collision with a heavy vehicle, head on collision, and collision at a non-junction road. A helmet is designed to cushion and protect riders' head from the impact of a crash. Several studies showed that helmets decrease the severity of injury, the likelihood of death, and the overall cost of medical care but claims have been made that helmets increase the risk of neck injuries and reduce peripheral vision and hearing.

Motorcycle crashes are predictable and therefore preventable. The known interventions were discovered through research and development conducted mainly in developed countries.

The Department of Forensic Medicine of All India Institute of Medical Sciences, New Delhi conducts the postmortem examination in all cases of unnatural death in South Delhi. In recent years there has been a significant increase in autopsies conducted by the Department. Despite of newer modalities of medical and surgical

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management there is an increase in mortality of motorcycle fatalities.

Material and Method

The study was carried out at the Mortuary and Toxicology laboratory of Department of Forensic Medicine &Toxicology, AIIMS, New Delhi from April 2007 to March 2008. The study participants were all victims of fatal motorcycle accidents brought to the mortuary by police for post-mortem examination from South-Delhi jurisdiction (death within 30 days of the crash). Information was obtained from the relatives of the deceased, police inquest, hospital records, and post-mortem examination findings. Blood sample was collected from victims. All the samples were screened first for the presence of volatile compounds using Cavette test (Qualitative Test). The positive samples were tested quantitatively for alcohol using GLC (Gas Liquid Chromatography).

Results

Ninety four cases of motorcycle fatalities were reported during the study period, amounting to about 5.38% of all autopsied cases received in the mortuary of All India Institute of Medical Sciences during the period of April 2007 to March 2008. As compared to females (6.4%) majority of the victims (93.6%) were males with a male: female ratio of 14.66:1(Table. 1). Commonest age group involved was 21-30 years (n=42, 44.67%) followed by 31-40 years (n=26, 27.66%). No case was reported in the age group of 0-10 years. (Table.2) Maximum number of accidents occurred on ring road (36.17%) followed by the interstate highway (34.04%), passing through Delhi. Most of the deceased (n=74, 78.72%) were driving the vehicle at the time of accident, out of which only 54.05% (n=40) wore helmet at the time of accident. None of the pillion riders were wearing helmet at the time of incident (Table 3). Maximum accidents occurred between 006hrs to 1200 hrs (n=32, 34.04%) followed by between 2400hrs to 0600 hrs (n=28, 29.79%) (Table 4). Most of the fatalities occurred due to impact of another vehicle from behind (40.42%**)**, followed by fall of the rider due to loss of balance of vehicle due to various reasons (29.78 %). In a majority of cases offending vehicles were, the heavy weight motor vehicle (34.04%) followed by the medium weight motor vehicle (19.14%). In 38.30% (n=36) cases death was on the spot followed by survival of the victim for one week only two case (2.13%) by ambulance (Table 6). Head and face was the most vulnerable body region involved in 89.36% (n=84) of cases followed by extremities in 55.31% of cases. (Table 7) Head injury including cervical spine (n=70, 74.47%) was the leading cause of death followed by visceral injury (17.02%) (Table 8). Cervical spine injuries were seen in eighteen cases (19.15 %). Alcohol was found positive in only six cases (6.38%).

Discussion

In our study, there were 94 cases of motorcycle fatalities amounting to 5.38% of total medico-legal autopsy conducted during the period. Majority of cases (n=88, 93.6%) were male as compared to female (n=6, 6.4%). Male to female ratio was found out to be 14.66:1. It is due to greater male exposure on streets and the personal and behavioral characteristics of male. Similar findings were recorded in studies by *Wladis A et al* [2] and *Sirathranont J* & *Kasantikul V* [3].

Commonest age group involved was 21-30 years (44.67%) followed by 31-40 years (27.66%). The age group 20-40 years is the most active phase of life, physically and socially, and outnumbers the other road users, they therefore account for the maximum number of accidental deaths. Similar findings were seen in studies by *Dandona R et al* [4] in Hyderabad, where maximum fatality in motorized two-wheeled vehicles (MTVs) was seen in the age group 21-40 and Ding SL et al in Taiwan, where the most common motorcycle accident injured patients were generally young males, laborers or students**.** In contrast, a study by *Sirathranout J & Kasantikul V* [3] in Thailand, found the age more vulnerable group to be below 21 yrs.

Maximum accidents occurred between 0600hrs to 1200 hrs of the day (34.04%) followed by between 2400hrs to 0600 hrs (29.79%). During morning hours most people are in a hurry to

reach their office complex. Delhi being the capital of India, numerous people work in the offices of business organization, and BPOs. Most of the people who use two wheelers belong to a comparatively younger age group.

Most of the deceased (78.72%) were driving the vehicle at the time of accident, out of which only 54.05% wore a helmet at the time of accident. None of the pillion riders were wearing helmets atthe time of the incident. Helmeted riders showed more severe somatic (below-the-neck) injuries as compared to non-helmeted riders, suggesting that helmeted riders are less likely to sustain fatal injuries in low-threat accidents. However in most of the cases, helmets could not remain in place during the accident. In a retrospective study by *Sirathranont J& Kasantikul V* [3], the peak incidences of all motorcycle crashes were found between 1800hrs to 2100hrs. Male motorcycle riders accounted for 69 per cent of the accident population, and most riders were under 21 years of age. Only 4 per cent of the riders were wearing helmets at the time of the accident. Helmet usage was much lower among passengers, only about 1 per cent.

In a study by *Heilman DR et al* [5], more than 60% of the 2,934 crash involved non-helmeted cyclists. Two-thirds of all crashes resulted in injury, with head, neck, and face (HNF) trauma accounting for 21.4% of all lesions. Compared to their helmeted counterparts, helmet-less riders suffered HNF trauma 2.30 times as often, and were 3.19 times as susceptible to fatal injuries. The number of injuries and the severity of trauma were significantly higher for those individuals not wearing helmets. A substantial decline in usage of helmet occurred in those under 18 years of age, despite the legal requirement.

In the present study, the majority (n=64, 68.08%) of the patients were transported to the hospital by PCR van (Police Control Room van), followed by private vehicle (n=28, 29.79%) and in only two cases (2.13%) by ambulance. PCR vans were the most effective mode of transport, because of their large number and effective mode of communication. In most of the cases

PCR vans reached the site within 20 minutes. This is consistent with the study of *Sahdev P et al* [6] in 1993**.** In a majority of the cases offending vehicles were heavy weight motor vehicles such as bus, truck and minibus (34.04%) followed by medium weight motor vehicles (19.14%). This is consistent with the study conducted by, *Sharma BR et al* in or more (n=26, 27.66%) (Table. 5). Most of the victims were transported to the nearest hospital by PCR van (Police Control Room van) (n=64, 68.08%), followed by private vehicle (n=28, 29.79%) and in 2001[7].

Head and face was the most vulnerable body region involved in 89.36% of cases followed by extremities (55.32%) (Table 7). Cervical spine injuries were seen in eighteen cases (19.15%). The significant finding of this study was the presence of serious internal neck injuries despite the absence of external physical evidence of trauma to the neck. Head and neck injuries (74.47%) were the leading cause of death followed by visceral (Thoracic and abdominal) injuries (17.02%) In a study by *Sirathranont J & Kasantikul V* [3], upper and lower extremities were injured most frequently, although these injuries were not life threatening. The most fatal injuries to the motorcyclists were to the head, abdomen, and chest in decreasing frequency. In a similar study by *Doyle D et al* [8]**,** legs, arms, head and thorax were the most commonly injured body regions. Serious injury to one or both of the latter two regions appeared to be implicated in the fatal outcomes.

No significant difference in the pattern of injuries to helmeted and helmet-less driver/pillion rider was seen in the study. (Table 8 to Table 11) This is because the study was conducted for fatal cases only, and most of them were high-threat accidents, suggesting helmeted riders are not fully protected from sustaining fatal injuries to head and neck in high-threat accidents. Presence of alcohol was seen only in 6.38% of the cases. Maximum concentration of blood alcohol was 100mg %.

Acknowledgement

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Table- 1: Sex wise distribution

Sex	Number	%
Male	88	93.6
Female	6	6.4

Table –2: Age wise distribution

Age (yrs)	Total	%	Male	Female
0-10	0	0	0	0
11-20	10	10.64	8	2
21-30	42	44.67	42	0
31-40	26	27.66	24	2
41-50	8	8.51	6	2
51-60	4	4.26	4	0
>60	4	4.26	4	0

Table –3: Use of helmet in occupants

Sr.No.	Occupant	No. of cases	%	Use of helmet			
				Yes	%	No	%
1	Driver	74	78.72	40	54.05	34	44.95
2	Pillion rider	20	21.28	0	0	20	100

Table- 4: Time of accident

Sr.No.	Time	No. of cases	%
1	2400 hrs to 0600 hrs	28	29.79
2	0600hrs to 1200 hrs	32	34.04
3	1200hrs to 1800hrs	20	21.28
4	1800hrs to 2400hrs	14	14.89

Table- 5: Survival period

Sr.No.	Survival time	No. of cases	%
1	Died on the spot	36	38.30
2	Brought dead to hospital or died within hour of admission	18	19.15
3	Up to 24 hrs	8	8.51
4	1 day - week	6	6.38
5	> 1 week	26	27.66

Table- 6: Mode of transportation

Sr.No.	Mode	No. of cases	%
1	Private vehicle	28	29.79
2	Ambulance	02	2.13
3	PCR Van	64	68.08

Table -7: Injured body region

Sr. No.	Body region	No. of cases	%
1	Head & face	84	89.36
2	Neck	18	19.15
3	Thorax	30	31.91
4	Abdomen & Pelvis	26	27.66
5	Extremity	52	55.32

Table- 8: Cause of death

Sr. No	Cause	No. of cases	%
1	Central nervous system	70	74.47
2	Visceral injury (Thorax and abdomen)	16	17.02
3	Combination	08	8.51

Table- 9 : Pattern of injury in helmet users

Sr.No.	Body region	No. of cases	%
1	Head & face	34	85
2	Neck	8	20
3	Thorax	14	35
4	Abdomen & Pelvis	14	35
5	Extremity	22	55

Table –11: Pattern of injury in non-helmet users (Total 54 cases)

Sr.No.	Body region	No. of cases	%
1	Head & face	50	92.59
2	Neck	10	18.5
3	Thorax	16	29.62
4	Abdomen & Pelvis	12	22.22
5	Extremity	30	55.55

Table- 10: Cause of death in helmet users

(Total 40 cases)

Sr. No	Cause	No. of cases	%
1	Head injury	30	75
2	Visceral injury	8	20
3	Combined	2	5

Table- 12:Cause of death in non-helmet users

(Total 54 cases)

Sr. No	Cause	No. of cases	%
1	Head injury	40	74.08
2	Visceral injury	8	14.81
3	Combined	6	11.11

Originals and Papers

Determination of cause of death in decomposed bodies-A regional study

Cyriac job

Abstract

Once we die, the tissues have to reach the food chain, which is brought by various processes. But this can cause misinterpretation of ante mortem findings. In order to assess the extent of these changes, its effect on injuries, assessment of cause of death in such cases, the extent of certainty etc one year study was conducted at Thrissur Government Medical College during the year 2007. All decomposed bodies were included in this study. Males were more with a ratio 5.13:1. Maximum incidence was in the age group of 31 to 50 years; with mean age 38.46 years $\pm$ 14.2361 years. The age ranged from newborn to 92 years in male and 75 years in female. All were found dead cases and majority recovered from water. On Postmortem opinion was arrived at in 101 cases and not in 40 cases. A taught standard rule of thumb does not hold true as postmortem changes are influenced by various variables. Despite technical difficulties in handling the decomposed the autopsy was still a useful diagnostic exercise to find out both the cause and manner of death.

Key words: *Decomposition, pm changes, cause of death*

Introduction

Once any human being die, the tissues have to reach the food chain. This process is brought by chemical (mostly enzymatic) and bacterial reaction and by the action of predators. But this can cause misinterpretation of medico legally significant ante mortem findings[1] or even reporting of wrong findings. Putrefaction of the body is one of the most significant artifacts [2]. No opinion is better than poor opinion[3], but still we are forced to comment on the same. We can easily identify some findings in most cases. In some case we can say certain findings were absent. Both are equally important in diagnosing manner and cause of death. We get bodies in a decomposed state for postmortem examination recovered from water, railway track, closed rooms etc. In rail death cases there may be multiple injuries of varying age. We have to say which are the ante mortem injuries and whether there are any postmortem injuries. Once the skin is pealed off due to decomposition it may be difficult to identify injuries like abrasions, which are of very crucial value in homicidal cases.[4] During postmortem examination we are forced to give a reasonable opinion regarding the cause of death.

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Aims and objectives

In order to assess whether it is easy to find out injuries, cause of death, pattern of changes after death etc in decomposed bodies and to assess the extent of certainty, one year (2007) study was conducted. All cases where the body is in a decomposed state at the time of postmortem are included in this study. Further it is also aimed at to study the age wise and sex wise incidence of such cases, common causes of death, time since death etc.

Materials and Methods

At Thrissur Government Medical College we are doing more than 1500 postmortem per year. We are getting cases not only in and around Thrissur but also from Palakkad and Malappuram districts. A retrospective study of all cases of postmortem done during the period 2007 was conducted using proforma. The postmortem findings and the investigation reports were correlated. Age, sex etc were correlated.

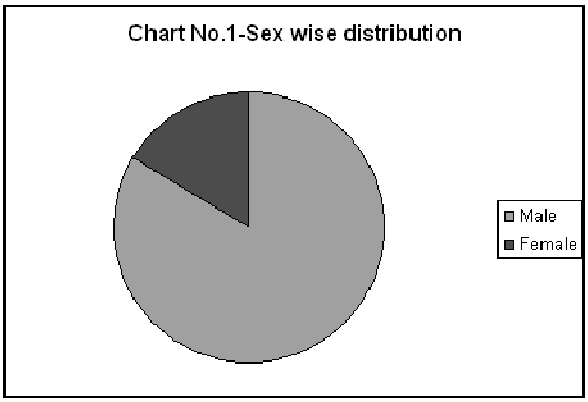
Incidence of such cases with season was also studied. Statistical analysis is done using the software "Epi Info."

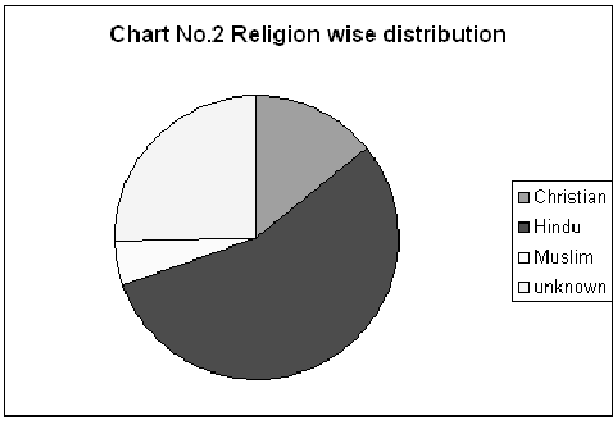
Observations

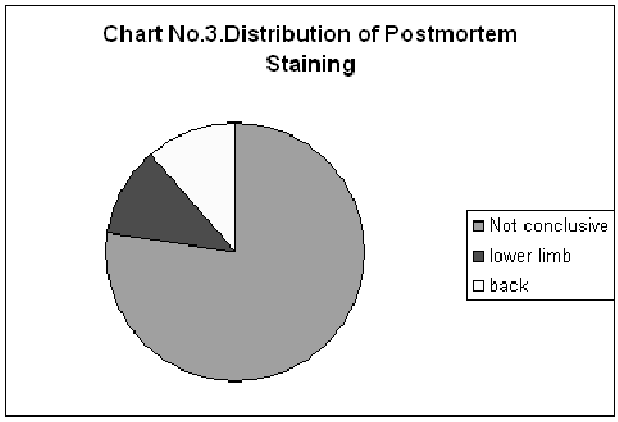
During the year 2007, 1807 cases were brought for postmortem examination at the department of Forensic Medicine, Thrissur Govt. Medical College. Of these 141case (07.8%) showed varying degrees of decomposition starting from greenish discoloration of right iliac fossa and these cases were selected for detail study. Fully skeletonised dry bodies were excluded.

Males (n=118 (83.7%) out numbered females; 23cases (16.3%). The ratio is 5.13:1. The incidence is maximum in the age group of 31 to 40 years (n=32: 22.7%)), followed by the age group 41 to 50 years, ie. 31 cases (22%). Mean age is 38.46 years $\pm$ 14.2361 years. The median age is 37.75 years. Maximum case is seen in the age of 24 and 30 years (22 cases ie 15.6 % each). The age ranged from newborn to 92 years in male and 75 years in female (one case each). Four newborns out of the six are females (male: female 1:4). There are 78 (55.3%) Hindus, 20 (14.2%) Christians and 07 (05%) Muslims. Thirtysix (25.5%) are unknown. All are found dead cases. Majority (n=60: 42.55%) recovered from water. As per the requisition form (KPF 102) there are 15 (10.63%) hanging cases, 9 (6.38%) homicides and in 46 (32.62%) police could not found out any apparent cause. On Postmortem examination 11 (07.8%) cases are found to be natural deaths, 8 (05.57%) poisoning cases, 44 (31.21%) drowning cases, 7 (4.96%) head injury cases and no opinion is arrived at in 40 (28.32%) cases. There are incidence of firearm injury, strangulation, decapitation and electrocution (one case each). Among the different months maximum cases were received in the month of July. Among the 21 cases 18 were recovered from water.

Postmortem staining was not conclusive in 109 (77.3%) cases. Bloating was earliest more common in the genital area. It was found only in the genital organs in 3 and found associated with face in 12 cases, abdomen in 18 and both abdomen and face in 11. Eggs of flies present in 8 (5.67%), maggots in 35 (24.82%), both eggs and maggots in 2 (1.4%) and absent in 96 (68.08%). Pupa was seen in a mummified body.



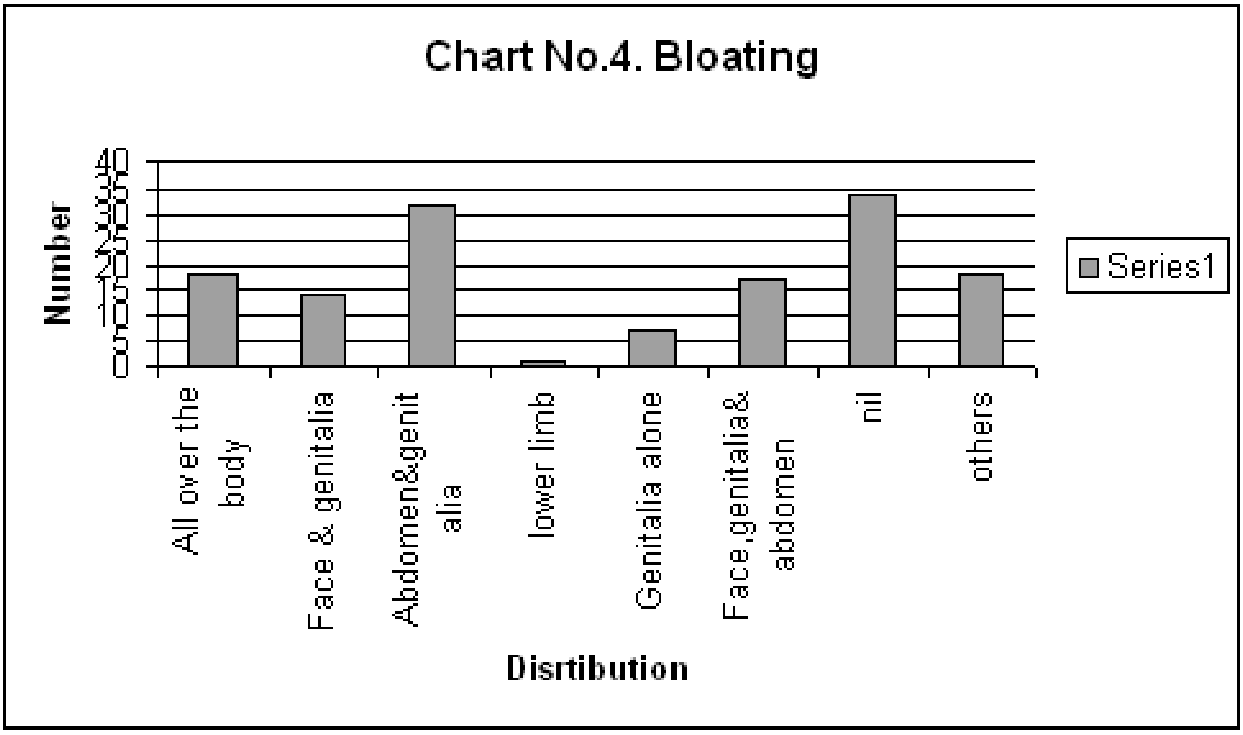


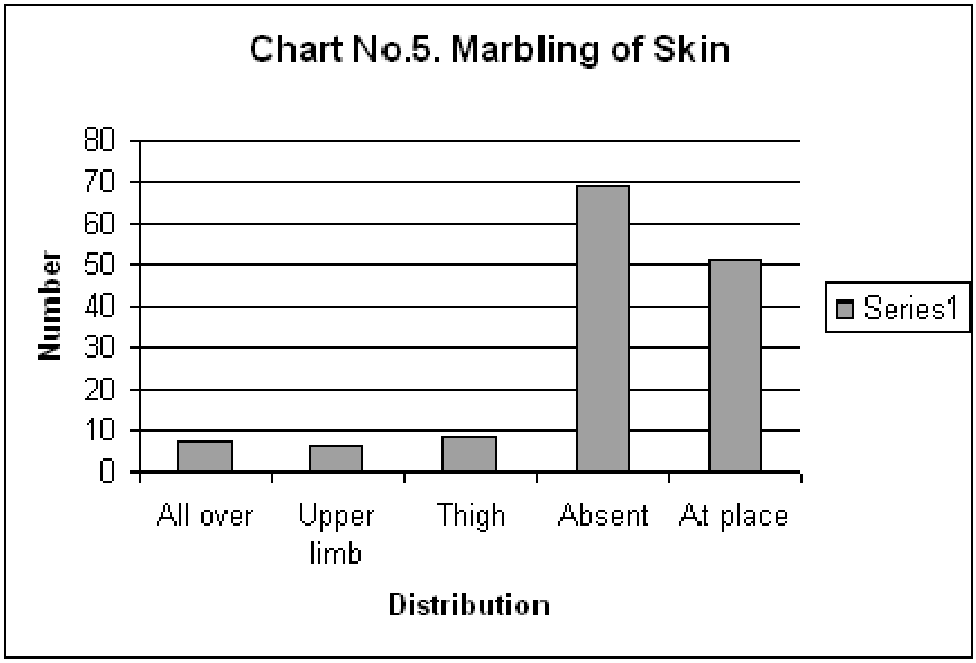


In 5 cases (03.54%) there was no discolouration even though bloating was present in some areas. Varying shades of discolouration was seen in 18 cases (12.77%) as against 91 cases (64.54%) were discolouration was uniform. In other cases it was regional. In 9 the body was

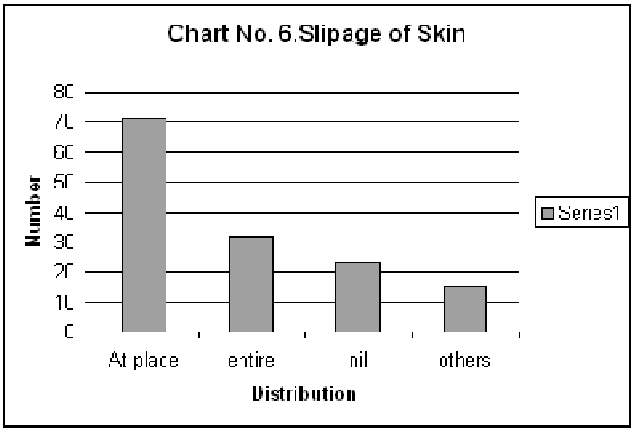
partially skeletonised and in 2 almost skeletonised. Including this marbling could not be appreciated in 69 cases (48.94%) while in 6 cases (04.26%) that was present all over the body.

In 51 cases (36.17%) it was seen at place.. In 89 (63.12%) cases the rigor mortis was lost while in 23 (16.31%) it was still retained all over and in 16 (11.35%) cases it was retained on lower limbs only.





Job : Decomposition & cause of death



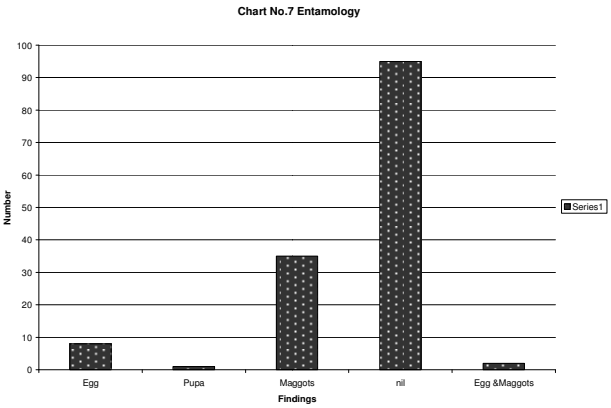


Table-1 : Frequency of cause of Death

Sr. no	Cause of death	Number	Percentage
1	Found dead	46	32.62
2	Hanging	15	10.63
3	Found in water	60	42.55
4	Poisoning	01	00.7
5	Homicide	09	06.38
6	Rail Track	08	05.67
7	Electrocution	01	00.7
8	Firearm Injury	01	00.7
	Total	**141**	**100**

Table-2 : Frequency of Age and Sex

Sr.no	Age group	Number		Total	Percentage
		Male	Female		
1	New born to 10yrs	2	4	06	04.26
2	11 to 20 yrs	4	1	05	03.55
3	21 to 30 yrs	16	4	20	14.18
4	31 to 40 yrs	27	5	32	22.69
5	41 to 50 yrs	27	4	31	21.99
6	51 to 60 yrs	24	3	27	19.15
7	61 to 70 yrs	10	1	11	07.8
8	71 to 80 yrs	06	1	07	04.96
9	81 to 90 yrs	01	0	01	00.7
10	91 to 92 yrs	01	0	01	00.7
	Total	**118**	**23**	**141**	**100**

Table-3: Frequency of cause of death in different Months

Month	Found dead	Hanging	Found in water	Poisoning	Homicide	Rail Track	Electro-caution	Firearm Injury	Total	%
Jan	4	1	1	0	2	0	0	0	8	05.67
Feb	0	1	2	0	2	0	0	0	5	03.55
Mar	4	0	2	0	0	0	0	0	6	04.26
Apr	5	3	1	1	3	1	1	1	16	11.35
May	7	1	0	0	0	3	0	0	11	07.8
June	2	0	4	0	0	1	0	0	7	04.96
Jul	3	0	18	0	0	0	0	0	21	14.89
Aug	2	1	7	0	1	0	0	0	11	07.8
Sept	6	2	8	0	0	0	0	0	16	11.35
Oct	4	2	5	0	1	2	0	0	14	09.92
Nov	5	2	7	0	0	1	0	0	15	10.64
Dec	4	2	5	0	0	0	0	0	11	07.8
Total	**46**	**15**	**60**	**1**	**9**	**8**	**1**	**1**	**141**	**100**

Table-4 :Opinion wise and cause wise frequency

cause	Found dead	Hanging	Found in water	Poisoning	Homicide	Rail Track	Electro caution	Firearm Injury	Total	%
Natural	11	0	0	0	0	0	0	0	11	07.8
Hanging	0	15	0	0	0	0	0	0	15	10.64
Drowning	0	0	44	0	0	0	0	0	44	31.21
Poisoning	7	0	1	0	0	0	0	0	08	05.67
Stab	1	0	0	0	2	0	0	0	03	02.12
Multiple injury	0	0	0	0	1	2	0	0	03	02.12
Head injury	0	0	0	0	4	3	0	0	07	04.96
RPCER	25	0	14	1	0	0	0	0	40	28.37
miscellaneous	2	0	1	0	2	3	1	1	10	07.09
Total	**46**	**15**	**60**	**1**	**9**	**8**	**1**	**1**	**141**	100

Discussion

Males (n=118; 83.7%) out numbered females (n=23:16.3%) with a ratio of 5.13:1. This could be due to our culture where females spend most of their time in the houses and their absence usually enquired about. The proportion is reversed in case of new born (male: female 1:4), indicating that female feticide is more even in Kerala. The incidence was maximum in the age group of 31 to 40 years (n=32: 22.7%), followed by the age group 41 to 50 years, ie. 31 cases

(22%). Maximum case was seen in the age of 24 and 30 years. This is the age group where men leave their home in search of employment etc. Hindus were involved more compared to other community.(55:14:5). All were found dead cases. Majority (n=60: 42.55%) recovered from water that too more during the monsoon period. Many water sources are not protected and those fell in water usually come to the surface only on decomposition. This also denotes that in most of the cases the death is accidental.

Even though the autolytic process starts at cellular level much earlier, appearance of different shades of colour in the skin, formation of gases and liquefaction of tissues are the main presenting features of decomposition. Putrefaction is optimum at temperatures of 20-40^{0}C and that is why bodies exposed to the sun, especially in summer decompose faster.[4] There is no general agreement with regard to the time of commencement, complex involvement, duration and passing of rigor.[5] It is a usually held notion that the putrefaction follows disappearance of rigor mortis, but this may not hold true in all cases because in extreme hot and / or humid months, it may make its appearance before rigor has completely passed off from the body[6]. Dalal et al also found that a uniform time of appearance and disappearance of rigor mortis cannot be made applicable throughout a vast country like India where different weather conditions exist throughout its various parts at a given time[7]. In this study among the 127 decomposed bodies with out late changes rigor mortis was completely lost only in 89 cases (70.08%). Marbling of the skin is distinctly appreciable in the superficial veins of abdomen, shoulders, chest and neck.[6] In this study it was not well marked in 69 cases while in 6 cases it was present all over. In 65 (46.1%) cases it was scattered.

Determination of time since death from decomposed bodies is an important exercise. Built of the body, age, environmental condition like temperature and humidity (moisture), clothing, manner of burial, type of soil at the buried place, cause of death, presence of maggots etc are a few which modify the rate of putrefaction. Most of the above data can be collected from the body. But climatic changes have to be collected from regional metrological centre or by using special instruments in the department. Entomological studies also help a lot in determining postmortem interval. But for that purpose the temperature and humidity data of the site where body is being recovered plays an important role[8]. As a taught standard rule of thumb does not hold true; a body wise critical analysis based on postmortem findings and variables especially temperature and humidity (Maximum, minimum and average of each day) is needed. Such an analysis was not employed here.

Postmortem discolouration and marbling of skin are mainly attached to the production of sulphmethhaemoglobin. Even though clothing hastens putrefaction initially by preserving body temperature, close contact with the body (especially braziers, socks etc) retards putrefaction by obstructing vessels and preventing spread of organisms. Contact with hard substance, positions of the body etc also contribute to this. Thus we cannot expect a uniform postmortem discolouration. It may differ from body to body, from environment to environment and from on part of the body to aother.[6] Sometime one part of the body may be mummified, while the rest may show liquefying putrefaction. In this study in three cases both mummification and adiposere were present. Postmortem staining and contusions are differential diagnosis and when putrefactive changes are well advanced it may be impossible to decide whether the blood pigment in the area originated from intravascular or extravascular source[5]. Varying shades of discolouration was seen in 18 cases (12.77%) as against 91 cases (64.54%) were discolouration was uniform. In 22cases (15.6%) it was regional. Postmortem staining was not conclusive in 109 cases (77.3%). Shifting of areas of postmortem staining is another effect owing to the pressure of gases in the blood vessels.

Even though decomposed, in majority (n=101 (71.63%) the cause of death was opined but in 40 (28.37%) cases the opinion was reserved. When skin is pealed off, the superficial injuries like abrasion cannot be made out[4]. But

contusion may be described even after many days.[4] In this study we could be able identify abrasions especially pressure abrasion where the skin is found adherent to the tissue underneath. Even on decomposition this skin still remained attached even though pealing was there at other areas. Further abrasions may not be uniformly superficial. At some place there was some amount of involvement of dermis and some were associated with contusion. Such injuries were easily made out. Unusual skin lesions caused by the disruption and dehiscence of healing surgical wounds[9], ante mortem and postmortem may be created by decomposition. But by logical reasoning these can be easily made out and in this study injuries were identified. Histopathological examination was not found helpful as in all cases the pathologist opined that no opinion can be given as the tissues are decomposed.

The climate of Kerala, as in the most of the other part of India, is tropical. Winter is followed by the summer season. Monsoon touches the state in June and remains there till September. During rainy season most ponds and pits were filled with water. In 2007 it extended from June to November. Maximum cases (18 cases) were recovered from water in the month of July. Recently climatic changes are very common and that changes should be recorded.

Conclusion

A taught standard rule of thumb does not hold true as the process of various postmortem changes are influenced by various variables especially temperature and humidity. Incorporation of maximum, minimum and average temperature and humidity of each day during the period from death to postmortem examination and the exact climate is to be included in the Postmortem report. From these data and postmortem changes we can do appropriate calculations to find out time since death. A detail entomological study is to be made mandatory in bodies with eggs, maggots or pupa. This will help us to determine time since death etc. Despite technical difficulties in handling decomposed, colour variation, body changes, maggot activity etc; the autopsy was still a useful diagnostic exercise. Even though fresh and /or preserved bodies give more information, decomposed bodies also give significant pathological and anatomical features which enable both the cause and manner of death. Even in decomposed injuries including abrasions can be made out and can be differentiated from postmortem injuries.

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Originals and Papers

Defense wounds in homicidal deaths

Mohammed Iliyas Sheikh, Pranav Prajapati **& Vijay Kaushik ****

Abstract

In order to determine the incidence and specific pattern of defense wound, this study was carried out on 193 homicidal deaths, which showed defense wounds in 54(27.98%) cases. Out of 54 victims, 88.89% were males and 11.11% were female. The maximum numbers of homicidal cases with defense wounds were seen in unknown group (14%) followed by business group (11%). It was found that the most common defense wound was incised wound (46.29%). It was found that in 55.56% of cases, sharp weapons were used whereas in 35.19% of cases blunt weapons were used. In 31.51% of cases defense wounds were seen on both sides while in 40.47% of cases left side of the body was involved.

Key words: *Victim, defense wound, homicide, sharp weapon, palm.*

Introduction

Defense wounds are the results of immediate and instinctive reaction of the victim to save himself[1,2]. Defense wound in case of homicidal deaths resulting from raising the arm to ward off the attack from the assailant or by grasping the weapon of offence [3].

Defense wounds are slashes on the fingers, hands and forearm resulting from all instinctive reaction in self-defense. Wounds are seen commonly on the palms and palmer aspects of the fingers. The grasping of the attackers weapon usually causes wounds on palmer aspects of the hands. Those on back of the hand or on the forearm are caused by attempts to ward off the attack. With sharp weapons the wounds are clean cut; with blunt weapons one may see bruises, abrasion and lacerations. If the weapon grasped by the victim has two sharp edges, wounds are present on the palm as well as on the palmer aspects of the fingers [4].

Although the presence of defense wounds constitutes strong evidence in favor of homicide, the absence of such wound does not rule out a homicidal attack. With a surprise attack the first serious wound may render the victim defenseless. Attack from the back does not give the victim a chance to defend himself, nor will a person under the influence of alcohol or drugs or all rendered unconscious be able to defend himself. Under such circumstances defense wounds are lacking.

Either by supportive or contradicting the medical evidence (i.e. autopsy finding), correct diagnosis of homicide is made with the statement given by the suspects of the witnesses. Defense wound form a valuable evidence for reconstructing the fatal incidence in homicidal deaths.

Material and method

The present study was carried out on homicide victims, consisting of 193 cases brought for medico legal postmortem examination to the mortuary of Government Medical College and New civil Hospital, Surat from January 2004 to December 2005 and Surat Municipal Institute of Medical Education and Research (SMIMER) from June 2005 to December 2005(five police station area were being authorized to SMIMER for doing postmortem examination).

The study was conducted for two-year period during which 4680 medico legal postmortem were conducted. Out of them 193

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cases were of homicide. Out of them 54 cases showed defense wounds. Interpretation of defense wounds was done after careful and complete consideration of all circumstances surrounding the offence and death. All cases of homicide victims either confirmed by investigating police officer or suspected or found to be homicide at postmortem.

In this study each cases of homicide showing defense wound were examined to determine the age, sex and occupation of victim, type of injury, weapon used, side involved.

Table- 1 :Incidence of defense wounds

Period of study	Total homicidal deaths	Defense wound present	Percentage
2 years	193	54	27.98%

Amongst 193 cases of total homicidal deaths, only 54 cases (27.98%) showed defense wound on upper extremities.

Table- 2: Age distribution

Age group in years	Cases with defense wounds	Percentage
0-9	1	1.85
10-19	5	9.36
20-29	22	40.84
30-39	15	27.88
40-49	8	14.91
50-59	2	3.70
60-69	0	0
70-79	1	1.85

Out of 54 cases of defense wound 22 cases (40.84%) belong to 20-29 yrs age group followed by 15 cases (27.88%) belong to 30-39yrs age group.

Table- 3: Sex distribution

Sex	Cases with defense wounds	Percentage
Male	48	88.89
Female	6	11.11

Amongst 54 victims of homicide with defense wound, 48 cases (88.89%) belong to male group. The percentage of defensive attitude among male was about eight times than female attitude.

Table- 4-:Victim's occupation

Occupation	No. of cases with defense wounds	Percentage
Service	10	18.52
Business	11	20.37
Student	6	11.11
Labour	8	14.81
House wife	5	9.36
Unknown	14	25.93

The maximum number of homicidal cases with defense wound seen in unknown group (14%) followed by business group (11%) and service group (10%).

Table- 5: Types of injuries in defense wounds

Type of injury	No. of cases	Percentage
Contusion	10	18.52
Incised	25	46.29
Contusion + Incised	2	3.70
Lacerated wound	9	16.67
Stab wound	2	3.70
Stab wound + Incised	3	5.56
Stab + laceration + contusion	1	1.85
Contusion + laceration	2	3.70

In homicidal deaths, the most common type of injury in defense wounds was incised wound (46.29%) followed by contusion (18.52%) and lacerated wound (16.67%).

Table-6-:Type of weapon used

Weapon used	No. of cases	Percentage
Blunt	19	35.19
Sharp	30	55.56
Both	5	9.36

For defense wounds, the most common weapon to be used was sharp cutting weapons (55.56%) followed by blunt weapons (35.19%).

Table:-7: Distribution of defense wounds over upper extremities

Body parts involved	No. of defense injury by sharp cutting weapon	No. of defense injury by blunt weapon	Total defense wounds
Rt.arm	8	3	11
Rt.forearm	11	8	19
Rt.hand	10	4	14
Lt.arm	10	6	16
Lt.forearm	15	5	20
Lt.hand	13	2	15

Number of cases showing defense wounds were more common on left forearm, left hand and left arm.

Table-8: Defense injuries on victim

Side involved	No. of cases	Percentage
Right side	15	27.75
Left side	22	40.74
Both side	17	31.51

The most common side for defense injuries on victim was on left side (38.89%) followed by both side (31.46%).

Discussion

The present work was undertaken on examination of 54 homicidal cases with various types of defense wounds. On analysis of Table-1 the incidence of defense wound was 27.98% amongst the homicidal deaths. This finding support the findings made by other author.[5, 6] It was observed from table no.3 that male outnumbered female and defensive attitude of male eight times more than female attitude. Male by nature have more defensive to violent activities as compared to female and homicide is largely a male crime because of extrovert nature of males and a male dominant society where they handle most of the disputes and more exposed to extraneous world. In Turkish and U.K. study female showed defense wounds in more number of cases than male [7, 8]. Almost two third (69%) of the victims were in age group 21-40 years, because the commonest homicide group was younger age group (3rd and 4th decade of life), which can be attributed to a fact that more active life in this two decade by nature over involvement in violent activities.

It was observed from Table -4 that victims from business and service group were more involved because of continuous exposure to different people in world. It is also observed from table no.5, 6 that incised wound were the commonest defense wound (46%), while sharp cutting weapon was the most common weapon. From this series it is appeared that when assailants attack with sharp weapon, victim known the risk of life and try to seize the weapons and it is also observed from the Table -7 that left side of victim was more commonly involved. It is the natural instinct of the victim to raise his/her arm to ward of the attack to protect vital organ like brain. *Pollanen MS* states that defensive injuries are common on right side [9]**.** We observed in our study that victim's left arm, forearm and hand were involved because of nearest to that perpetrator therefore these were used as a means of defense first of all.

Conclusion

In the court of law the forensic expert will have to answer certain questions concerning defense wounds. Most common questions are about the type of weapon used by the assailant, on which side assailant was present, number of assailants involved etc. Circumstantial evidence plays a great role in drawing conclusion from the number of wounds indicating which one is defensive wound. Interpretation of defense wound is done only after careful and complete consideration of all circumstances surrounding the trauma and death.

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Originals and Papers

Estimation of age by pubic symphysis metamorphosis in East Delhi population

Arvind kumar, A. K. Tyagi** & K. K. Banerjee***

Abstract

Forensic medical specialists are very often faced with the problem of fixing the individuality of unknown human bodies. The bones are relatively indestructible structures of the body. Bones have abundance of information in them as they resist putrefaction to a great extent. Age related changes occurring in the pubic symphysis in 112 bones (60 males and 52 females) have been explored in this study using Mckern-Stewart criteria. The results show that the Mckern-Stewart criterion can be equally useful in estimation of age for Indian population also.

Key words: *Age estimation, pubic symphysis, Mckern-Stewart criteria.*

Introduction

The simplest and frequently used method for identification of human dead bodies is personal recognition by close relatives. But sometimes identification of an individual pose problem in situations such as advanced decomposition, damage by animals, mass disasters etc, where the bodies have been fragmented or mutilated by various means for various reasons and requires special attention[1]. Under these conditions, the regressive changes in pubic symphysis are one of the best methods to study the features as they are well preserved by virtue of their anatomical position [2-5].

Material and Method

A total number of 112 (60 males and 52 females) human pubic bones from the dead bodies brought for autopsies in the mortuary of department of Forensic Medicine, University College of Medical Sciences and GTB Hospital were studied. Only the bodies of known age without a history of any disease or deformity affecting the bones during their lifetime were included.

The pubic symphyses from dead bodies were removed by cutting the pubic rami at the level of pubic tubercle on either side. They were then buried into the earth for the period of 6-8 weeks to separate the bone from soft tissue of either side by natural process of decomposition. After that the bones were removed, washed, air dried and studied by using criteria of ***Mckern-Stewart*** [6-8]**.** They divide the symphysis pubis into 3 components having six metamorphic changes in each and the symphyseal surface into dorsal and ventral halves by longitudinal ridge or groove. These halves are termed dorsal demiface **(component-I),** and ventral demiface **(component-II). Component-III** is the symphyseal rim, which encircles the two components and appears after the other components have run their course. The total score for an individual is calculated as the sum of the score of all three components.

The component scores and total score for the bone using **Mckern-Stewart Criteria** were cross tabulated in relation to the known age of the bodies and compared with other studies in Indian population.

Observations

A total of One hundred and twelve (112) bones from human bodies in the age group of 20 – 50 years, resident of metropolitan city Delhi,

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East zone were taken for the study. Out of these 112 bones, 60 were from male subjects and 52 from female subjects. The scoring was done using Mckern Stewart criteria.

Component –I

The first feature of component –I of the criteria is dorsal margin, it was observed to begin (score 1) at the mean age of 21.0 years in the both the sexes and was complete (score 2) at the mean age of 22.0 years in males and 23.6 years in females. The second feature, formation of the dorsal plateau was observed to start (score 3) at the mean age of 25.5 years in males and 26.6 years in females and it completed (score 5) at the mean age of 39.5 years in males and 39.1 years in females.

Component-II

The first feature of component –II of the criteria is ventral beveling. It was observed to begin (score 1) at the mean age of 23.6 years in males and 23.2 years in females and completed (score 2) at the mean age of 24.0 years in males and 26.0 years in females. The second feature, ventral rampart was observed to start (score 3) at the mean age of 33.3 years in males and 31.6 years in females and completed (score 5) at the mean age of 42.0 years in males and 40.6 years in females.

Component-III

The first feature of component-III formation of symphysis rim was observed to start (score 1) at the mean age of 32.8 years in males and 31.7 years in females and it completed (score 2) at the mean age of 39.2 years in males and 38.2 years in females. The second feature, rarefaction of symphysis rim was observed to start (score 3) at the mean age of 41.1 years in males and 47.8 yrs in females and it completed (score 5) at the mean age of 49.0 years in males and 49.6 years in females.

Discussion

The total scores observed in the present study, when compared with *Mckern-Stewart* study showed marked overage in present study population. However, for the scores from 0-5, the age difference that was around 3 years but for higher scores the age difference increased further. The study shows that in the early age group the morphological changes have been observed to appear more or less at the same age in both the studies but the maturation of pubic symphysis was observed to appear early in bones from American population as compared to bones from Indian population.

When the present study is compared with *Pal and Tamanker's* study[9], the observations shows overage of around 5 years for the total score 0-7, however for higher scores, the age group was more or less same. It shows that the morphological changes in os pubis appears early in the *Pal and Tamanker's* study (Gujarati population) as compared to present study (Delhi population, which is a mixed population) and the maturation of os pubis occurred more or less at the same age in both study populations.

When present study is compared with *Sinha's* study[10] which was done on male population of Delhi, the mean age of male population of present study is comparable with the differences of around 3 years in all the scores except for score 10 in which the difference of 8 years and in score 15 there was the difference of 10 years.

Conclusions

1. Age can be estimated by the study of metamorphosis of os pubis based on the Mckern-Stewart's criteria up to the accuracy of $\pm$ 1year in the age group of 20-30 years, $\pm$ 5 years in the age group of 30-40 years and $\pm$ 8 years in the age group of 40-50 years.
2. The morphological changes of the pubic symphysis started late in present study (Delhi population) as compared to the Mckern-Stewart's study (American population) as well as in Pal and Tamanker's study on Gujarati population. This difference may be due to the continental or regional variation.
3. In present study, it was found that one set of morphological changes in all the 3 components is delayed by 3 years as compared to the study conducted by Sinha in the year 1991 on male Delhi population. This delay of 3 years may be due changes in

factors like climatic, dietetic and life style etc of individual staying in Delhi over a period decade.

4. Approximate age of individual can be assessed by just studying the morphological changes in any component of symphysis pubis defined by Mckern-Stewart's criteria but for accurate assessment of ages, changes in all the three components should be taken into consideration.
5. After comparing the present study with the other workers in the subject, it can be concluded that there is a significant variation in morphological changes of pubic symphysis therefore for age estimation the latest data available of that region should be used for more accurate estimation of age.

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Table -1 : Showing comparison of present study with studies of Mckern-Stewart[6], Pal & Tamanker[9] and Sinha[10]

Total score	Mckern-Stewart [6] (Mean ages in yrs)	Pal & Tamanker [9] (Mean ages in yrs)	Sinha [18] (Mean ages in yrs)	Present study male (Mean ages in yrs)	Present study female (Mean ages in yrs)
0	17.29	--	--	--	20.99
1-2	19.04	14.60	17.00	21.0	21.25
3	19.79	19.66	--	22.0	25.0
4-5	20.84	20.87	20.33	25.5	25.1
6-7	22.42	25.60	23.8	--	30.0
8-9	24.14	29.14	27.5	31.87	31.15
10	26.05	35.66	26.33	34.75	35.5
11-13	29.18	38.12	38.15	36.9	38.83
14	35.84	45.00	48.88	47.83	41.16
15	41.0	55.00	59.4	49.0	49.6

Originals and Papers

A study of victims of natural sexual offence in the Bankura district of West Bengal

Biswajit Sukul ,Saurabh Chattopadhyay** & T. K. Bose****

Abstract

The study highlights the salient features of natural sexual offence in the Bankura district of West Bengal during the period 2006-07. A retrospective study showed a rising trend during the period 2001 to 2006. Most of the victims were in the age group of 18-30 years and majority of the incidences occurred during the summer months of April to August. An overwhelming majority of 86.20% of the cases presented late for examination and revealed only old tears of the hymen on examination. Most of the victims were unmarried and in 16.09% they became pregnant after the act. A critical analysis of the findings along with the importance of early medical examination in such cases is presented in the paper.

Key words: *Natural sexual offence, victims & medical examination.*

Introduction

One of the most heinous crimes in the present society is rape. Though sexual intercourse among opposite partners may be considered a basic need among humans, yet forceful sexual intercourse has never been accepted in the society. Incidences of such forceful sexual intercourse have often been reported in historical literature. The incidence of natural sexual offence far exceeds the unnatural sexual offence in our country. America records a case of rape every five minutes.[1] An early and detailed medical examination is of vital importance for the purpose of investigation and to prevent the loss of vital trace evidence. Lack of definite medical evidence is responsible to a large extent for low conviction rate in such offences. It is worth mentioning that though a large number of cases of sexual offences are reported as rape quite a few among them are consented acts and hence definite evidence of forceful sexual intercourse is lagging.

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The present study aims to find out and critically analyze the demographic pattern and prevalence of natural sexual offences in the Bankura district of West Bengal.

Materials and methods

The study was conducted in the department of Forensic and State Medicine, Bankura Sammilani Medical College, Bankura, West Bengal during the period 2006-2007. The study included all the victims of natural sexual offence brought for medical examination to the department. Details regarding the cases were obtained from the police papers and history taken from the victim girls and their family members. Standard examination procedure was followed during examination of the cases.

Observations

A total of 87 cases were reported during the period of study. Though our study included cases of natural sexual offence, all the cases brought for examination were either under Sec 376 IPC i.e. rape or Sec 497 IPC i.e. adultery. No cases of incest were reported. A retrospective study of the number of cases showed a rising trend from 2001 to 2006. There was a sudden drop in the number of cases in 2007. (Figure-1)

During the two year period of study majority of the cases occurred during April to August (49 cases i.e.56.32%) and the highest number of cases (13 i.e. 14.94%) were reported during the month of May. (Figure- 2)

Maximum number of cases occurred in the jurisdiction of Bankura Police Station(P.S.) (18.39%) followed by Khatra P.S. (14.94%) and Gangajal ghati P.S. (13.79%).

In the present study adults in the age group of 18-30 years were found to be the most common victims (45.97%) followed by the age group of 10-18 years (39.08%). (Figure- 3) Majority of the victims were un married (77%) (Figure-4)

Among all the cases, 14 (16.09%) had a history of pregnancy resulting from the act and were either pregnant at the time of examination or had aborted recently.

Out of all the cases 75 (86.20%) presented with old tears whereas in only 6 cases (6.90%) recent tears were detected on examination and in another 6 cases the hymen was found to be intact.(Figure- 5)

Discussion

The rising trend in the sexual offence cases is a reflection of the western influence in our society. The impact of commercialization of the female body as found in the print and visual media has surely influenced even the rural areas. It has been well documented that sexual assault cases are under reported.[2] *Beebe* [3] reported that only about 10-50% of the female victims reported about their assaults. Hence though there has been a rising trend in Bankura district as shown in the present study yet it may not be the true picture. Our study is supported by the fact that *Sagar* [4] reported 38 cases from South Delhi in 1991, *Bhardwaj et al* [5] 80 victims during the year 1993-94 and *Sarkar et al* [6] reported 90 victims from January 2001 to September 2002 from the same area. As per police records there were 57,542 sexual offence cases in England and Wales in the year ending March 2007 which was less by 7% compared to 2005-06.[7]

In the present study majority of the cases occurred during the summer months i.e. April to August with peak incidence in May (14.94%).

Statistics of sexual assaults in the Republic of Ireland for 2004-05 [8] also shows maximum incidence during the summer months of June to August. The effects of environmental factors on increased sexual desire and activity needs to be further studied to pinpoint the underlying reasons for the present findings.

Maximum number of victims was from the Bankura P.S. (16) followed by Khatra P.S. (13) and Gangajalghati P.S. (12). As the jurisdiction of Bankura P.S. covers the largest area and also includes the Bankura town hence the population is also more. Further the influence of the print and visual media is also significantly higher in the town.

Adult females in the age group of 18-30 years were the most common victims in our study. A major factor behind this is that most of the cases were actually consented acts of intercourse between the victim and the assailant and later the complaint was lodged when there was refusal to marry by the male partner. *Sarkar et al* [6] in his study found 16-20 years to be the most common age group for the victims while *Bhardwaj et al* [5] reported 40.70% in the age group of 13-20 years. In the study of *Du Mont et al* [9] majority of the victims of sexual assault were from 15-20 years and *Islam* [10] reported 33.5% victims between 12-15 years age. Adolescent victims were the most common (76.9%) in the study carried out by *Malohtra*.[2] In a study conducted in the Republic of Ireland the most common age category of victims was 16-30 years. [8] In a research study in West Bengal- "Abuse among child domestic workers" [11], it was noted that 20.3% of the participants were forced to have sexual intercourse with the abusers. The participants of the study included both males and females.

Over three fourth (77%) of the victims in the present study were unmarried. This is in confirmation with the findings that most of the victims were adult mature females and the acts were consented and there were repeated episodes of intercourse over a period of time. At a later stage a complaint was lodged only when the male partner refused to marry.

The present study found that 16.09% of the cases became pregnant following the act and

had aborted recently or were pregnant at the time of examination. *Boonma M*[12] in his study reported 3.20% cases to be pregnant during examination. This value was quite low as the study was conducted mostly on adolescent and children whereas in our study the adult females were the most common victims.

Majority of the cases (86.20%) in the current study presented late for examination and in them only old tears were detected. The reason being the same as discussed before – consented acts of intercourse over a period of time followed by refusal to marry. A failure in mutual settlement among the parties resulted in further delay in the complaint being lodged and the medical examination. Only in 6.90% cases recent tears were detected and in another 6.90% the hymen was found to be intact. *Sarkar et al* [6] found hymen ruptures in 85% cases, majority of which were old tears. *Islam* [10] reported hymenal tears in 38.9% cases with fresh tears in the fourchette in 2.6%. *Grossin*[13] in his study found hymenal lesions in 11% cases. In all the cases that presented late for examination no genital injury apart from ruptured hymen could be detected. It may be due to the fact that either there were no injuries due to the consented acts or they may have healed in the long post coital interval. It is worth mentioning that many of the victims were habituated and had previous experience of sexual intercourse, which further reduced the chances of genital injury.

Santos et al[14] found that 61% cases reported for medical examination within 72 hours of the incident and findings in the genitalia and / or anus was present in 31% cases.

Conclusion

The study projects the scenario of natural sexual offence in a rural area of West Bengal. In majority of the cases there was no evidence of forceful sexual intercourse at the time of examination due to a long post coital interval. Moreover, vital trace evidence was also lost as a result of delay in examination. Hence prompt reporting of the cases with early examination is of vital importance to collect medical evidence in such cases.

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Figure- 1: Year wise distribution of cases

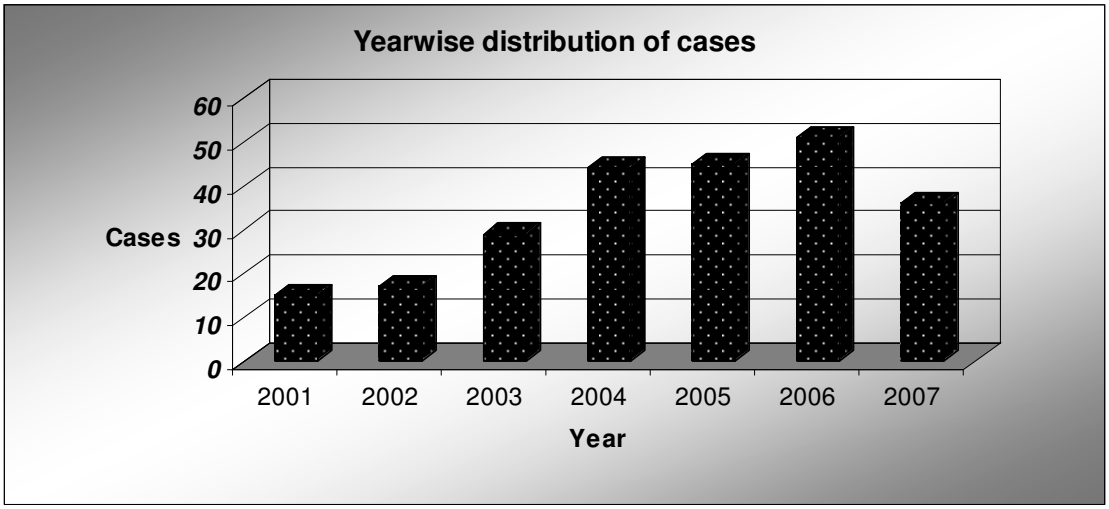


Figure –2: Month wise distribution of cases

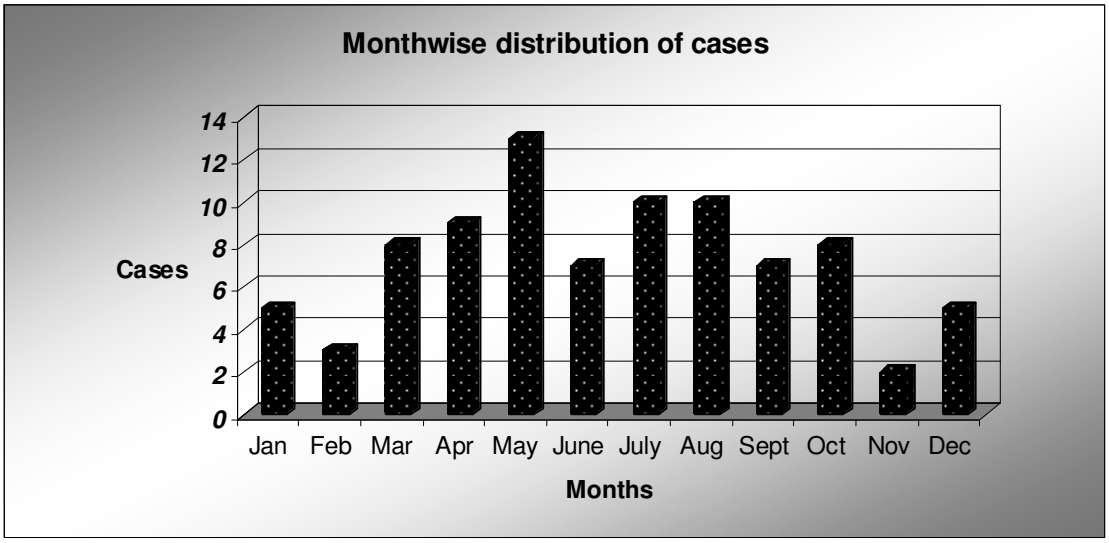


Figure –3: Age wise distribution of cases

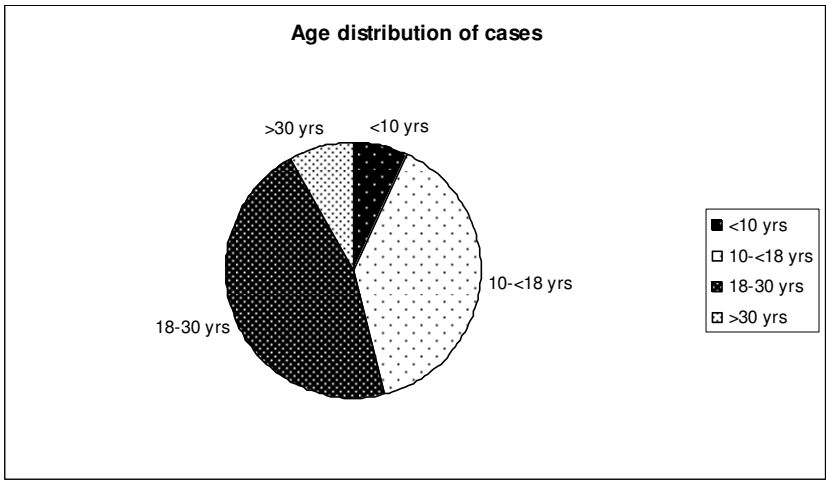


Figure –4: Distribution of cases as per marital status

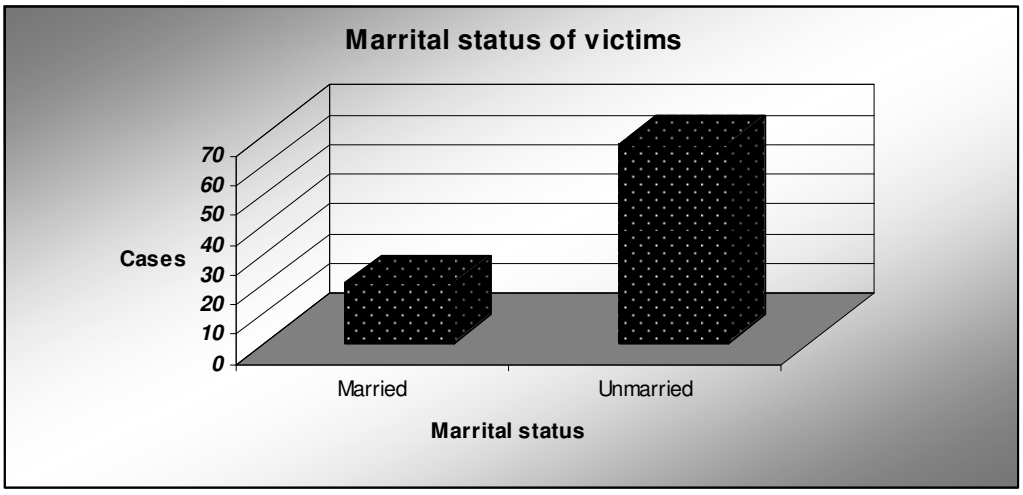
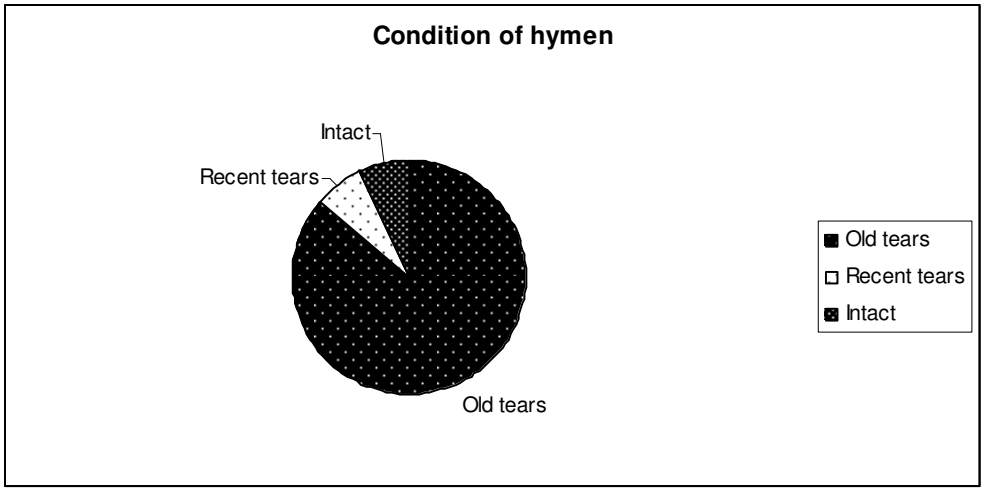


Figure –5: Distribution of cases as per status of hymen



Originals and Papers

Relationship between the postmortem intervals and the pericardial enzyme activities in subjects of Chandigarh zone of India – A preliminary study

Dalbir Singh & Rajendra Prasad***

Abstract

Determination of relationship between the postmortem interval and the postmortem pericardial enzyme activities is the topic of discussion in various studies. Many authors have demonstrated a highly significant double logarithmic linear relationship between the time since death and the various body fluids electrolytes concentration in human.

In view of these facts, the present study was carried out to substantiate this propensity in the enzymes activity in postmortem pericardial fluid in human. Analysis of pericardial fluid obtained from 150 subjects at autopsy revealed that the rate of activities of creatinine phosphokinase, gamma-glutamyl transferase, lactic dehydrogenase and amylase activities has statically highly significant relationship ($p<.0001$) with the postmortem interval up to 36 hours of death.

Key words: *Postmortem interval, time since death, pericardial enzyme activities, creatinine phosphokinase, gamma-glutamyl transferase, lactic dehydrogenase, amylase*

Introduction

Despite of the fact that the significance of estimating the postmortem interval has been known since millennia, however there is no such method by which it can be estimated accurately.

Till date, series of physio-chemical changes which occurs in a dead body forms the basis for estimating time since death. Among the physical changes livor mortis, algor mortis and rigor mortis etc. even if modulated by numerous factors, works satisfactorily in the estimation of early post mortem period. After this period or when above mentioned changes are in contradiction, thanatochemistry of body fluids is the only tool perhaps left for the estimation of time of death of the deceased. Most often investigated body fluids for the purpose are the blood, vitreous humour and cerebrospinal fluids. These fluids though modulated by various factors have shown changes in concentration of their electrolytes and enzymes activities proportional to the postmortem interval [1-17].

Many workers have demonstrated that the postmortem changes in the activities of various enzymes in different body fluids are significantly affected by the environmental conditions in which a dead body was found lying.[19, 24] These environmental conditions are different in this part of India in comparison to where these studies were carried out. As hardly any data exists regarding postmortem changes in the activities of various enzymes in the pericardial fluid and the present worker had already demonstrated an encouraging results in respect of changes in the levels of pericardial fluid electrolytes in relation to time since death[17]. Present preliminary study is an attempt to substantiate this propensity in the enzyme activities in this transcellular extension of blood plasma.

Materials and Methods

With the valid consent of legal heir of the deceased, pericardial fluid was obtained from 150 subjects between the age of 11to 69 years (108 males, 42 females) who were admitted and died because of various medico legal causes (trauma

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101, burn 32, poisoning 17) at Postgraduate Institute of Medical Education and Research, Chandigarh (India) and on whom medico legal autopsies were conducted between 2.5 and 60 hours of death by the department of Forensic Medicine. Under aseptic conditions, thoracic cavity was opened by removing the sternum. The pericardium was carefully opened with a pair of clean scissors taking the precautions of avoiding any contamination of the pericardial fluid. The sample was aspirated by using a clean sterile 10cc syringe in a sterile glass vial. The samples were then analyzed for Creatinine Phosphokinase, Gamma-glutamyl transferase, Lactic dehydrogenase and Lactic dehydrogenase by using the standard protocols i.e.

Creatinine Phosphokinase assay	by UV-Kinetic (IFCC method)59.
Gamma-glutamyl transferase	by UV-Kinetic (IFCC method) 59.
Lactic dehydrogenase assay	by UV-Kinetic (IFCC method) 59.
Amylase assay	by Amyloclastic Method.

In the present study subjects were different then those reported in the earlier studies and only those cases were considered in which cause, mode & time of death and other demographic profile were known accurately. Subjects with significant ante mortem electrolytes imbalance, metabolic disorder, on diuretics or with any particulate matter in pericardial fluid or pericardial pathology were not included in the study.

The data thus collected was analyzed statistically and efforts were made to correlate the changes in the activities of various enzymes not only with postmortem interval but also with the mode of death, age, seasonal variations and gender.

Results

a) Enzymes activities in pericardial fluid

Absolute value and rate of enzyme activities in pericardial fluid obtained at **v**arious postmortem intervals were as below (Table-1& 2)

1) Gamma-glutamyl transferase

Activities of this enzyme in pericardial fluid increased from mean value of 197.47± 55.12 U/L at postmortem interval of <12 hours to mean value of 240.28 ± 72.16 U/L at postmortem interval at 24-36 hours and then decreased to mean value of 159.54 ± 25.70 U/L at postmortem interval of 36-48 hours and further to mean value of 158.55 ± 50.63 U/L at time of death of 48-60hrs.

2) Creatinine phosphokinase

Its activities in pericardial fluid increased from mean value of 2485.20± 701.99 U/L at postmortem interval of <12hours to mean value of 3473.67 ± 558.67 U/L at postmortem interval at 24-36 hours postmortem interval and then decreased to 3232.70 ± 351.30 U/L at 36-48 hours and further to mean value of 2686.88 ± 613.95 U/L at time since death of 48-60hrs

3) Amylase

Activities of amylase in pericardial fluid increased from mean value of 2546.43± 568.46 U/L at postmortem interval of <12hours to mean value of 38812.80 ± 637.33 U/L at postmortem interval at 24-36 hours and then decreased to mean value of 3466.20 ± 828.04 U/L at postmortem interval at 36-48 hours and further decreased rapidly to mean value of 1976.04 ± 809.63 U/L at time of death of 48-60hrs.

4) Lactic dehydrogenase

Lactic dehydrogenase activities in pericardial fluid increased from mean value of 2508.43± 845.17 U/L at postmortem interval of <12hours to mean value of 4030.98 ±507.56 U/L at postmortem interval at 24-36 hours and then decreased to mean value of 3691.18 ± 491.47 U/L at postmortem interval at 36-48 hours and further to 3242.67 ± 301.25 U/L at time since death of 48-60hrs.

Rate of activities of all the above enzymes was more in first 12hours and then level off to a more gradual rate of increase up to 36 hours of death and then decreased. This change in activities were found to be statistically highly significant (p<.0001) (Table-2).

b) Relationship between time since death and enzyme activities with age, gender, seasonal variations and cause of death (Table 1l I to VI).

Enzymatic activities of gamma-glutamyl transferase was more in the subjects <18 years followed by in the age group 18-60 years and >60years and that of creatinine phosphokinase was in the age group of 18-60 years followed by<18years and>60 years. where as that of a lactic dehydrogenase and amylase were more in the subjects <18 years followed by in the age >60 years and group 18-60 years (Table 3) .Similarly activities of gamma-glutamyl transferase , amylase and creatinine phosphokinase were more in male as compared to females and that of lactic dehydrogenase was slightly higher in females(Table 4).

Activities of gamma-glutamyl transferase, lactic dehydrogenase, and amylase were more in those who have died due to poisoning followed by due to trauma and burn where as that of lactic dehydrogenase, and amylase were more in those who have died due to poisoning followed by due to burn and trauma that of creatinine phosphokinase was more in those died due to burn followed by due to poisoning and trauma (Table V). Statically significant ($p<.0001$) alterations in the activities of all the investigated enzymes were more prounced in summer then in winter. Relationship between the postmortem interval and alteration in investigated enzymes activities with age, gender and cause of death were found statically insignificant

Discussion

Advantage of pericardial fluid over vitreous humour and cerebrospinal fluid is the availability of the easily obtainable in reasonable large volume and over blood is that it is less prone to microbial contamination and bacterial degradation, hence allowing a large number of tests to be conducted on each specimen with few restrictions because of the volume of fluid available[16]. Observation of present study that significant changes occurs in the pericardial enzymes activities proportional to time of death was as reported by others [18-24]. Luna[18] showed that creatinine kinase isoenzymes pattern provides significant information of cardiac status of the deceased. Akoi[19] reported a correlation between the postmortem interval and glutamate oxaloacetic transaminase and glutamate pyruvate transaminase. Balasooriya et al [20] demonstrated a significant increase in the pericardial enzymes viz. alanine aminotransferase, gamma glutamyl transferase, hydroxybutyric dehydro-genase, alkaline phosphatase, glutamate oxaloacetic transaminase, creatinine phophokinase concentration with an increasing time of death. The greatest rise were seen in the levels of creatinine phosphokinase while the smallest rate of rise was seen in gamma glutamyl transferase. Gurumukhi et al [21] had observed a significant rise in the pericardial Alanine transminase proportional to time since death.

Variations in rate of activities of investigated enzymes than as reported by others[18-21, 23-24] may be due to the tropical climate of Chandigarh zone of India, which hasten the process of putrefaction[11-17]. Cause of death, statistically not modulating the pericardial fluid investigated enzyme activities in present study may be due to the exclusion of the subjects with significant ante mortem metabolic disorder or on diuretics in this series. Arroya et al [24] had also found no significant difference in biochemical composition in pericardial fluid of natural or violent deaths

Although apprehended,[11-17] no literature was available to the authors to discuss the role of environmental temperature on postmortem pericardial enzyme activities . It could be due to that mean temperature in both climates observed was different from the reported ambient temperature favoring the process of decomposition i.e. 21-38 ^{O}C [11-17]. Therefore, decomposition of body was possibly at different rate, resulting in variations of these enzyme activities in hot and cold climatic conditions. Similarly, gender was reported to have no major role to play in the process of putrefaction[26] and could be the reason that a change in pericardial enzyme activities was found statistically insignificant between the genders in the present series.

It can be concluded that although modulated by various factors there is a highly significant relationship exist between the postmortem interval and alteration in the postmortem enzymes activities that can help in estimation of time of death in humans.

Acknowledgement

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Table-1: Relationship between the time since death and enzyme activity

Time Since Death (hrs.)	No. of Subjects	Mean Time Since Death (hrs)	Gamma-glutamyl transferase (U/L)	Creatinine phospho-kinase (U/L)	Amylase (U/L)	Lactic dehydrogenase (U/L)
<12.0	21	8.02± 2.62	197.47± 55.12	2485.20± 701.99	2546.16± 568.46	2508.43± 845.17
12.0-24.0	67	18.5± 3.56	236.05± 56.54	3049.35± 714.12	3369.19± 779.60	3807.32± 719.43
24.0-36.0	43	28.56± 2.52	240.28± 72.16	3473.67± 588.57	3812.80± 637.33	4030.98± 507.59
36.0-48.0	12	41.15± 2.86	159.54± 25.70	3222.70± 351.30	3466.20± 828.04	3691.18± 491.47
48.0-60.0	7	50.82± 2.61	158.55± 50.63	2686.88± 613.95	1976.04± 809.63	3242.67± 301.25
Total	150	23.26± 11.02	222.12± 64.94	3088.96± 719.58	3323.88± 863.85	3653.95± 814.78
P-value			.000**	.000**	.000**	.000**
correlation coefficient			-.161	.098	.227	.272

**Highly Significant (p<0.01)

Table-2: Relationship between the time since death and rate of enzyme activity

Time Since Death (hrs.)	No. of Subjects	Mean time Since Death (hrs.)	Gamma-glutamyl transferase (U/L)	Creatinine phosphokinase (U/L)	Amylase (U/L)	Lactic dehydrogenase (U/L)
<12.0	21	8.02± 2.62	20.91± 10.54	296.02± 63.13	324.05± 101.26	291.65± 48.13
12.0-24.0	67	18.5± 3.56	10.29± 3.57	157.43± 38.08	177.78± 40.50	203.15± 52.30
24.0-36.0	43	28.56± 2.52	6.75± 2.83	116.26± 23.19	130.41± 26.35	137.62± 25.16
36.0-48.0	12	41.15± 2.86	2.63± 0.59	74.52± 11.04	81.27± 19.86	86.75± 15.67
48.0-60.0	7	50.82± 2.61	2.15± 1.10	49.99± 14.46	36.57± 16.66	61.24± 9.03
Total	150	23.26± 11.02	9.77± 7.07	153.38± 74.98	170.37± 87.37	180.82± 74.83
p-value for Rate of rise			.000**	.000**	.000**	.000**
Correlation with the rate			-.726	-.796	-.797	. -.857

** Highly Significant (p<0.01)

Table-3: Co-relationship between time since death and enzyme activities with age

Cause of Death	Trauma (n=101)	Burn (n=32)	Poison (n=17)	Total (n=150)	F	p-value
Mean Time Since Death (hrs.)	23.34± 11.36	24.89± 10.75	19.67± 8.98	23.26± 11.02	1.258	.287
Gamma- glutamyl transferase (U/L)	217.87± 62.65	200.61± 50.17	287.87± 65.00	222.12± 64.94	12.31	.000**
Creatinine phosphokinase (U/L)	3051.84± 767.58	3170.65± 616.24	3155.71± 614.08	3088.96± 719.58	.41	.664
Amylase((U/L)	3315.20± 905.76	3320.70± 775.33	3381.47± 808.14	3323.88± 863.85	.04	.958
Lactic dehydrogenase (U/L)	3552.48± 879.57	3848.74± 546.06	3890.13± 754.37	3653.95± 814.78	2.459	.089

** Highly Significant

Table-4: Co-relationship between time since death and enzyme activities with gender of subjects

Age Groups	<18 (n=13)	18-60 (n=124)	>60 (n=13)	Total (n=150)	F- value	p-value
Mean Time Since Death (hrs.)	18.47± 8.68	23.62± 11.36	24.63± 9.03	23.26± 11.02	1.4	.25
Gamma- glutamyl transferase (U/L)	252.34± 54.13	220.04± 66.00	211.75± 60.25	222.12± 64.94	1.651	.19
Creatinine phosphokinase (U/L)	3074.89± 535.56	3092.77± 752.13	3066.63± 585.91	3088.96± 719.58	.01	.99
Amylase((U/L)	3798.57± 1085.13	3276.92± 836.90	3297.20± 800.92	3323.88± 863.85	2.186	.12
Lactic dehydro-genase (U/L)	3760.64± 849.22	3638.12± 819.78	3698.27± 785.03	3653.95± 814.78	.15	.85

Table- 5:Co-Relationship between time since death and enzyme activities with cause of death

Sex	Male (n=108)	Female (n=42)	Total (n=150)	p- value
Mean Time Since Death (hrs.)	23.34± 11.28	23.06± 10.45	23.26± 11.02	0.889
Gamma-glutamyl transferase (U/L)	223.56± 69.20	218.42± 52.97	222.12± 64.94	.66
Creatinine phosphokinase (U/L)	3114.96± 734.01	3022.08± 685.08	3088.96± 719.58	.48
Amylase((U/L)	3348.83± 886.14	3259.73± 810.43	3323.88± 863.85	.57
Lactic dehydrogenase(U/L)	3636.57± 857.48	3698.63± 700.60	3653.95± 814.78	.67

Originals and Papers

Epidemiology of road traffic accidents (RTA) victims in Ahmedabad- A study of 5 years (1995-1999)

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Abstract

With rapid growth in all most all corners of world, conveyance of commuters for social, commercial or any other purpose is dependent mainly on road surface transport. Premature disability or even death especially in developing countries have been attributed to road traffic accidents. The present study conducted highlights the pattern and profile of RTA victims during 1995 to 1999 - a pre-BRTS(Bus Rapid Transit System) phase in the metro city of Gujarat.

Key words: *Epidemiology, RTA, victims*

Review of Literature

According to a study conducted by the National Transportation Planning and Research Center (NTPRC) every four minutes a person is killed or injured in road accidents in India[1]. The spectrum of injuries depends on site, direction & force of impact, design of vehicle, ejection of victim and supervening factors like overturning or fire.

However, reports homicide under the guise of RTA has appeared in literature. *Kar and Patnaik* [2] have reported a case in which the victim's family member killed him by mechanical force and ligature strangulation and misguided the police with history of RTA. A thorough examination helped the investigation to reveal the murder mystery. More or less similar case has been reported by *Tandon et al* [3] inn which differentiating the multifactorial injuries as ante mortem and post mortem could solved the felony by a mob and throwing body to road side to mimic an accident.

Apart from excluding the homicidal component, the prime aim in case of identified victims, aim of autopsy is mainly to:

1. Find out whether victim suffered to some disease or trauma and in case of trauma- what type of internal damage he/she succumbed.
2. Reconstruct the accident.

Ravi Kiran & Saralaya [4] have concluded in their review article some road safety measures for prevention of enormous impact of road traffic injuries in terms of mortality, morbidity and socioeconomic factors. In addition to design of vehicle, condition of roads, human factors like driving behaviour, driving capability, risk taking have also been blamed and need of long term and short term modulators of risk taking behaviour have also been recommended.[5] With reference to motorized two-wheeler crash injuries mandatory helmet legislation has been recommended by Sharma[6] which can help in reducing injuries, death and medical costs.

Material and method

The study is attempted with an aim to find out pattern of accidents due to expansion of the limit of Ahmedabad city in the last decade, development and introduction of fast speed vehicles and safety measures to be used during pre BRTS phase.

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The present study was undertaken at Sheth V. S. General Hospital, Ahmedabad during 1995-99. Out of total 20100 medico legal cases, 7478 cases were of road traffic accident. Out of total 4388 autopsies performed during this period, 600 deaths were due to road traffic accident.

General particulars of each case and autopsy findings were entered in proforma and tabulated further to retrieve relevant data for the purpose of observation and discussion. Results were compared with observations of various authors.

Observations

Table-1: Year wise distribution of RTA deaths according to sex

Year	Female (%)	Male (%)	Total (%)
1995	21(16.7)	105 (83.3)	126(21.0)
1996	9(9.6)	85(90.4)	97(15.7)
1997	18(14.4)	107(85.6)	125(20.8)
1998	12(9.7)	112(90.3)	124(20.7)
1999	22(16.8)	109(83.2)	131(21.8)
Total	**82(13.7)**	**518(86.3)**	**600(100)**

It is obvious from Table-1 that during all the five years there was a male predominance to a significant extent. Maximum cases were observed during summer followed by winter as compared to winter season.(Table-2)

Table –2: Distribution of RTA deaths according to seasons

Season	No. (%)
Monsoon	150(25.0)
Summer	242(40.3)
Winter	208(34.7)
Total	**600(100)**

The type of vehicle involved was motorized two wheeler(scooter, motor cycle, moped)and bicycle followed by three wheeler and four wheel light and heavy motor vehicle. (table-3).

Table -3 : Distribution of RTA deaths according to type of vehicle

Type of vehicle	Number
Ambassador	6
Bicycle	55
Car/Maruti/Fiat	28
Chakdo	11
City Bus	4
Jeep	35
Moped	18
Motor Cycle	51
Pedestrian	165
Rickshaw	25
Scooter	141
State Roadways Bus	15
Tempo	25
Truck	21
Total	600(100)

Table –4:Distribution of RTA deaths according to status of victim

Status of victim	Percentage
Pedestrian	27.5
Four wheeler occupant	22.3
Three wheeler occupant	06
Two wheeler occupant	35.0
Bicycle rider	09.2
Total	**100**

Table-4 depicts that pedestrians were a major chunk among the victims of RTA followed by two and four wheeler occupants as compared to three wheeler occupants and bicycle riders.

Table -5: Distribution of RTA deaths according to body region injured

Year	Head	Thorax	Abdomen	Abdomen+ Extremity	Extremity	Total
1995	100	40	50	46	96	126
1996	78	23	22	21	75	94
1997	111	42	34	32	113	125
1998	102	21	24	23	100	124
1999	98	24	35	33	108	131
Total	**489**	**150**	**165**	**155**	**492**	**600**

Extremities and head were commonly injured body parts a s compared to thorax and abdomen.(Table-5)

Table –6: Age wise distribution of RTA deaths according to cause of deaths

Cause of death	Adolescence	Adult	Child	Total
S & H (Multiple injury)	11(8.3)	109(82.0)	13(9.8)	133
S & H (single injury)	0(0)	7(87.5)	1(12.5)	8
Shock-Head Injury	18(6.2)	243(83.5)	30(10.3)	291
Delayed Complications	2(6.5)	28(90.3)	1(3.2)	31
Shock – Injuries (multiple)	8(6.1)	112(85.5)	11(8.4)	131
Shock Injury(single)	0(0)	6 (100)	0(0)	6
Total	**39(6.5)**	**505(84.2)**	**56(9.3)**	**600(100)**

Table-6 reflects that in maximum number of cases death was due to shock on account of head injury followed by almost equal ratio of hemorrhage and shock on account of multiple injuries. Delayed complications, hemorrhage and shock ,shock due to single injury(other than head) were in a small proportion**.**

Table –7: Distribution of RTA deaths according to hospitalisation and spot deaths

Year	Hospitalisation	Spot death	Total
1995	105(83.3)	21(16.7)	126
1996	77 (81.9)	17 (18.1)	94
1997	76 (60.8)	49 (39.2)	125
1998	95 (76.6)	29 (23.4)	124
1999	90 (68.7)	41 (31.3)	131
Total	443 (73.8)	157 (26.2)	600

Majority of the victims succumbed to RTA injuries after hospitalization and a considerable number of victims died on the spot.(Table-7)

Table –8: Age wise distribution of Pedestrians

Age Group	Pedestrian
0-9	40
10-19	28
20-29	07
30-39	09
40-49	04
50-59	14
60-69	32
70-79	18
Total	**162**

The most striking feature of Table-8 is the extremities of age group (child and old) were the major pedestrians died as compared to other age groups.

Discussion

The incidence of RTA deaths observed in the present study (13.67%) was almost half than *Chavali et al* [12](35%) out of total medico legal autopsy cases. The difference can be attributed to difference in factors like variation in geographical factorstype of roads, jurisdiction etc.

The sex wise distribution observed in the present study was quite closer to other workers[7,8,9,10,11,12&13], that is to say a male predominance.(Table-9)

fatigue during this season in the area.

The most commonly involved body region was head in our study which was quite consistent with observations by Dhillon et al [13]. Thus, the role of helmet-use a s advocated by Sharma6 with reference to two wheeler riders can be endorsed in our set up for all practical purposes. (Table-12 & 12)

The number of spot deaths in our study was close to that of Chavali et al [12] but not with Gupta et al [7] which can be explained by difference in emergency ambulatory services in an area in question(Table-14). The recently launched 108 services by EMRI(Emergency Management and Research Institute) may play some positive role in reduction of spot deaths.

Table-9: Comparison of sex wise distribution of RTA victims

Author	Male (%)	Female (%)	Total (%)
Gupta et al [7]	88(88)	12(12)	100(100)
Ravikiran et al [8]	138(85.71)	23(14.29)	161(100)
Kaul et al [9]	713(75.05)	237(24.95)	950(100)
Pathak et al [10]	63(79.74)	16(20.26)	79(100)
Biswas et al [11]	99(90)	11(10)	110(100)
Chavali et al [12]	924(83.3)	185(16.7)	1109(100)
Dhillon et al [13]	46(92)	4(8)	50(100)
Present study	518(86.3)	82(13.7)	600(100)

The distribution of cases according to season observed in the present series is compared in Table-10, which shows higher incidence during summer was a common feature in present study and that of Biswas et al [11]. However, the incidence of RTA deaths during monsoon season was consistent with Ravikiran et al [8]. This marginal variation can be attributed to difference in geographical conditions. The higher incidence of RTA deaths during summer in our study can be due to the human factor of heat

Table-15 shows that extremities of age group (child and old persons) were common victims in the group of pedestrians. This indicates a clear need of strict use of Zebra crossing and some escort for child and elderly pedestrians and in turn the risk can be minimized.

Table-10: Comparison of seasonal variation in RTA

Season	Ravikiran et al [8]	Biswas et al [11]	Present study
Monsoon	78(48.5)	22(20.0)	150(25.0)
Summer	29(18.0)	69(62.7)	242(40.3)
Winter	54(33.5)	19 (17.2)	208(34.7)
Total	161(100)	110(100)	600(100)

The observation of present study, that is to say pedestrians being most vulnerable group was a common phenomenon in all study across the country. (Table-11) This indicates that with reference to safety of pedestrians much more attention has to be paid.

Conclusion

Victimology of RTA deaths is a common and almost uniform across the country. The cost society pays (individually and collectively) is much more than apparent. Improvement in road surface

Table-11: Comparison of status of victim and type of vehicle

Author	Pedestrian	Four wheeler	Three wheeler	Two wheeler	Bicycle rider	Total
Singh et al [15]	129 (28.7)	NA*	NA	NA	NA	450(100)
Gupta et al [7]	44(44.0)	10(10)	NA	19 (19)	15(15)	100 (100)
Ravikiran et al [8]	97(60.2)	26(16.2)	NA	38(23.6)	NA	161(100)
Kochar et al [14]	60(37.5)	16(10)	4(2.5)	39(24.4)	41(25.6)	1609100)
Biswas et al [11]	49(57.3)	20(18.1)	NA	21(19.0)	20(18.2)	110(100)
Chavali et al [12]	340(35.79)	214(22.53)	NA	290(30.53)	52(5.47)	950(100)
Pathak et al [10]	26(32.91)	12(15.19)	NA	39(49.37)	2(5.53)	79(100)
Present study	165(27.5)	134(22.3)	36(6.0)	210(35.0)	55(9.2)	600(100)

*NA= Not available

Table-12 : Comparison of cases according to body region injured

Region	Dhillon et al [13]	Present study
Head	38(76.0))	489(81.5)
Thorax	16(32.0)	150(25.0)
Abdomen	26(52.0)	165(27.5)
Abdomen+ Extremity	NA	155(25.83)
Extremity	37(74.0)	492(82.0)
Total	50(100)	600(100)

Table-13: Comparison of cases as per cause of death

Cause of death	Biswas et al [11]	Chavali et al [12]	Dhillon et al [13]	Present study
S&H (Multiple injury)	46(41.8)	NA	38(76.0)	133(22.16)
S&H(single injury)	NA	NA	NA	8(1.33)
Shock-Head injury	46(41.8))	800(72.0)	9(18.0)	291(48.5)
Delayed complications	11(10.0)	NA	3(6.0)	31(5.16)
Shock((Multiple injury)	NA	NA	NA	131(21.83)
Shock(Single injury)	NA	NA	NA	6(1.0)
Total	110(100)	1109(100)	50(100)	600(100)

Table-14: Comparison of cases according to hospitalization

Author	Hospitalisation	Spot deaths	Total
Gupta et al [7]	78 (78.0)	22(22)	100(100)
Chavali et al [12]	761(68.62)	348(31.38)	1109(100)
Present study	443(73.8%)	157(26.2%)	600(100)

infrastructure, strict compliance with road safety rules by drivers as well as pedestrians, rapid emergency services -both medical and non medical (Towing of break down vehicles, prompt and a scientific investigation into accident) are major factors to reduces the loss of a preventable but not inevitable hazard.

The BRTS(Bus Rapid Transit System) is expected to be introduced in the city of Ahmedabad in May 2009. The present profile of RTA deaths will form a reliable data for comparison of two different phases of transport system at the center and can authenticate the role of such new system or may even suggest some other pattern(and flaws?) during post BRTS phase.

Table-15: Comparison of cases of pedestrians as victims

Age group	Singh et al [15]	Present study
0-9	27(20.93)	40(24.69)
10-19	19(14.72)	28(17.28)
20-29	18(13.95)	07(04.32)
30-39	18(13.95)	09(05.55)
40-49	14(10.85)	04(02.46)
50-59	14(10.85)	14(08.64)
60-69	17(13.17)	32(19.75)
Above 70	02(0.77)	00(00.00)
Total	129(100)	162(100)

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Originals & Papers

Identification of Quizalofop-p-ethyl in biological materials by thin-layer chromatography

V. Dhingra & J. Pandey***

Abstract

Quizalofop-p-ethyl is an herbicide used in field crops the present paper describes the use of thin-layer chromatography for the detection of Quizalofop-p-ethyl in biological materials. Using different solvent systems and spray reagent.

Key words: *Quizalofop-p-ethyl, herbicide, Targa super, Pilot super, Assure II.*

Introduction

Quizalofop-p-ethyl is a selective, post emergence phenoxy herbicide. It is used to control annual and perennial grass weeds in potatoes, soyabean, sugar beets, peanuts, vegetables, cotton and flax. The compound is absorbed from the leaf surface and is moved throughout the plant. It accumulates in the active growing regions of stem and roots. This is a relatively new compound and thus very little information is available about the forensic identification of this compound and now days it is frequently encountered in forensic toxicology[1]. Chemically it is 2-[4-[(6-chloro-2-quinoxalinyl] phenoxy] propanoic acid with molecular formula C17H13N2O4Cl having structural formula (Figure-1) it belong to phenoxy quinoxaline class of compound. In market it is sold under the trade name "Targa Super".

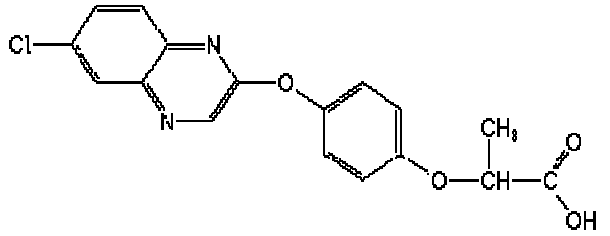

Figure-1: Chemical structure of Quizalofop-p-ethyl

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A case has been reported in which a person committed suicide by taking "Targa Super" herbicide[2]. In the present study we suggest a routine thin layer chromatographic method for the identification of Quizalofop-p-ethyl constituent of "Targa Super" commercial formulation. Using different solvent systems and spray reagent Palladus chloride and Orthodianisidine solutions as chromogenic reagents.

Material and Method

Extraction of Quizalofop-p-ethyl from Biological materials:

About 50 gm viscera [stomach, intestine, liver, spleen, kidney, lungs pieces] containing Quizalofop-p-ethyl was taken and minced carefully, 100 ml of hexane and 10 ml of acetone were added. The contents were kept for over night, then filtered and solvent was allowed to set evaporated. The residue was redissolved in 1 ml of (1:1) hexane and acetone and was used for thin-layer chromatography.

All reagents were of analytical grade. Distilled deionized water was used throughout as and where required.

(1) Palladous chloride reagent:

1.0 g. of palladous chloride dissolved in 100 ml. of water containing 0.5 ml. of conc. HCl

(2) Orthodianisidine reagent:

0.623g. Of Orthodianisidine dissolved in 100 ml. of absolute ethyl alcohol and filtered.

TLC procedure[3]:

Standard glass TLC plates were coated with slurry of silica gel G in water (1:2) to a thickness of 0.25 mm and activated at 110ºC for 1 hour.

Microgram quantity of a standard solution (1 mg/ml in acetone) of Quizalofop-p-ethyl and extracts from visceral material were spotted on different plates and these plates were then developed in presaturated TLC chamber using different solvent systems after the solvent had traveled 10 cm up, the plates were removed from the chamber and allowed to get dried in air, then sprayed with spraying reagents. The Rf values in different solvent systems are given in Table-1.

Table-1 : Rf values of Quizalofop-p-ethyl in different solvent systems

Sr. No.	Solvent system	Rf value
1.	Hexane/Ether (9:1)	0.35,0.75,0.95
2.	Hexane/Acetone (8:2)	0.65,0.75,0.86
3.	Hexane/Acetone (6:4)	0.80,0.85,0.95
4.	Hexane/Acetone / Ether (7:2:1)	0.35,0.70,0.90

Results And Discussion

The visualizing reagent Palladous chloride, gave yellow coloured spots with Quizalofop-p-ethyl, whereas Ortho dianisidine gave brownish black coloured spots at the same Rf value.

Thus the reported reagent and solvent systems for TLC detection and identification of Quizalofop-p-ethyl herbicide is simple and sensitive method, which can be used preferentially in forensic Laboratory for its detection in visceral material.

Acknowledgement

Authors are thankful to Dr J.K. Agarwal, Director, State Forensic Science Laboratory, and Mr S.R. Patidar, Joint Director, Regional Forensic Science Laboratory Gwalior, M.P. for providing laboratory and library facility.

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Preliminary report

Fractured hyoid bone with separated fragment and type of fracture

Shaikh Khaja

Abstract

Forensic Medicine experts examine the hyoid bone to decide whether or not the fracture is ante mortem or post mortem in nature and also the type of fracture in cases of autopsy with external neck injury of compression or constriction type. At occasions, Medical officers working at P.H. C., C. H.C. or district hospitals forward such bone to Forensic expert for such opinion. A preliminary study of experimental and reconstructive nature was carried out. The results indicated that it is possible to opine that whether the fracture was due to inward compression or antero- posterior compression.

Key words: *Neck compression, hypoid bone, separated fragment , type of fracture*

Introduction

Hanging as a commonly reported method of suicide and strangulation as method of homicide lot many a times pose difficulty in differentiating the fatal neck compression. The process of decomposition and skeletonisation further make the task more challenging due to scanty or no soft tissues, which are among the parameters for differentiating the two. Under the circumstances, examination of bones of neck achieves prime significance. The fracture of hyoid bone depends on age of individual and type of compression. After the ossification of greater cornu with body after age of 40 years there is loss of mobility and in turn variation in incidence of fracture of hyoid bone in case of hanging has been reported, i.e. 9.37% by Patel et al[1], 4,9 % by Fimate et al [2]and 15.38% by Gargi et al [3]. The type of hyoid bone fracture (if present) can help to decide the manner of neck compression-hanging or strangulation(ligature or palmar). Commonly, the lateral compression fracture is seen in strangulation and anteroposterior fracture of hyoid bone suggests hanging. However whether the each fractured piece displaced inward or outward and opinion about type of neck compression needs careful observation and expert interpretation [4].

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Material and method

Present study of experimental nature was undertaken in the department with the use of 10(Ten) normal hyoid bones collected during post mortem examination. In half of the cases each greater cornua of hyoid bone was held between thumb and index finger and pressure was applied in inward direction to experimentally produce inward compression fracture, which was observed carefully. In remaining half of the cases hyoid bone was held between thumb at body of hyoid and two digits (index and middle finger together), and pressure was applied in antero-posterior direction to experimentally produce the antero-posterior fracture, which was observed carefully.

Observations

In cases where pressure was exerted inwards, the periosteum on the lateral aspect was torn first, followed by its extension medially. The fracture line on lateral aspect was irregular with beveling effect but on medical side of fracture line was horizontal. (Figure-1)

In cases where the pressure was exerted antero-posteriorly , the periosteum on the medial aspect was torn first in irregular manner and fracture extended from medical to lateral side with beveling effect on medial side. (Figure –2)

Conclusion

With careful examination of fractured cornua of hyoid bone (or even the separated fragment for that matter) it is possible to decide the type of fracture- lateral compression or antero-posterior type. In case of inward compression irregularity in fracture line and beveling is present on lateral surface and in case of antero-posterior compression the same is observed on medial side. Subsequently, it can be opined whether it is due to hanging or strangulation.

However, the small sample size without age information of each subject coupled with experimental nature of the work, I feel that similar experimental and reconstructive work in large and known samples can help in further illuminating the issue of type of hyoid bone fracture and opinion about the type of neck compression.

Figure-1: Irregular lateral end with beveling effect on same side in case of lateral compression.

Figure-2: Irregular medial end with beveling effect on same side in case of antero-posterior compression.

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Case Report

Mutilated segments of human body in piece-meal : need for reconstruction and a positive opinion-A case report

R.K. Singh, P.S. Thakur **,N.M. Unda*** & G.L. Sodhi *****

Abstract

Trunk of a dead body of a middle-aged male was brought to M.Y. Hospital, Indore (M.P.) for post-mortem examination by police station, Chandan Nagar, Indore in the month of June 1999. It was examined, measured and preserved the segmented part in the department. After ten days; two amputated human lower limbs that is one right and one left limb were brought by Sanwer police station for autopsy. These parts were also examined, measured and reconstructed with the preserved parts. How these two cases of different jurisdiction were correlated has been discussed in the paper.

Key words: *Mutilated segments in piece meal and reconstruction*

Case history

Remnants of a human dead body were referred for post-mortem examination from Chandan Nagar Police Station, Indore with the history that it was found at some distance from National Highway. It comprised of root of the neck upto nearly upper 1/6th parts of both thighs and upper limbs up to the upper ends of both upper arms just below the shoulders in an amputated condition. Rest part of the body was not available. After ten days, two amputated limbs from upper 1/3rd parts of thighs to the tips of the toes, one of right side and the other of left side, recovered from a pond, were brought by Sanwer Police Station. These two cases were reconstructed to know whether these were of one individual or not?

On post-mortem examination, trunk was found amputated at C_7 vertebra level and at arms, just below shoulders. Measurements from different segmented ends were taken and the the bones cut were boiled and cleaned. Sex and age determination was done. Upper 1/6th parts of both the thighs were also found amputated which were also measured. Bones were taken out, boiled and cleaned for further examination. Later when the amputated two lower limbs were received for examination; there measurements from segmented ends were taken. Bones were separated, boiled and cleaned. The soft tissues in their respective sides were compared, correlated with different anthropometric measurements, restructuring of crest ridges, cortex, medulla, density, colour and cortico-medullary ratio of bones. They were approximated to see alignment and comparison as shown in the figures. They were also compared for sex and age. These features were found closely identical.

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****Casualty Medical Officer, M.Y.Hospital, Indore (M.P.)

Discussion

The famous " Drum Murder case", "Ruxton case" and " The Baptist Church Cellar Murder case" are the major among other cases illustrated in medical literature of 20th century.[1] The series of similar reports still continue in the 21st century as well. *Govekar and Mangal* [2] have reported a case of phantom limb in which detailed and careful analysis of the member received, helped the investigation to conclude that the limb

belonged to a female who was amputated for lower limb disease and the casual or care less way of disposal generated the whole medico legal exercise. *Patowary and Barbhuiyan* [3] have reported a case in which scientific reconstruction of skeletal remnants helped the investigation to solve a gruesome murder, awaiting superimposition, DNA typing and chemical analysis. The reconstruction of skeletal remains and opinion there upon by *Azad et al* [4] was consistent with DNA typing at ten loci.

Reconstruction of injuries in a custody death and other relevant findings (of course a fresh body)have been found useful by *Mangal et al* [5]. Garg [6] has highlighted the importance of reconstruction in skeletonised human remains in solving a murder mystery of unknown person who turned out to be a dacoit killed by villagers.

The present case is little different from previously reported ones as the human remains were submitted for medicolegal examination in piecemeal at interval of about ten days and that is also by different investigating agencies.

On reconstruction of the parts received, their different measurements on the respective sites, their colour, consistency, crests, ridges, surface pattern, cortex, medulla of bones, and respective structures in continuity were closely identical and correlating to each other. Apart from parameters of identity, the manner and method of dismemberment can play a crucial role. Typical appearance at dismembered ends in bones have been described in detail by Spitz [7], i.e. fragmentation of severed edges of long bones by axe, parallel- horizontal or oblique furrows in bone surface caused by skipping of saw blade. The reconstruction of manner of separation or dismemberment in available parts received in piecemeal proved to be crucial in forming the opinion that all remains examined in piece meal belong to one individual.

Conclusion

- The case illustrates importance of minute and detailed examination and reconstruction of mutilated segments of the body in order to establish identity and individuality of the person. Apart from parameters of identity, manner and method of separation play a vital role to form a scientific basis of any positive opinion.
- Preservation of appropriate parts of body for further matching and reconstruction when the missing parts are recovered later, at the same center is recommended for future reference.
- In case of unsolved mystery of human remains, a thorough search for missing links shall be thought of in nearby centers of region/ state or province.

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Figure-1: Separate pieces of femur bone placed in alignment but with some gap

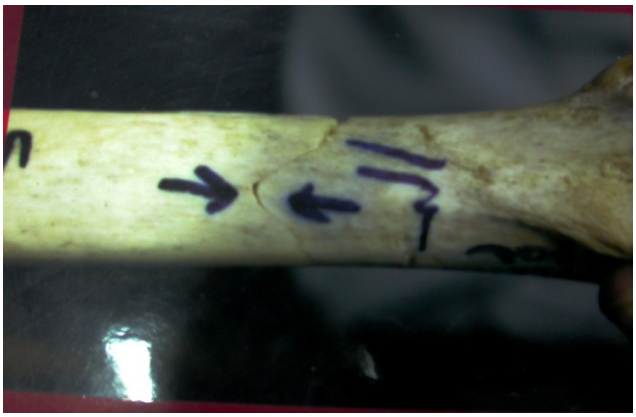

Figure-2: Two parts of femur bone align exactly (protruding part of one aligns perfectly to the dent of another)

Figure-3: Other side of bone with exact alignment at transverse level of separation

Figure-4: Other end of bone with exact alignment at transverse level of separation

Figure-5: level of separation with furrow above the level of separation due to skipping of blade of sharp weapon

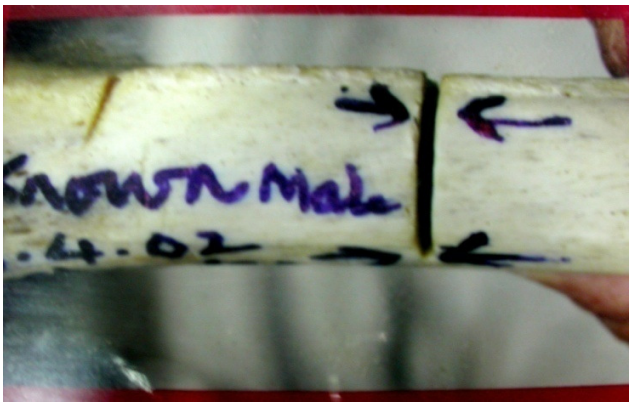

Figure-6: level of separation with furrow above the level of separation due to skipping of blade of sharp weapon(close view of figure-5)

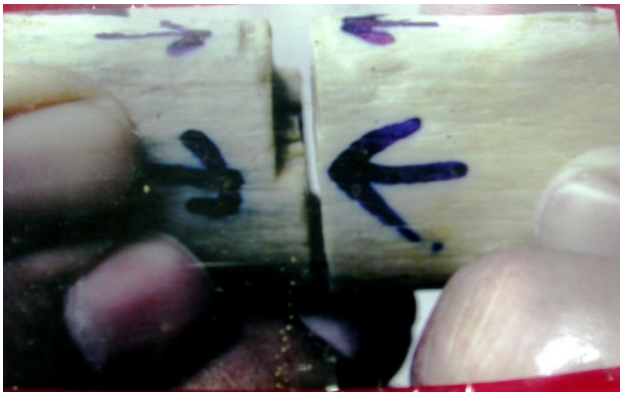

Figure-7: level of separation with cut mark above the level of separation due to skipping of blade of sharp weapon(rear view of figure-5)

Figure-9: Separated upper ends of femur bone with similar cortico-medullary ratio (also note sigle transverse furrow in right one)

Figure-8: Upper part of femur bones of each side with visible cortico-medullary ratio

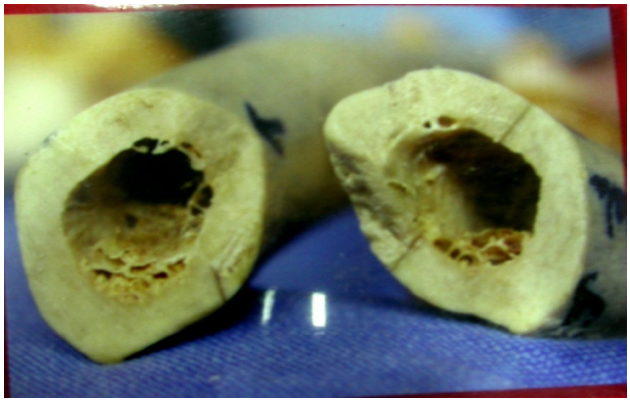

Figure-10 : Separated lower ends of femur bone with similar cortico-medullary ratio (also note single oblique furrow in right one)

Case Report

A rare case report of sudden death of a child due to non-traumatic (spontaneous) acute subdural haemorrhage

S. P. Garg , D. K. Mishra** & Chakresh Jain***

Abstract

Cases of spontaneous acute subdural haemorrhages have rarely been reported in available literature. A case of sudden death of an eight year old child is thereby presented, which the police reported to have died in mysterious circumstances (probably due to unknown poisoning). They were not convinced with the version of the poor father of the deceased that his son died within 8 hour time of returning happily back home after a 2 hour play session in neighborhood, with the sole complaint of moderate intensity (as per himself) headache. No history of fall, trauma, fever, epilepsy, animal/snake bite or vomiting/convulsions during terminal illness was available. No signs of external injury, snake/animal bite, asphyxia etc were present on autopsy. Internally no significant findings were found except for presence of bilateral subdural haemorrhage. No intracranial vascular anomaly was detected on gross examination. The case shall be discussed from medico legal angle with review of relevant literature.

Key words: *Sudden death in childhood, spontaneous acute subdural haemorrhage (SDH)*

Case history

An average built eight year old child was brought dead in casualty department with the history that the child was well and healthy untill 8 hours before his death, when after returning back home from a two hour play session in neighborhood, he suddenly started complaining of a mild headache. He took his evening meals. The headache got worse later. However, there was no significant history of fall from height, accidental injury or assault over head, chronic headache, epilepsy/convulsions, vomiting, unconsciousness, fever, bleeding disorders etc. The consciousness was relatively preserved until death, however child got irritable for few minutes towards the end. Unfortunately, the child died before he could receive medical care and was brought dead only in the morning.

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An autopsy was performed which showed no significant external finding over clothing or body. No evidence of external injury was present. A thorough search was made for any signs of animal / snake bite as the particular countryside where the deceased used to live, is known for snake bite cases presenting particularly in children with a brief illness with neurological manifestations terminating in sudden death. On internal examination scalp was pale (no evidence of injury), skull was intact, there was red subdural hemorrhage (partly clotted) present all around both cerebral hemispheres which was thicker (0.3-0.4 cm) on left side and was in form of soft haematoma over base in middle cranial fossa of 5x4x0.5cm size.

Cerebrospinal fluid was clear and parenchyma of brain was pale and healthy. On naked eye examination no significant vascular anomalies i.e. ruptured aneurysms, secondary haemorrhage through subarachnoid space, ruptured cortical arteries/bridging veins were evident. Postmortem changes were consistent with history of 12 to 24 hours of time since death.

Other internal organs showed no significant findings and were normal. Death was opined to be due to coma as a result of acute intracranial hemorrhage (non-traumatic).

Discussion

Subdural haemorrhage can occur at any age, but is common at both extremes of life[1]. They are scarcely reported in toddler to adolescent age group. *Knight* [1] claims that the lesions are always due to trauma and probably there is no such entity like "spontaneous subdural haemorrhage". The injury is associated with closed head injury and even in absence of history of head injury, evidence of scalp trauma, skull fracture or brain injury; in states of vascular fragility some minimal trauma to head must precipitate bleeding. He casts a doubt on the commonly proposed theory of shaken baby syndrome i.e. subdural hemorrhages taking place in young children after shaking the baby. Fracture plays no role in the pathogenesis of the haemorrhage[1]. However acute subdural haematomas are known to be common lesions in fatal child abuse particularly in infants.

The causes may be

- Rupture of bridging or communicating veins traversing the subdural space to drain into the parasagittal sinuses. Rupture may occur in case of rotational movement of the brain in relation to the skull. These veins are most frequently encountered in the lateral frontal region, the apex of the temporal lobe and the subtentorial region. Lack of muscle fibres and thinness of the fibrous walls and elastic lamina predisposes these categories of veins to rupture as the brain slides within the skull. Furthermore, it has been reported that the parasagittal bridging veins have viscoelastic properties that govern the vessel-rupture and depend upon the rate at which the vessels are strained and the direction of strain. -tear in the dural venous sinuses following a blow.
- Laceration of the dura and tear of middle meningeal artery in which bleeding occurs into subdural, and not in epidural space.
- Fresh tear occurring in an old adhesion between the duramater and the brain with consequent bleeding.

The lesion is often solitary and mostly unilateral. Blood tends to accumulate in the base of skull especially in middle cranial fossa. In acute subdural haemorrhages blood usually is red, partly fluid and partly clotted. It has been suggested that about 100-150 ml is usually the minimum associated with fatalities[2].

Spontaneous development of acute subdural haematomas is rare & the etiology is varied. Few of the common conditions that can lead to acute subdural haematomas are hypertension, arterial bleeding disorders or aneurysm, bleeding as a result of anticoagulant therapy. Hemophilia is the commonest hereditary bleeding disorder but its presentation as a acute subdural haematomas is uncommon[3]. *Agrawal et al* [3] have reported a case of spontaneous subdural haematoma in a young adult. Rarely it can be as a result of cocaine abuse [4] or due to cocaine induced vasculitis. Subdural haemorrhage is essentially venous/ capillary in origin[5], however few reports of haematoma due to rupture of cortical arteries are mentioned in the literature[6, 7]. A case of nontraumatic acute subdural haematoma was reported by *Avis* [8].

Acute subdural haematomas may be rapidly fatal due to the associated massive cerebral damage. Intracranial aneurysms or angioma may rupture into the subdural space and cause an acute or chronic subdural haematomas, is less widely appreciated. The acute spontaneous subdural haematomas due to the rupture of a cortical vessel, usually one affected by atheroma into subdural space is an uncommon entity. *Maxeiner* [9] claimed that bridging vein rupture was directly proven as the source of the (minimal) subdural haematoma by a postmortem X-ray with contrast material. The site of rupture of the vessel or vessels is difficult to locate[5]. On most occasions bleeding is slight but fatal compression of brain by a large subdural hemorrhage can occur within a few hours[10].

About 70% of subdural haematomas occur due to falls & assaults and 25% due to vehicular accidents and are especially likely to be found in alcoholics, old persons & in children. Acute subdural haematoma may vary from thin layer of one mm to 2 to 3 cm thickness but in fatal cases of a layer half to one cm. covers a

large area of one or both hemispheres[11].

In the present case, absence of evidence of other known causes of subdural haematoma or any other cause of death (through chemical analysis report of viscera and histopathology report of tissues) and fairly reliable and corroborative history in view of the postmortem findings was consistent the opinion of spontaneous (non-traumatic) intracranial haemorrhage.

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Case Report

Fatal LPG cylinder blast accident – a case report

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Abstract

Accidental explosions[1] in the home are not uncommon which may be associated with gas leaks, the storage of explosive material such as propane. LP Gas cylinders are very commonly used in the household as a cooking gas and also as fuel in motor vehicles. In spite of safety guidelines accidents occur which are fatal. Due to the release of high pressure LP gas the blast effect becomes destructive and fatal. We report here a case of two deaths due to fatal LPG cylinder blast, which came for autopsy to AIIMS Mortuary**.**

Key words: *Liquified petroleum gas, blast, propane, butane.*

Introduction

LPG or LP Gas is the abbreviation of Liquefied Petroleum Gas. This group of products includes saturated hydrocarbons – propane (C_3H_8) and butane (C_4H_{10}), which can be stored and transported separately or as a mixture. They exist as gases at normal room temperature and atmospheric pressure. It is called Liquefied petroleum gas because these gases liquefy under moderate pressure. They liquefy at moderate pressure readily vaporizing upon release of pressure. It is this property that permits transportation of a storage of LP Gas in concentrated liquid form.

LPG comes from two sources. It can be obtained from the refining of crude oil. When produced this way it is generally in pressurized form. LPG is also extracted from natural gas or crude oil stream coming from underground reservoirs. 60% of LPG in the world today is produced this way whereas 40% of LPG is extracted from refining of crude oil.

The commercialized product referred to as "propane" and "butane" consists very largely of these saturated hydrocarbons, but during the process of extraction/production certain allowable unsaturated hydrocarbons like ethylene, propylene, butylenes etc. may be included in the mixture along with pure propane and butane. The presence of these in moderate amounts would not affect LPG in terms of combustion but may affect other properties slightly (such as corrosiveness or gas formation).

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Case history

On 17.10.07 two cases were brought for postmortem in AIIMS Mortuary, Deptt. of Forensic Medicine and Toxicology. The inquest paper revealed that the deceased were couples who were found dead in the their kitchen room in their residence in Defence colony, South Delhi. The neighbours heard a loud blast sound at about 7.30 pm on 16.10.07. When they rushed to the house they found the husband and the wife lying in the floor with the pool of blood. They rushed them to the AIIMS emergency but they were declared dead on arrival. The scene of accident in the kitchen showed blood spattered in the floor, wall and even in the roof. There was a LPG cylinder kept on the side in standing position with the knob open. The room was well ventilated.

The external examination of the body of the husband showed a well-built body, brownish complexion, 5 feet 6 inch tall with 75 kg weight. The rigor mortis was well developed in all the four limbs and the postmortem lividity seen on the backside and the dependent parts of the body. There was singeing of hair in the eyebrows and

scalp. There was multiple burn injury (I and II degree) over the face, neck, anterior chest wall, left upper limb, anterior abdomen, and left anterior thigh. There was a lacerated wound of size 7x4 cm, muscle deep with charred margins in the postero-medial aspect of left arm. There was another lacerated wound of size 4x6 cm, muscle deep with charring of underlying muscle. The left hand was amputed at left wrist joint with charring of the skin and soft tissues. There was rupture of the anterior abdominal wall with a gap of 60x40 cm with charred margins and the visceral organs exposed. On internal examination the lower respiratory tract showed blood stained froth. There were subpleural haemorrhagic patches on both lungs. The heart surface showed multiple contusions of size about 1x1 to 2x2 cm. The stomach showed semi digested food mixed with blood about 100 ml. The left kidney showed laceration of size 4x2 cm on the anterior surface of the middle third region.

The external examination of the wife's body showed a well built 45 yrs old, brown complexion, 5 feet one inch tall, weighing 60 kg. The rigor mortis was well developed in all the four limbs and postmortem lividity present in backside of abdomen and the dependent parts. The body showed multiple contused abrasions and lacerated wounds (skin to muscle deep) varying in size from 8x5 cm to 1x 0.5 cm present over the face, anterior chest, anterior abdomen and anterior aspect of both upper and lower limbs. On internal examination there was multiple contusions over the surface of the stomach, small intestine and mesentry. The stomach contained one litre of blood stained fluid mixed with semi-digested food. The left kidney showed laceration of size 4x1x0.5 cm in the anterior surface of the lower pole with the surrounding haemotoma. There was no visible pathological lesion in both the case.

The cause of death in both the case was given as shock due to blast injuries sustained by the accidental LPG cylinder blast.

Discussion

In the victims of explosion we can see various types of injuries like blunt impact injuries (bruises, abrasions, lacerations, incised wound usually occurring over the bony prominences where the skin is less mobile, penetrating injuries, burns and fractures. In both the above cases we find the mixture of these injuries. The pattern, distribution, consequences and medical management of explosion injuries varies greatly with the nature [8, 9, 10] of the explosive material. The explosive blast injuries can be divided into four main categories[1] and the nature and extent of injuries depends upon the blast wave energy of the explosion. The primary blast injuries result directly from the sudden changes in enviromental pressure caused by the blast wave. Disintegration or disruptions of tissues tend to occur when the tissues are in close proximity to the explosive device. The flying debris striking the victim causes the secondary blast injuries. Most bodies, unless in extreme proximity to the centre of the explosion, remain relatively intact. One of the characteristic features of bomb blast is body stippling with the the injury triad of bruising, abrasions and lacerations. The tertiary blast injuries are caused by victim impacted against stationary object e.g, injuries by collapsing collapsing buildings. Babar et al [4] showed in their study on ocular trauma that 20% of the ocular trauma was caused by gas cylinder and automobile battery explosives. The injuries in these two cases were mainly of primary impact due to the blast waves caused by the LPG cylinder blast. The body of the husband showed abrasions, contusions, lacerations, burn injuries, fracture of left wrist joint bones with amputation and lacerations of visceral organs. The majority of the injuries were present on the front side and above the waist area. The scene showed blood spattered over the wall and the roof and the cylinder standing below with open knob. This suggest that both the victim must be standing close to the cylinder and the husband must have handled the cylinder with his left hand. The injury severity is more in the husband suggesting that he must have in more proximity to the cylinder. The bloodstain in the roof suggests the upward direction of the blast wave. The cylinder appears to have defective valve in the knob which has caused the leak and the subsequent explosion.

Common properties of LPG [3]

It is colorless and cannot be seen.

- It is odorless. Hence LPG is odorized by adding an odorant prior to supply to the user, to aid the detection of any leaks.
- It is slightly heavier than air and hence if there is a leak it flows to lower lying areas.
- In liquid form, its density is half that of water and hence it floats initially before it is vaporized.
- It is non-toxic but can cause asphyxiation in very high concentrations in air.

LPG expands upon release and 1 liter of liquid will form approximately 250 liters of vapor. LPG is used as a fuel for domestic (cooking), industrial, horticultural, agricultural, heating and drying processes. LPG can be used as an automotive fuel or as a propellant for aerosols in addition to other specialist applications. LPG can also be used to provide lighting through the use of pressure lanterns while butane and propane are different chemical compounds, their properties are similar enough be useful in mixtures. Butane and propane are both saturated hydrocarbons. They do not react with other. Butane is less volatile and boils at 0.6 degree C. Propane is more volatile and boils at degree C. Both products are liquids at atmospheric pressure when cooled to temperatures lower their boiling points. Vaporization is rapid at temperatures above the boiling points. The calor (heat) values of both are almost equal. Both are thus mixed together to attain the vapor pressure that is required by the end user and depending on the ambient conditions. If the ambient temperature is very low propane is preferred to achieve higher vapor pressure at the given temperature. The advantages of LPG are as follows:

- Because of its relatively fewer components, it is easy to achieve the correct fuel to air ratio that allows the complete combustion of the product. This gives LPG its clean burning characteristics.
- Both propane and butane are easily liquefied and stored in pressure containers. The properties make the fuel highly portable, and hence, can be easily transported in cylinder or tanks to end-users.
- LPG is a good substitute for petrol in spark ignition engines. Its clean burning properties,a properly tuned engine, give reduced exhaust emissions, extended lubricant and spare plug life.
- As a replacement for aerosol propellants and refrigerants, LPG provides alternatives fluorocarbons, which are known to cause deterioration of the earth's ozone layer.

Mechanism of cylinder of cylinder blast [3]

LPG is a flammable gas. It is the most commonly used cooking gas in every homes. It is generally contained in iron gas cylinders and delivered to homes by the authorized dealers. The average weight of the cylinder is 14.2 kg. The flammable limit value of LPG is between 1.8% to 9.5% volume of gas in gas/air mixture. The flammability range for LPG is considerably lower and narrower than that for other commonly used gaseous fuels. The small percentage concentration at the lower limit, however, means that even small leaks can create explosive atmosphere. It is colourless which means that it's presence by sight cannot serve as warning signals for the impending potential fire hazards whenever there is a leakage. It is distinctively odorized to give warning in case of leakage. The odourant contents is about $1/5^{th}$ of the LFL i.e., (0.36%). In other words, it can be smelt long before it becomes dangerous enough to catch fire.

Its vapour density is 1.8 to 2.0 at 25°C. LPG in gaseous state is nearly twice heavier than air. Any leakage of LPG, therefore will tend to collect in low lying areas such as drains. This should be borne in mind when dispersing LPG leaks. The liquid to gas expansion ratio is 1:250 at atmospheric temperature. It means 1 volume of liquid on expansion generates 250 volume of gaseous LPG. The leakage of liquid LPG is, therefore very dangerous. The liquid density of LPG is 0.525 to 0.580 at 15°C which is lighter than water. Therefore in case of leakage LPG could be carried by flowing water. This factor

should be borne in mind when using fire water hose streams for fire control purposes. The latent heat of vapourization value for LPG is 88 Kcal/kg at 20°C at 1 atm pressure.

Hence, the latent heat of vaporization is very high for LPG. Thus, LPG takes large quantity of heat, when it vaporizes. On vaporization, LPG's requirement for latent heat gives rise to the cold burn resulting from liquid contact with naked flesh. This results in several local chilling and damage to the tissues.

The LPG has high calorific value of 11000 Kcal/kg. The poor visibility of the ignitable mixture and high burning velocity that can injure instantly anyone coming into contact with it, on account of high caloric value of LPG.

Most of the LPG explosion accidents are due to the vapour cloud explosion (VCE) event. It starts with the leakage of LPG either due to damage of the connecting tube or defective valve sealing the cylinder. The wind plays a significant role in its dispension. The immediate ignition of this LPG will cause fire balls followed by the delayed ignition which cases vapour cloud explosion causing severe damages.

The boiling liquid expanding vapour explosion (BLEVE) occurs where there is a major container failure, which contained liquid above its boiling point. A BLEVE is generally followed by a fireball, which rises due to the buoyancy effect of hot gases. The burning liquid droplets fall down like rainfall. The BLEVE of an LPG vessel occurs when it gets engulfed in fire as in case of a pool fire at ground level.

LPG gets overheated resulting in pressure build-up. The pressure in vapour space increases, PSV starts leaking and a flame appears at PSV discharge nozzle. The vessel portion is contact with liquid LPG remains cool while those in contact with vapour LPG get overheated. The steel gets softened due to reduced UTS. Thinned vessel wall ruptures due to enhanced internal pressure. The overheated LPG mass gets ejected, catches fire and rises as a fireball followed by blast.

Common causes of LPG accidents

Liquefied petroleum gas is a flammable gas, which has the potential to create blast accidents. Therefore it is important that the properties and safe handling of LPG are understood and applied in the domestic and commercial/industrial situations.[3]

- Liquefied petroleum gas is stored under pressure. The gas will leak from any joint connection, which is not sealed properly.
- Liquefied petroleum gas is heavier than air. Any significant leak will move downward and stay on the ground. LPG will accumulate in any low-lying area such as depressions in the ground, drains or pits.
- Since LPG is stored in two phases, liquid and gaseous, there is potential for either liquid leak or a gas leak.
  - If the liquefied petroleum gas leak is a gas leak it may not be seen (because LPG is colourless), except where the leak is of sufficient size to be seen shimmering in the air.
  - When a liquid liquefied petroleum gas leak occurs, the gas release will be as a patch of ice around the area of the leak, or as a jet of white liquid. This white appearance is due to the cooling effect created by the rapid expansion the LPG liquid into a gas. The condensing atmospheric moisture makes them visible.
  - In concentrated amounts and in uncontrolled conditions, liquefied petroleum gas has the potential to create a fire or an explosion.

As per the various investigation conducted by OISD, it found the following common causes for the LPG related accidents.[3]

i) Overfilled/liquid full cylinders, which are highly dangerous.
ii) Forgetting to switch off the regulator when not in use.
iii) Damaged O-ring of the PR knob.
iv) Leak of LPG from damaged rubber lube.
v) Incorrect way of fixing the regulator causing damage and leak of LPG.

Safety precautions[3]

Choose an LPG supplier who can provide you with well-maintained LPG cylinders after-sales support.

- Always close the cylinder or tank valves after use.
- Use a child-safe regulator on the LPG cylinder for domestic use.
- Ensure that your LPG supplier provides a supply of LPG that is odorized to allow smell and detect leaking LPG.
- Always use LPG appliances, and other gas equipment that is approved for use, and meets all local safety standards.
- Check for gas leaks on a regular basis.
- Always use LPG rubber tubes that have an ISI mark.
- Always close the LPG cylinder or tanks valves after use.
- Never check for gas leaks using a lit match. Always use a solution of soapy water to look for bubbles coming from around valves and pipe joints. These bubbles indicate gas leak.
- Replace the LPG cylinder hose on a regular basis, and replace any damaged hose with a new hose.
- Stand the cylinder upright and make sure that any hose connection between the cylinder and the appliance does not come into contact with or near the gas burner.
- If you smell or find a gas leak:[5,7]
  - ♣ Turn off the gas supply valve from the cylinder of the tank.
  - ♣ If possible turn off the appliance.
  - ♣ Turn off or remove any other source of ignition.
  - ♣ Ventilate the room by opening doors and windows.
  - ♣ Inform your gas supplier immediately.
  - ♣ Leave the house or apartment, and advise your neighbours.
  - ♣ If you think that there is a danger of a fire, call the Fire Service.

Conclusion

Deaths and injuries from the effect of explosive devices and the explosive substances can occur in a variety of circumstances. And LPG cylinder[6] is one the common cause of domestic blast accidents. The primary role of the medical investigation of explosives is to document the injuries and collect evidence that will assist with the investigation of the nature and source of the explosion. It is also important to educate the public about the safety precautions in handling the LPG cylinders and enforce strict guidelines for standards and precautions to be followed by the Suppliers.

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Figure- 1 : The scene of accident (Kitchen)

Figure- 2: Multiple scattered Blast Injuries on the female victim

Figure- 3: Multiple scattered blast Injuries on the male victim

Figure- 4: Amputated left hand with burst abdomen in male victim

Figure- 5: Multiple contused lacerations and perforations of intestines

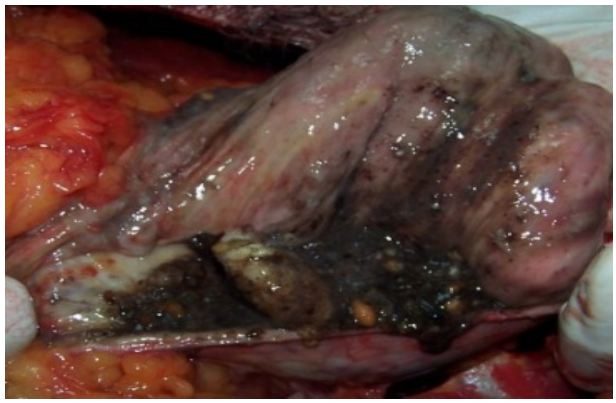

Figure- 6: Soot particles in stomach of the female victim

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Case Report

Fatal stab wound with scissors

Prateek Rastogi & B. Suresh Kumar Shetty***

Abstract

Stab injuries of the chest are not uncommon and could be accidental, suicidal or homicidal. Stab wounds of the chest may be associated with a spectrum of injuries ranging from the insignificant to the lethal. However, the present case discusses the importance of careful examination of an unusual circumstantial presentation with a sharp weapon [scissors]. The case presented with haemopericardium and haemothorax due to penetrating injury to the heart. This case is highlighted, so that it becomes a necessary tool for the forensic experts to have an unbiased approach at autopsy and come to a logical conclusion.

Key words: *Stab wound, sharp weapon, circumstantial evidence.*

Introduction

Punctured wounds occur most commonly in cases of assaults and homicide, but they are also seen in traffic injuries and accidental falls on the projecting objects and are uncommon in self inflicted punctured wounds.[1] Stab wounds of the chest may be associated with a spectrum of injuries ranging from the insignificant to the lethal.[2] Patients presenting with penetrating injuries to heart may be completely stable, and the diagnosis can be missed.[3] Stab injuries from knives, broken glass bottles, china, porcelain and scissors have been documented in literatures.[4] We highlight here an unusual case presentation of accidental stab injury on the chest, which has resulted from a scissors, a sharp weapon.

Case history

A 20-year-old married female was allegedly assaulted by her husband with scissors (Figure-1). She died on the way to the hospital and post mortem examination was conducted the next day. On external examination dead body was cold & stiff, postmortem lividity was present at the back but not fixed. Fecal discharge was present at anal area. An elliptical stab wound, with clean cut margins, measuring 1.1 x 0.5 cm was present obliquely on left side of chest in 2nd intercostals space 3.5 cm from midline. Wound was directed from medial to lateral & from above downwards (Figure-2). The wound perforated the underlying intercostal muscles, perforated the pericardium & penetrated the pulmonary trunk near its origin (Figure-3). An abrasion, measuring 1 x 1 cm, reddish in colour was present at the back of left elbow. In addition, internal examination showed 100 ml blood in right pleural cavity, 500 ml blood in left pleural cavity and 150 ml blood in pericardium. Brain and lungs were congested and oedematous. Kidneys were pale and no abnormal odour was present in gastric contents. No other external /internal injuries were present on the body. All other natural body orifices were intact.

Cause of death was opined as haemorrhage secondary to sharp force trauma to the pulmonary trunk.

Discussion

In cases of assault on a young healthy conscious victim we usually expect signs of struggle on the victim, accused or in the surrounding areas. Signs on victims can be produced by accused in an attempt to overpower. Signs on accused can be the result of victim's

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attempts to safeguard himself, while disturbances on scene can be the result of accused trying to catch victim and victim trying to escape. Also, cases of homicide show multiple injuries on the victim signifying attempts by the perpetrator to ensure death.

In present case, no such findings were present, thus suggesting absence of any struggle between the victim and the assailant. As per relatives, there was some verbal fight between the lady and her husband just before the unfortunate event (Lady was sitting and her husband was standing) during which the husband in anger forcefully threw scissors on her. The force was sufficient enough to penetrate the thoracic cage and to inflict fatal wound on the pulmonary trunk. The abrasion on elbow might have resulted when the lady fell down on floor. Although, this gives a sufficient explanation for the accidental fatal wound, still the possibility of an intentional assault with scissors held in hand and victim pinned to ground cannot be ruled out.

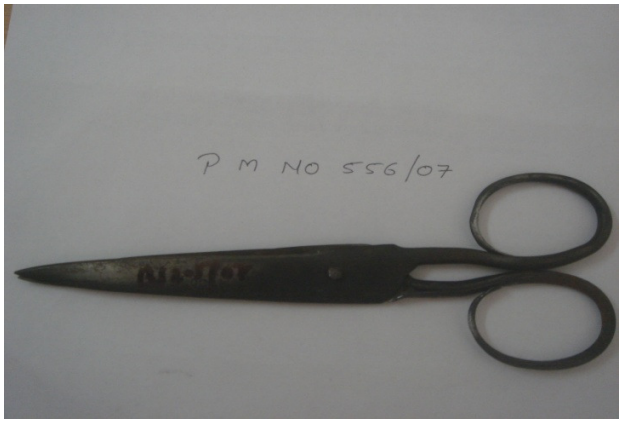

Figure-1: Alleged weapon of offence

Figure-2: Stab injury to the chest wall

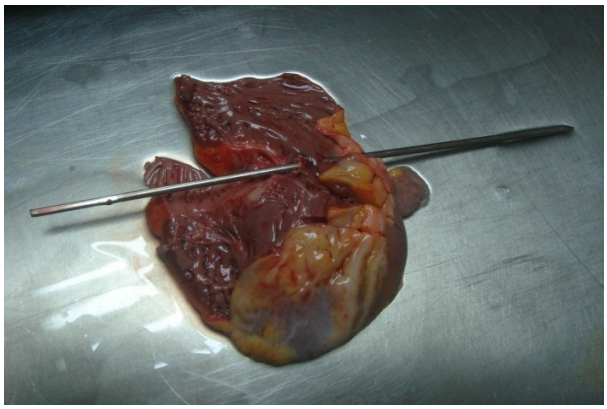

Figure-3: Internal injury to the heart

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Case Report

Third coronary artery – Boon or Bane?

Hareesh S. Gouda , Shashidhar C. Mestri**& Sunil C. Aramani****

Abstract

Third Coronary Artery is a direct branch from the right aortic sinus without any observable common trunk with the right coronary artery. Third coronary artery is an important bridge for collateral circulation between right and left coronary system. The prevalence of Third Coronary Artery has wide Geographical differences. This extra coronary artery may be a boon for the person having it. This artery when present may help in establishment of partial identity of an individual if ante mortem record, angiograph is available.

Key words: *Third coronary artery, collateral circulation, geographical variation, sudden natural death, boon, partial identity*

Introduction

Third Coronary Artery is a direct branch from the right aortic sinus without any observable common trunk with the right coronary artery [1]. It is also called as Second right coronary artery [1] or Supernumerary coronary artery or right Vieussen's artery or Adipose artery [2]. Existence of this artery has been known since the days of eminent anatomist Morgagni. It has gained importance & commonly recognized only after the work by Schlesinger's group in 1940's [3]. It acts as an important bridge for collateral circulation between right and left coronary system as it frequently anstomoses with either conal branch to form Circle of Vieussens [4] or anterior interventricular branch of left coronary artery [5]. Third coronary artery may be a boon for the person having it. In this article a case of fatal head injury involving a 13 year old boy in whom Third Coronary Artery was noticed as an incidental finding, is being reported to emphasize on chance findings and their importance in either sudden death or is there any possibility of causing synergistic effect to hasten death.

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Case history

A boy aged 13 years was brought to the Trauma Care & Emergency Medical Service of Dr.Prabhakar Kore Hospital & MRC, Belgaum at 11 am with history of road traffic accident at around 9.30 am. On examination he had head injury and after preliminary treatment he was shifted to Neuro Surgery Intensive Care Unit. But, unfortunately he succumbed to the injuries next day at 6.15 am and body was shifted to the mortuary for Medico Legal autopsy.

Autopsy revealed head injury which was sufficient to arrive at cause of death. Incidentally during dissection of heart, we found three coronary ostia in the aorta. One was present in the left posterior aortic sinus and two were present in anterior aortic sinus (Figure- 1). The additional ostium which was present in the anterior aortic sinus in front of right coronary artery was that of Third Coronary Artery. Tissues adjacent to the origin of right and third coronary artery were dissected to confirm the independent

aortic origin of Third Coronary Artery. There was no demonstrable gross cardiac pathology. All other viscera were intact and on cut section congested.

Cause of Death was opined as "Brain stem dysfunction consequent upon intracranial haemorrhage due to head injury sustained by blunt force impact".

The heart was subjected for postmortem angiography to visualize the course of Third Coronary Artery (Figure- 2).

Discussion

Third Coronary Artery is a direct branch from the right aortic sinus without any observable common trunk with the right coronary artery [1]. It supplies the infundibulum (*conu*) of the right ventricle, which is usually vascularised by the conal branches of the right coronary artery and anterior descending branch of left coronary artery[2].

The prevalence of Third Coronary Artery has wide Geographical differences. Occurrence of Third Coronary Artery in different populations is as follows, Japanese – 36.8 %; Kenyans – 35 %; Bulgarians – 34.8 %; Indians – 24 %; English population – 15.8 %; Iraqis – 8 % and Germans – 7.1 %. Report of these studies supports the hypothesis of Garg et al. that Coronary artery variations may have Genetic basis [1].

In a study conducted to know the prevalence and distribution of Third Coronary Artery in Kenyans, it was observed that the Third Coronary Artery may extend epicardially to supply the apex of the heart. This observation suggests that one must be careful during surgical procedures around the anterior wall of the right ventricle and infundibulum since such a long Third Coronary Artery may present a surgical hazard [1].

Variations in the occurrence of Third Coronary Artery may also be related with age of the study population. According to a study conducted by Miyazaki & Kato, prevalence of Third Coronary Artery in adult hearts is more than fetal hearts [1].

Prevalence of Third Coronary Artery was significantly higher in subjects older than Two years of age than in those who were younger in a study conducted at Minnesota, US. Three potential explanations given by the researchers are,

- Failure of identification of artery in the small specimens from fetal and infantile subjects.
- Progressive age related increase in the calibre of the aorta, resulting in moulding of structures, so that a conus artery arising initially from the proximal segment of the right coronary artery is carried onto the aorta.
- Postnatal budding of the Third Coronary Artery from the aorta.

From the results of their study researchers are also of the opinion that whichever of the above mentioned explanations are correct, some coronary arterial patterns are not decisively established at the time of birth. In this study about 45 % of hearts of individuals aged between 51–79 years showed the presence of Third Coronary Artery [3].

It is also been reported that Electrocardiographic evaluation in diagnosis of left anterior descending artery occlusion, ECG may not detect any ishaemic change in the region of collateral flow (infundibulum of right ventricle). This highlights the importance of distribution of the Third Coronary Artery in the progress and extent of Myocardial Infarction and in cardiac surgery [1].

In another study conducted at Toho University School of Medicine, Tokyo, it was found that the size of Third Coronary Artery orifice was smaller in normal heart than a pathological heart. The existence of multiple Third Coronary Artery orifices and the fact that pathological hearts have a higher incidence than normal hearts suggest that the Third Coronary Artery develops and contributes to the collateral circulation after birth [6].

Conclusion

Till today there is not a single case of fatality due to third coronary has been reported. Third coronary artery was found even in elderly individuals [3] which indirectly indicate that this vessel is not incompatible with life. Insufficient evidence to suggest that third coronary per se could provoke any known disease state. Also,

this artery is an important bridge for collateral circulation between right and left coronary system.

So, as per the results of the available studies this congenital anomaly is safe, benign and advantageous for the individuals having it. However other congenital coronary anomalies like origin of left coronary artery from anterior aortic sinus, right coronary artery from left posterior aortic sinus or single coronary can cause sudden death in young athletes.

Hence, if third coronary is found at autopsy it should not be blamed as cause of sudden natural death.

From medico legal point of view having third coronary is not a bane rather is a boon as it may help in establishment of partial identity of an individual if ante mortem records of third coronary is available.

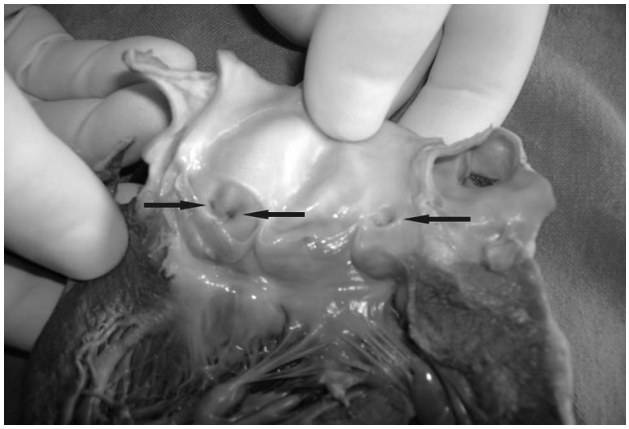

Figure -1. Dissected aorta showing three Coronary Ostia

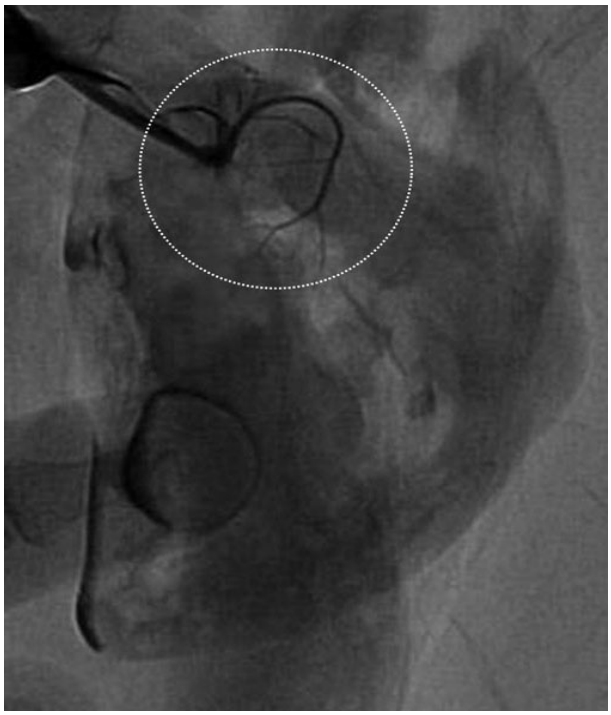

Figure -2: Postmortem angiograph showing Third Coronary Artery

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Review Article

Consent and publication

Pradeep Kumar M.V., Jagannatha S.R.** & Naveen kumar T.***

Abstract

Medical man starts his practice with ethical and legal obligation in the form of consent. Much has changed in the past few decades. Patients are now given more information, are alerted to the risks, and are able to discuss choices. The final choice made by the patient is based on an understanding of the issue and consent is given. Consent must be based on an 'intelligent understanding' of a responsible patient or authorized legal party. Information about a patient that a doctor acquires during a professional relationship is confidential. This principle of confidentiality affects the publication in medical journals of any material pertaining to a particular patient or research subject. Thus, patient's right to privacy should not be infringed without informed consent.

Even in this modern world, medical men fail at occasions to take authorized consent and subsequently entangle themselves with legal hurdles. Within the broad context of informed consent, here we explore the particular issue of consent for publication of material that emerges from the doctor-patient relationship.

Key words: *Publication, informed consent, patient's right to privacy, confidentiality*

Introduction

According to Medical dictionary, the word consultation means 'a meeting to discuss or plan something'[1] . Consultation with the doctor means the patient is provided with information so that they can make choices. The relationship between the patient and doctor is considered as 'fiduciary relationship' (good faith and trusting). A patient who presents him or her at the doctors' clinic for a routine procedure implies his/ her consent to treatment, thereby establishing doctor-patient relationship. According to British Surgical Practice, if the patient does not protest when the doctor takes a scalpel during treatment, it means that the patient consents for procedure[2]. The term consent means voluntary agreement, compliance or permission. According to the Indian Contract Act two or more persons are said to consent when they agree upon the same thing in the same sense [3].

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Historical Background

The introduction of scientific and experimental knowledge into clinical medicine in the nineteenth century brought with it an increased demand for experimentation on human subject. This research was done mainly on patients in hospital, often without their consent, under on "ethos of Science and medical progress." As a result of injury to some patient's subjected to non-therapeutic research, however, controversy and public debate ensued about the ethics of human experimentation. So in 1891 the Prussian minister issued a directive "must in no case be used against the patient's will". But the first detailed regulations about informed consent were issued after critical public discussion and political debate on the Neisser case and set forth the legal basis of disclosure and unmistakable consent. Later the criticism of unethical human experimentation in Germany, the Reich Government in 1931, issued detailed 'Guidelines

for new therapy and human experimentation.' The Guidelines clearly distinguished between therapeutic ('New therapy') and non-therapeutic ('human experimentation') and set out strict precautions[4].

But the Nuremberg Code of 1947 is widely regarded as the first document providing ethical regulations in human research on the basis of informed consent. Later the Declaration of Helsinki (revised 1975), a code of ethics for the guidance of doctors in clinical research, was originally adopted by the World Medical Association at the Eighteenth World Medical Assembly in June 1964 [3].

The Declaration of Geneva (as amended by the 22nd WMA, Sydney, Australia, Aug. 1968) 5 approved by; the World Medical Association binds the doctor with the words "The health of my patient will be my first consideration." The Medical Council of India as the Code of Ethics 3 follows this.

Discussion

The issue of consent within medical practice, research, & publication is coming increasingly to the fore as the balance of power in the doctor- patient relationship tilts towards patients. Information about a patient that a doctor acquires during a professional relationship with the patient is confidential. It may not normally be revealed to others except with the consent of the patient concerned. Although the publication of information that enables the patient to be identified is widely agreed to be a breach of confidentiality, the position of anonymised information is more contentious. In one view there is no breach of confidentiality, if the patient cannot be identified. The obligation of confidentiality is restricted to information that is capable of being connected to a particular person[6].

However there are certain situations, where anonymised information has been recognizable to the patient or family involved and caused upset. One such incidence was encountered in British Medical Journal. The journal had published – without revealing the patient's name and with written consent- a radiograph and photograph of a patient who had been attacked with a machete. Later, when the case came to court, the pictures were reproduced in most of Britain's National newspapers and on television. Journalists had made a link between the case and the BMJ pictures [7].

Anonymising is impossible. The best solution is to obtain informed consent for all such material that is to be published. "Obtain consent from patients before publishing personal information about them as individuals in journals, textbooks, or other media in the public domain, whether or not you believe the patient can be identified. Consent must therefore be sought to the publication of, for example, case histories about, or photographs of, patients" [8].

Journals have their own proposed guidelines regarding consent and publication. Few journals are of the opinion that if the patient is dead, then it is possible to publish material about patient- particularly general anecdotes- without consent. Even General Medical Council also admits the same [9].

In one such case a person from a medical family, came across an article mentioning about his son's rare heart malformations. He easily identified it, as the child had an absent right subclavian artery, an interrupted aortic arch, VSD, PDA, and ASD. The article was published without the consent of the fact that taking consent for publication is exempted in case of patients who have died. In his letter to BMJ the person totally disagreed with the rule that consent is exempted in case of the death of the patient. His son had died from subaortic stenosis, endocarditis, stroke & CCF. He opined that keeping the sensitive nature of the case he should have been informed of any publication and further that express consent is a must before publication[10].

The proposed guidelines in the journals about consent and publication are brief. At times, a particular- and unresolved- problem arises. In the process of obtaining consent people may be given information they would rather not have, undermining the doctor- patient relationship. There may arise problems over confidentiality inquiries into patient's death.

Exceptions in which publication would be permitted without the patient's consent are:

- The patient is long dead and has no living relatives.
- The interaction with the patient was long ago- perhaps more than 15 years, as the interaction was long ago & the patient was elderly or terminally ill, the patient is likely to be dead.
- All extraneous information that might help identification is excluded.
- Most exceptional circumstance of over-riding importance to public health [9].
- Publication of research results, which arise from the researcher-participant relationship regulated by research ethics committee.
- Publication of information including wire services and news archives obtained from the journalist- subject relationship.

Conclusion

Patients have rights to privacy that should not be infringed without informed consent. Identifying information should not be published in written descriptions, photographs or pedigrees unless the information is essential for scientific purposes and the patient gives written informed consent for publication. One should of course do our best to ensure that the patient is not identifiable from the material you publish. Complete anonymity is difficult to achieve. In an attempt to attain anonymity, the patient data should not be altered or falsified. One should follow the patient's wishes, if we know them. If not, one should consider whether publishing information that could be identified would cause distress to relatives or the patient's spouse or partner. If one is satisfied that the publication would not cause distress, and that we have no reason to think that the patient/ next of kin would have objected, we may use the case study or photo (black tape should covering over both eyes) in published material. At times, a case may arise where material may be published without consent " in the public interest", which should be weighed between confidentiality and public interest.

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Review Article

Juvenile delinquency in India – a cause for concern

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Abstract

Childhood experiences are important in the development of criminality, however, not all criminals reveal their criminality early in life. While the origins of criminal behavior in childhood are a complex matter, delinquency is reasonably predictable early in some children's lives. Similarly, antisocial behavior in the form of juvenile delinquency is predictive of adulthood crime. It seems evident, though, that early problem behavior should not be neglected for two reasons – it is predictive of later, more serious, problems and, if it is acted on, then even simple interventions may be effective at reducing future delinquency.

Key words: *Juvenile delinquency*

Introduction

The term juvenile delinquency applies to violation of criminal code and certain patterns of behavior that are not approved for children and young adolescents. It may be grouped as individual delinquency (in which only one individual is involved and the cause of delinquent act is traced to individual delinquent), group supported delinquency (committed in companionship and the cause is attributed not to the personality of the individual but to the culture of the individual's home and neighborhood), organized delinquency and situational delinquency [1]. A delinquent young person is disobedient and wayward, runs away from home and school, cannot be controlled by the parents and teachers, is not amenable to any kind of discipline, is self-willed and habitually acts in a manner injurious to the welfare and happiness of others and himself.

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Different scholars have classified juvenile delinquents on different basis. Hirsch classified them in six groups on the basis of kinds of offences committed: Incorrigibility (for example, disobedience and keeping late hours), Truancy (staying away from school), Larceny (ranging from petty thefts to armed robbery), Destruction of property (both public and private), Violence against individual or community and sexual offences ranging from homosexuality to rape. Eaton and Pole, classified delinquents into five groups according to the offence: Minor violations (disorderly conduct and minor traffic violations), Major violations including thefts, Property violations, Addiction, and bodily harm including homicide and rape. Trojanawicz classified them as accidental, ill socialized, aggressive, occasional, professional and gang-organized. Psychologists have classified juvenile delinquents on the basis of their individual traits or the psychological dynamics of their personality into five groups: mentally defective, psychotic, neurotic, situational and cultural [2].

Sociological theories of juvenile delinquency put emphasis on the environment, social structures and the learning process. However, it is generally agreed that a number of factors that play an important part in a youngster's delinquent behavior can be divided into two groups, individual factors and situational factors. The individual factors include personality

traits like submissiveness, defiance, hostility, impulsiveness, feeling of insecurity, fear, lack of self-control and emotional conflicts while situational factors may be attributed to family, companions, movies, school environment, work environment etc.

Just as the causal factors of delinquency are diverse and numerous, so are the definitions. Sociologists define deviance as any behavior that members of a social group define as violating their norms. This concept applies both to criminal acts of deviance as well as to non-criminal acts that members of a group view as unethical, immoral, peculiar, sick, or otherwise outside the bounds of respectability [3]. According to another definition, delinquency is a condition arising in the matrix of socio-personal disorganization in the sequence of experience and influences that shape behavior problems. It is the product of dynamic social process, involving numerous variables and the failure of personal and social controls. It is a symptom of deep socioeconomic and social ailments [4]. According to the legal concept, a delinquent juvenile is one who commits an act defined by law as illegal or delinquent, and who is adjudicated 'delinquent' by an appropriate court.

In India, the concept of delinquent behavior is confined to the violation of the ordinary Penal Laws of Country carried out by boys or girls up to the age of eighteen years. State laws prohibit two types of behavior for juveniles: the first includes behavior, which is criminal for adults, as for example, murder, rape, fraud, burglary, robbery, etc. and the second includes status offenses like running away from home, unruly or ungovernable truancy, etc. Juvenile justice is commonly understood as a notion of fairness and justice and an alternative system of dealing with children through laws. Here the emphasis is protective, restorative, and reintegrative with care and rehabilitation. Thus, Juvenile Justice Act 2000 aims at evolving effective mechanisms and creating the necessary environment for care, protection, development and rehabilitation of juveniles in conflict with law.

Incidence

A decadal analysis of the incidence and rate of juvenile delinquency from the data published by the National Crime Records Bureau, Ministry of Home Affairs, Government of India 5 tabulated below (Tables 1 to 3), is self explanatory and demands for examination of the problems confronting juveniles. Although, official records are said to under-represent juvenile delinquent behavior since many crimes by juveniles are never reported to authorities or many juveniles who commit offenses are never arrested. As a result, official records systematically underestimate the scope of juvenile crime. However, despite being inadequate measures of the level of juvenile offending, official records monitor justice system activity.

Discussion

The Office of Juvenile Justice and Delinquency Prevention and the Federal Bureau of Investigation providing current statistical data on juvenile arrests reported continuing decline in almost every major category of crime. However, despite the continuing decline in arrest rates, juvenile offenders in residential placement (n= 108,931 on 10/27/99) increased by 3% from 1997 to 1999. The total includes a 12% increase in placement of juveniles in a residential facility for a technical violation. Between 1980 and 2000, the arrest rate for all offenses reflected a 35% increase for juvenile females and a decline of 11% for juvenile males [6].

The United States Department of Health and Human Services, Administration on Children, Youth and Families, through the National Child Abuse and Neglect Data System, released April 2002, reported that 879,000 children were found to be victims of child maltreatment. Maltreatment categories typically include neglect, medical neglect, physical abuse, sexual abuse, and psychological maltreatment. Almost two-thirds of child victims (63%) suffered neglect (including medical neglect); 19% were physically abused; 10% were sexually abused; and 8% were psychologically maltreated [7].

According to a report [8], in 1981, juveniles accounted for over one out of three arrests for robbery, one out of every three arrests for crime against property, one out of six arrests for rape,

and one out of eleven arrests for murder. In 1981, about one teenager out of every fifteen in the nation was arrested. Between 1983 and 1991, crimes committed by juveniles under eighteen showed another staggering increase: robberies increased five times, murders tripled, and rapes doubled. More than five hundred children arrested for rape in 1991 were twelve. During the 1996-1997 academic school year, 6,093 students were expelled for bringing firearms or explosives to school. Some 14000 young people were attacked on school property every day, and 160 thousand children missed school every day because of the fear of violence. A large percentage of these at-risk, antisocial youth are vulnerable to gang recruitment and membership[8].

In Britain, the total rate of violent crimes against individuals has increased a frightening 1,200% during the period 1960 to 1993. The number of robberies has increased by 2,700% in the same period. 93% of Britain's crime was against property. Although the total number of reported crimes in France has fallen slightly in recent years, juvenile delinquency has continued to rise sharply by 81% over the past ten years. One in five of those charged was under eighteen[8].

Other Western countries' crime rates parallel the trend of the United States, Canada, Britain and France. In Australia, the number of serious assaults, for example, has risen 391% between 1973 and 1992, while the robbery rate increased 190%. In New Zealand, the total number of violent offences increased 615% between 1960 and 1990, from 2,937 to 20,987. The crime rate in Greece also increased 1,268% between 1980 and 1990. In Germany the assault and theft rose 71%. During 1993 - 1997, the number of crimes committed by German children up to age fourteen surged 10.1% [8]. According to a report, juvenile courts, all over China tried 393,543 defendants aged less than 18 years during the period 1999 to 2005 convicting 393,115 and acquitting 428 [9].

A study of data published by the National Crime Records Bureau, Ministry of Home Affairs, Government of India [10], reporting the incidence and rate of juvenile delinquency in India reveals that the incidents of juvenile crimes have declined from 12588 in 1991 to 9267 in 2000. However, during the same period offences like burglary, arson, hurt, molestation etc. have increased. Despite the declining incidence of juvenile delinquency both at the absolute, and the relative levels, it is too often reported that rural and urban India have pervasive practices of child labor, juvenile servitude, domestic juvenile servitude and trafficking of juvenile girls [11]. Such reports demand for examination of the problems confronting juveniles.

Conclusion

Juvenile Delinquency and the problems related to it have been faced by all societies, all over the world, however, in the developing world the problems are all the more formidable. The process of development has brought in its wake a socio-cultural upheaval affecting the age-old traditional ways of life in the congenial rural milieu. In fact, various scientific advances and concomitant industrialization and urbanization have ushered in a new era, which is characterized by catastrophic changes and mounting problems. Cities have sprung up with heterogeneity of population, cultural variations, occupational differentiations and overcrowded conditions. As a result, social disorganization and maladjustment have taken place following a perennial influx of people from their rural habitat to the urban squalid slums. Juveniles are adversely affected by these changing conditions. At the same time, the traditional social control system that served as a preventive check against any antisocial activity is gradually giving way. Consequently, the problem of juvenile deviance and antisocial propensities is rearing its ugly head – a situation that needs to be checked.

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Table -1: Incidence and Rate of Juvenile Delinquency under IPC (1996-2006)

Year	Incidence of crime		% of juvenile crimes to total crimes	Estimated Mid-Year Population * (in 100,000)	Rate (Incidence Of Crime Per 100,000 Population)
	Total crimes	Juvenile crimes			
1996	1709576	10024	0.6	9319	1.1
1997	1719820	7909	0.5	9552	0.8
1998	1778815	9352	0.5	9709	1.0
1999	1764629	8888	0.5	9866	0.9
2000	1771084	9267	0.5	10021	0.9
2001	1769308	16509	0.9	10270	1.6
2002	1780330	18560	1.0	10506	1.8
2003	1716120	17819	1.0	10682	1.7
2004	1832015	19229	1.0	10856	1.8
2005	1822602	18939	1.0	11028	1.7
2006	1878293	21088	1.1	11198	1.9

Table -2: Juveniles apprehended under IPC and SLL Crimes by Age Groups (1996-2006)

Year	Total Apprehended	7-12 Years	Percentage To Total	12-16 Years	Percentage To Total	16-18 Years	Percentage to Total
1996	19098	3471	18.2	11397	59.7	4230	22.1
1997	17796	2747	15.4	12171	68.4	2878	16.2
1998	18923	3336	17.6	11548	61.0	4039	21.3
1999	18460	4039	21.9	10311	55.9	4110	22.3
2000	17982	3292	18.3	11389	63.3	3301	18.4
2001	33628	3696	11.0	12729	37.9	17203	51.2
2002	35779	4488	12.5	13864	38.7	17427	48.7
2003	33320	3584	10.8	11687	35.1	18049	54.2
2004	30943	2107	6.8	12415	40.1	16421	53.1
2005	32681	1645	5.0	13090	40.1	17946	54.9
2006	32145	1595	5.0	12535	39.0	18015	56.0

Table - 3: Juveniles apprehended under IPC & SLL Crimes by Sex (1996-2006)

Year	Boys	Girls	Total	% of girls
1996	14068	5030	19098	26.3
1997	14282	3514	17796	19.7
1998	13974	4949	18923	26.2
1999	13088	5372	18460	29.1
2000	13854	4128	17982	23.0
2001	31295	2333	33628	6.9
2002	33551	2228	35779	6.2
2003	30985	2335	33320	7.0
2004	28878	2065	30943	6.7
2005	30606	2075	32681	6.3
2006	30375	1770	32145	5.5

Review Article

Professional indemnity insurance *vis -a -vis* Medical professionals

*Sweta Agarwal * & Swapnil S. Agarwal***

Abstract

Public awareness of medical negligence in India is growing. Hospital managements are increasingly facing complaints regarding the facilities, standards of professional competence and the appropriateness of their therapeutic and diagnostic methods. After the Consumer Protection Act, 1986 has come into force; some patients have filed legal cases against doctors, have established that the doctors were negligent in their medical service, and have claimed and received compensation. This article presents a summary of importance of Professional Indemnity Insurance as preventive measure to avoid litigation and security to the Medical Professionals.

Key words: *Medical professionals, civil negligence, patients, indemnity, insurance*

Introduction to professional indemnity insurance

The term "*indemnity*" means *reimbursement* or *to compensate*. The principle of indemnity is strictly observed in liability insurances. These insurances are designed to provide the insured person protection against the financial consequences of legal liability [1]. This policy is meant for professionals to cover liability falling on them as a result of errors and omissions committed by them whilst rendering professional service. The indemnity applies only to the claim arising out of bodily injury and/or death of any patient caused by or alleged to have been caused by error, omission or negligence in professional service rendered or which should have been rendered by the insured or the assistants or the team of people employed by the insured [1].

An important level of protection against outcome of litigation would be to go for Insurance cover. Profession indemnity insurance is a tool, which not only meets the claim of compensation awarded against doctor/hospital but also gives a sense of mental security that even if some negligence is proved the insurance company will take care of it [2].

By law, professionals are required to perform the services for which they were hired in accordance with the terms of contract. While the first duty is primarily contractual, the second arises from the principle of law of tort [3]. A contractual arrangement is created, when a client hires a professional to perform a service. When he fails to perform the contractual obligations as promised and the client suffers harm as a result, the injured party is entitled to be restored to the position he would have occupied had the contract been performed as promised [3].

The policy covers all sums, which the insured professional becomes legally liable to pay as damages to third party in respect of any error and/or omission on his/her part committed whilst rendering professional service [4]. Professional Indemnity Insurance cover became available for Doctors and Medical establishments only from December, 1991[1].

The insurance companies not only pay the compensation to other party but also arrange for the legal help from advocates because they sometimes join hand with other party for monetary gains with an excuse that it's the insurance not the doctor who is to pay the

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compensation [3].

The policy offers a benefit of retroactive period on continuous renewal of policy whereby claims reported in subsequent renewal but pertaining to earlier period after first inception of the policy, also become payable. Group policies can also be issued covering members of one profession. Group discount in premium is available depending upon the number of members covered [4].

Legal cost and expenses incurred in defense of the case, with the prior consent of the insurance company, are also payable, subject to the overall limit of indemnity selected. Only civil liability claims are covered. Any liability arising out of any criminal act or act committed in violation of any law or ordinance is not covered [4].

Insurance company issues 'Professional Indemnity' policies to the following group of professionals [4]:-

1) Doctors and medical practitioners - which covers registered medical practitioners like physicians, surgeons, cardiologists, pathologists etc.
2) Medical establishments - which covers legal liability falling on the medical establishment such as hospitals and nursing homes, as a result of error or omission committed by any named professional or qualified assistants engaged by the medical establishment.
3) Engineers, architects and interior decorators.
4) Lawyers, advocates, solicitors and counsels.
5) Chartered accountants, financial accountants, management consultants.

There are certain acts that are not covered in case of indemnity policy issued to medical professionals [4]. These include:

- Any criminal act or violation of any Act of Statute
- Services rendered under the influence of intoxicants or narcotics
- Performance by Dentists under general anesthesia or any procedures carried out under general anesthesia unless performed in a hospital.
- Willful neglect or deliberate act
- Third Party Public Liability
- Pure financial loss due to loss of goodwill or loss of market

Ground facts about medical negligence

As per Salmond' Law of Torts negligence is the omission to do something which a reasonable man, guided upon those considerations which ordinarily regulate the conduct of human affairs, would do, or doing something which a prudent and reasonable man would not do [5].

Negligence is the breach of a legal duty to care. It means carelessness in a matter in which the law mandates carefulness. A breach of this duty gives a patient the right to initiate action against negligence [6]. All medical professionals, doctors, nurses, and other health care providers are responsible for the health and safety of their patients and are expected to provide a high level of quality care. Unfortunately, medical professionals can fail in this responsibility to their patients and cause far-reaching personal injuries, and even death. Medical negligence occurs when medical professionals harm their patients by neglecting them, acting maliciously, or by providing substandard care [7].

At the outset it is important to remember that virtually every country in the world operates its own unique legal system. At common law, the issue of professional liability insurance is a subset of the law of negligence. Persons who offer medical advice and treatment implicitly state that they have the skill and knowledge to do so, that they have the skill to decide whether to take a case, to decide the treatment, and to administer that treatment. This is known as an "implied undertaking" on the part of a medical professional. Honorable Supreme Court of India has held that every doctor "has a duty to act with a reasonable degree of care and skill" [6].

Doctors in India may be held liable for their services individually or vicariously. Doctors are not liable for their services individually or vicariously if they do not charge fees. Thus free treatment at a non-government hospital, governmental hospital, health centre, dispensary or nursing home would not be considered a "service" as defined in Section 2 (1) (0) of the Consumer Protection Act, 1986 [6].

A doctor can be held liable for negligence only if one can prove that she/ he is guilty of a failure that no doctor with ordinary skills would be

guilty of if acting with reasonable care. An error of judgment constitutes negligence only if a reasonably competent professional with the standard skills that the defendant professes to have, and acting with ordinary care, would not have made the same error [6].

Researchers have found that ,[8]

- 68 percent of the errors occur in outpatient settings and resulted in more than 1,200 deaths.
- Negligence was more likely to have severe outcomes when they occurred in hospitals, but the total number of high severity outcomes and death was larger in the outpatient setting.
- Of the 10 most prevalent medical conditions with error-related claims, no single condition accounted for more than five percent of all negligent claims.
- Diagnostic error account for more than one-third of the claims.

Benefits of medical indemnity insurance

1. It is beneficial not only to the doctors or hospital but also to the patients & their dependents because the insurance company takes care of the compensation [1].
2. Retroactive Benefit: This means that the insured will be covered for any professional act or omission occurring during the period of insurance [9].
3. It would take care of the amount of damages against third party.
4. Scheme will also compensate on the principle of "no fault liability "to give some relief in the case of death or permanent disablement of the patient [1].
5. The company will also pay the defense costs, which have a direct relevance to the claim [1].

Limitations of medical indemnity insurance

The only limitation that this policy has is that the amount of compensation is restricted by the limit of indemnity you decide for [10].

Conclusion

Provision of professional indemnity insurance for medical practitioners is a welcome step on the part of insurance companies. Surely it gives a sigh of relief to medical practitioners and establishments against the growing menace of compensation claims from patients.

Though it provides a sense of security, one must not forget that the security is only monetary. We must also understand that though the money paid as compensation is important but also our reputation also is at stake. And no one can insure anybody for one's reputation.

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Brief Communication

Serial killings- An investigative challenge

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Serial killings are an investigative challenge. Apart from the routine and general medicolegal investigations that include detailed crime scene investigations, medicolegal autopsy, and analysis of collected evidentiary material, criminal profiling is an important part of investigative process in serial killings. Through this correspondence importance of offender profiling as a specific investigative tool is impressed.

The objective of criminal profiling is to identify the perpetrator of a crime based on an analysis of the nature of the offence and the manner in which it was committed. It is thus, a behavioral and investigative tool that helps investigators to profile an unknown subject or offender. Criminal profiling is also known as offender profiling, criminal personality profiling, criminological profiling, behavioral profiling or criminal investigative analysis. In modern criminology, it is generally considered the "third wave" of investigative science: the first and second wave being the study of clues; and the study of crime itself; this third and final wave is the study of the abnormal psyche of the criminal[1].

Criminal profiling that is often considered as a part of criminal investigative analysis constitutes of a logical argument regarding characteristics of an offender responsible for a particular crime or a series of crime. It is a multidisciplinary forensic practice involving applied knowledge of criminalistics, medicolegal death investigation and psychology. Aim of the criminal profiling is to “Get inside or read the mind of the serial killer”. Criminal personality profile is based on a good crime scene examination. Certain clues at crime scene, by their very nature, do not lend themselves to ordinary collection techniques, such as the emotion of rage, hate, love, fear and irrationality. The criminal psychologist is able to identify and interpret certain items of evidence at the scene by studying the crime scene from a psychological standpoint, which provide clues to the personality type of the individual or individuals who have committed the crime. Practically speaking, in any crime in which available evidence indicates a mental, emotional, or personality aberration by an unknown perpetrator, the criminal personality profile can be instrumental in providing the investigator with information that narrows down the leads [2].

Thus criminal profiling can be a valuable investigative tool in identifying the potential suspects in serial murder cases if it is utilized in conjunction with sound investigative techniques ordinarily employed at the scene of crime.

References

1. Offender profiling. Available from URL:http://en.wikipedia.org/wiki/Offender_profiling
2. **Geberth V J.** Investigative assessment: Criminal Personality Profiling. In: Practical Homicide Investigation: Tactics, Procedures, and Techniques. 3rd ed. New York: CRC Press; 1996. pp. 707-793.

News and Events

"Forensic Medicon-2009": XXX Annual Conference of Indian Academy of Forensic Medicine was held at Nagpur from 21st to 23rd February 2009.

Dignitaries at Inaugural ceremony- [From left]

Dr. P. C. Dixit (Commissioner of Police, Nagpur),

Dr. V. P. Mishra (Vice Chancellor, Datta Meghe University of Medical Sciences, Nagpur),

Dr. B.P. Dubey (President-IAFM),

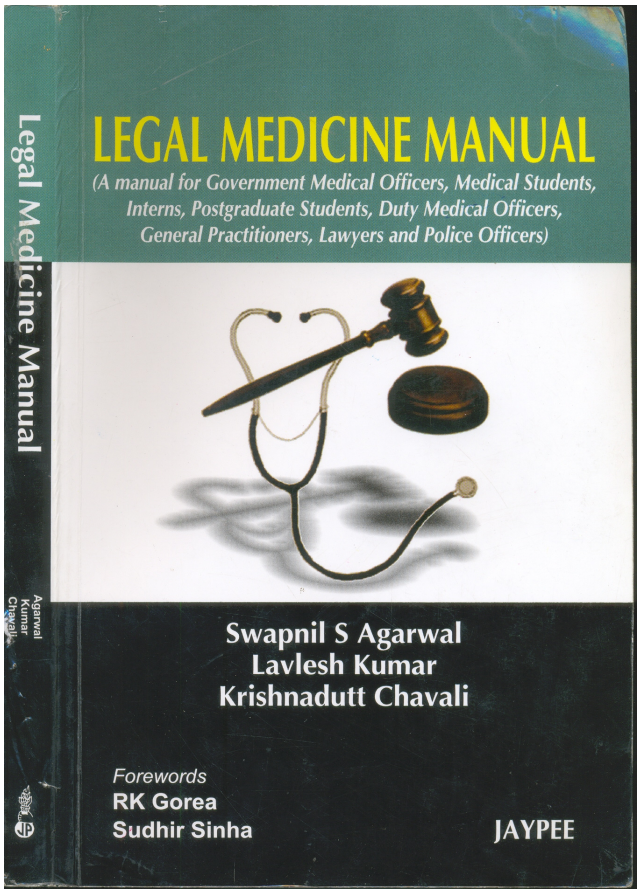
Shri V.C. Daga (Hon'ble Justice, Mumbai High Court),

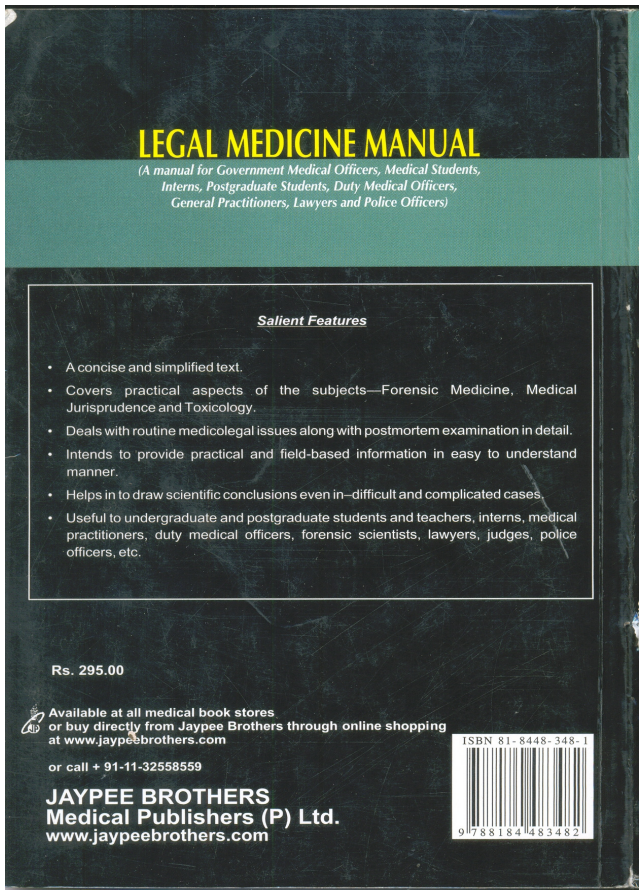
Dr. A.P. Dongre (Organising Secretory- "Forensic Medicon-2009") and

Dr. Sanjoy Das(General Secretary-IAFM).

---------- LONG LIVE IAFM----------

Book Review





Legal Medicine Manual

Usually the standard textbooks in the discipline have more elaboration on the theoretical aspects of the discipline, which form a valuable source of learning for students. The present compilation is different from others, that it basically aims at the issues and concerns with reference to day-to-day medico legal work. In addition to some theoretical facets, a wide range of legal medicine practise has been excellently taken care in the manual by the upcoming eminent experts of the fraternity. I am sure that it will be an asset to Medical officers, General Practioners, lawyers and police officials in addition to traditional class of undergraduate and post graduate students in the field of Forensic Medicine. It is my privilege to congratulate the authors namely Dr. Swapnil S Agarwal, Dr. Lavlesh Kumar and Dr. krishnadutt Chavali for such wonderful contribution to the field of legal medicine.

Dr. C B Jani
Editor-JIAFM

Supplements

Indian Academy of Forensic Medicine

Registration 349,12th May 1972, Panaji, Goa

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(To be submitted in Triplicate)

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Dear Sir,
I want to become a Life Member of the Indian Academy of Forensic Medicine. I have gone through the rules and regulations of the Academy and I agree to abide the same. I furnish the necessary particulars. Kindly enroll me as a member and oblige. Life member fee of Rs.2010/- (Rupees Two Thousand and ten only) is also enclosed herewith.

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Date…… Yours faithfully.

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Present address	
Address for correspondence	
Fax: Phone: E-mail:	
Educational qualification (with name of the University and date of passing)	
Present position in the profession	

Membership Fees Paid by Cash/ Cheque / DD (Tick one)

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Duly filled application form with fees shall be forwarded to "Dr. D. S. Badkur (Treasure- IAFM), Joint Director, Medicolegal Institute, Gandhi Medical College Building, Bhopal-462001(MP)" for 2009.

GUIDELINES TO AUTHORS/ CONTRIBUTORS

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