Journal of Indian Academy of Forensic Medicine (JIAFM)

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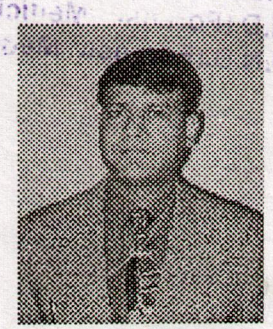

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Editor-in-Chief

Dr. Mukesh Yadav

From Editor's Desk

I feel immense pleasure to present before you the first issue of JIAFM 2006. I assure you about the quality of research papers and quality of printing in future issues. Your valuable suggestions are always encouraging me and I heartily welcome for future suggestions. On behalf of Executive Committee of IAFM for the years 2006-2008 I took resolution to further improve the quality and status of our Journal. We always learn from mistakes and try to improve upon these. I was not able to communicate with all of you, due to my shifting from Ambala to my new destination Saifai, Etawah, U.P., and again to Muzaffarnagar Medical College, Muzaffarnagar, for which I submit my apology. I am thankful to the advertisers who have provided additional financial resources for improving the quality of this issue.

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Editorial

Nithari Killings: Role of Forensic Experts

On the eve of New Year-2007 news flashes on TV Channels shaken the conscience of the whole civilization across the globe. First news was related to death sentence to Saddam Hussain in Iraq and other news was related to the finding of skeletons from the Nithri village of Noida, U.P., India. Sector-31, House No. D-5, owned by one of the alleged accused of serial killing Mohinder Singh Pondher came into lime light with the recovery of skeletal remains mainly skulls and other body parts on December 29, 2006. The alleged killer master-servant duo, who claimed to be admitted to raped and murdered several children mainly females. Around 38 children in all the age group of 3-11 years have gone missing from Nithari, a semi-rural village on the edges of this upscale suburban town, in the past 21 months. The first kidnapping was reported in March 2005.

Although polish from the very beginning of the investigation claiming of sending skulls and bones recovered from the house for scientific test in State Forensic Science Lab., Agra and Hydrabad. Police claimed of nine of the 17 skulls found have been identified (how? Perhaps by identification of the belongings of the victims by the parents and relatives) and details about the others could be known only after DNA tests. Number of skulls found at the scene was the criteria for counting the number of the victims alleged to be killed not other bones. But not able to utilize the services of the any of the Forensic Expert (Both Forensic Medicine and Forensic Science) form the very beginning raises serious doubts about their knowledge and integrity both. One can imagine the seriousness about the investigation by the statement of the CMO, Noida District Hospital appearing in one of the leading national newspaper that "as the police have found only skeletal remains of the victims, the postmortem report could not establish the cause of death, type of injuries or even the age or sex of the victims. "of the 206 bones, only 200odd bones and the skulls were sent to us. Most of the skulls were of young children and 11 of the heads had long hair, so we are assuming that they must be girls. But these are just assumptions, as we cannot ascertain anything with just skulls and a limbs". As forensic Expert we all know that in expert hands and as reported in literature by examining only skull one can safely predict sex of the individual to approximately at least 90% precision. And by x-ray examination of the long bones and observation of sutural closure of skull age of the victim can be predicted safely to some extent. As Forensic Experts are trained for examination of the skeletal remains and answer to all possible questions including number of persons to whom these bones belong. This leads to speculation by the media and general public about the possible motives behind such a heinous crime.

By the use of Modern Forensic Techniques: brain mapping, polygraph test, narcoanalysis and Functional MRI are quite useful in revealing the truth from the alleged accused. Similarly if postmortem was allowed to be done by the board of Forensic Medicine Experts and both Forensic Medicine and Forensic Science Experts were involved from the very beginning of these investigations the story could be different. Post mortem of skeletal remains was in these cases were done by the District CMO and his team not by the Forensic Medicine Experts. Everybody knows about the seriousness and level of knowledge about the prevalent practice of doing postmortem in most unscientific way at district mortuaries. The statement in the postmortem report submitted to police on January 01, 2007, "since we had only the skull, it was difficult to establish the cause of death, gender or age of the person". Post mortem report further mentions "portions of stomach, chest and a few bones were recovered with five bodies while skull was found in the other 12 bodies", further proves it.

Investigators have attempted for centuries to determine the truthfulness and accuracy of statements, the modern methods brain mapping, polygraph test, narcoanalysis and Functional MRI. The term narcoanalysis is derived from the Greek word 'narke' meaning "numbness" and is used as a pshychotherapeutic as well as interrogating technique that uses barbiturates drugs or truth serum to induce a state of unconsciousness in which secrets come to the surface since the person testifying is not in control of what he says.

The Latin expression "in vino veritas" meaning "truth in wine" meant that alcohol was used as one of the earliest truth serums. Now days, sodium pentathol is widely used as a truth serum. This barbiturate decreases higher cortical brain functioning. The main hypothesis that underlies this method is that lying is more complex than telling the truth and hence, lower cortical activity will make it difficult for a person to lie. The truth of the truth serum is a matter of global debate. The truth serum test is not legally admissible evidence in India. However, it can be used by interrogating agencies for further investigation purposes after court's permission.

A polygraph test, commonly known as 'lie detection test'. A polygraph is a device that measures and records several psychological variables such as blood pressure, heart rate, respiration and skin conductivity while the subject is asked a series of questions. Underlying this test is the ancient hypothesis that a persons' nervousness while telling a lie. The accuracy of the polygraph has been contested almost since the introduction of the device. The polygraph test mainly measures indicators of anxiety that accompany the telling of lies. However, if the subject exhibits anxiety for other reasons, or can control his anxiety level voluntarily, the test could result in false positive results. In 2003, the US based National Academy of Sciences claimed that the majority of polygraph research was of low quality. Polygraph test results are not admissible as evidence in court of law in India.

American Scientist Lawrence Farwell invented brain mapping or brain fingerprinting technique for detection of lies. This EEG / P300 wave-based system determines whether or not specific information is stored in a persons' memory. The test measures individual brain-wave responces to relevant words, pictures or sounds presented by a computer. Our brain stores events as memories. This function of the brain is used in differentiating a criminal and an innocent person. The criminal's brain stores the sequence of events that happens at the crime scene; an innocent man's brain however, would have no such memories. The brain maping method scientifically detects the presence or absence of specific memories in the brain. Words, pictures, codes

and sounds related to the crime are presented to the subject by a computer. The brain wave responces to these stimuli are measured using a headband equipped with EEG sensors. The data is then analysed to determine if the relevant information is present in the memory. Dr. Lawrence Farwell's Brain Fingerprint Laboratories, which ahs the patent for this technology, claims high level of accuracy. In fact, in March 2001, an Iowa District Court ruled that brain-fingerprinting testing met the legal Daubert Standard for admissibility in court as scientific evidence. This method is, however, not admissible in Indian Courts. This technology of brain finger printing was recently applied on Mr. Telgi, alleged accused of multi million 'Fake Stamp Scam' of India.

Functional MRI (FMRI) is another technology that is of interest to interrogators these days. Various research institutes claims that the Frontal Lobe area of the brain becomes more active when a person telling a lie. The FMRI scans the brain to find which areas were active in particular circumstances and hence can help determine whether a person is telling the truth or la lie.

Dr. Kiran Bedi (an IPS Officer) and V.N. Sehgal (Former Director, Central Forensic Laboratory, Delhi) in their article written for Hindustan Time's Editorial pointed out this lacuna of not involving Forensic Experts in the investigation form the very beginning and doing investigations in very crude and unscientific way. What prompted them to write this article, in their words "the first image showed during telecast the crude instrument that was used to dig out the skeletal remains of over 30 (and still counting) children and women? The second image showed the long claw of an earth-remover used to extract the human remains from the by-now notorious drain. By using such 'medieval' measures, the police have dealt a serious blow to the forensic investigation of the case. This case cried out for the presence of forensic scientists and medicolegal experts: including psychiatrist: from the very first visit to the crime scene.

Possibility of 'necrophilia' and 'necrophagia', sexual perversions along with the 'organ trade theory' can not be ruled out till the truth comes out of investigations and linking of all the missing link to come to a satisfactory end from the investigation point of view.

While no one has established a firm link between the killings and a thriving organ trade, one cannot simply rule out the possibility of an 'organ industry' of this nature in India. It is depressing realty that India is one of the two countries (other one being China) in the world, where human organs are readily available without any legal system in place. It is reported that International buyers strike low-cost deals with local medical practitioners who facilitates their trip to India's many hospitals. Usually a kidney, the most common transplanted organ, is sourced from someone economically disparate enough to 'donate' (sold) for a pittance. The Transplantation of Human Organ Act, 1994 makes the sales of human organs illegal in India. But loopholes in the law "except those donated by relatives", makes for a thriving black market. There are many loopholes in the law itself. For instance, the law against illegal organ transplants is a union legislation that has not been adopted by most Indian states. It is reported that on an average 2000 kidneys are sold in India. This number is probably gone up since the introduction of a treatment in the mid-Nineties that lowers the risk of a recipient's body rejecting a transplanted organ. The legislation was designed to enable the growth of cadaver-based organ donations. Almost more than one decade of its enactment the law has remained static while the 'practice of illegal organ transplantation has flourished. To make matters more difficult, no data exists and medical practitioners and policy makers are left guessing to how bad the situation is. The disclosures, over the last few years, of kidney transplant rackets in Bangalore, Hyderabad, Mumbai, Amritsar and Jalandhar have not changed matters. There is few hue and cry only by media after which everything settles down as before.

Before organ transplantation tourism becomes the flip side of India's much touted medical tourism, the State must take appropriate steps. But first, it must acknowledge the fact that the menace of organ transplant exists.

Although ultimately U.P. Government is agreeing on CBI Inquiry, and the important questions before the CBI are: what was the real motive behind these killings? Why only teenagers and children are chosen for this purpose? Why only female children are chosen? Why only socio-economically disadvantaged and illiterate families are chosen by the alleged accused? What was the reason for using surgical instruments for cutting the body parts? Where missing body parts were disposed off? Whether more persons other than two accused were involved or not? What was the role of police in dereliction of their duty?

Politicians are how much sensitive to such incidents can be gauged by the statements of a Minister from the U.P. that to from the mouth of the brother of the Chief Minister that "such small incidents keep happening" and as "small and routine incident" as reported by the media. After asking for the CBI enquiry and suspending few police officers Government of U.P. already accepted his mistake under pressure from the political opponents in view of the ensuing assembly elections in near future.

Ultimately CBI realized these mistakes and included Prof. (Dr.) T.D. Dogra of AIIMS, New Delhi, in his team of experts to start investigations a fresh on January 11, 2007, after about two weeks of reported incident and investigation. The new investigating team, comprising about 30 members included K.P.C. Gandhi of Andhra Pradesh Forensic Science Laboratory (APFSL), S.R. Singh of Central Forensic Science Laboratory (CFSL). CBI's Special Crime Branch has formed over a dozen teams to probe every aspect of the grisly crime and look into whether there were any lapses on the part of the local police. New team visited the scene of crime, adjacent buildings, may question staff at nearby hospitals and nursing homes to rule the possibility of any link with the human organ racket. The task is Herculean as the sleuths have to find out the identity of the persons killed and their parents. Proper DNA matching would be done before arriving at conclusive evidence. Proper identification is also important from the point of view of giving of compensation to right persons and to avoid any fake claim. We hope that truth may come out with the help of Forensic Experts and modern Forensic technologies to prove our expertise in this field of crime investigation.

Mukesh Yadav

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Head Injury: The Principal Killer in Road Traffic Accidents

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Abstract

Head Injury is the single most common cause of mortality in cases of vehicular accidents. Its outcome is a product of different mechanisms, types and amounts of head injuries and their anatomical locations. The objective of the present study was to analyze the pattern of Fatal Head Injury in road traffic accidents. Young adults (both males and females) in their most productive years of life are especially prone to head injury, as a result of vehicular crashes. For prompt treatment of such cases immediate Radiological Evaluation, Surgical Intervention and Intensive Care is required, for which there is no infrastructure at the primary health care level while it is inadequate at the secondary health care level.

Key Words: Vehicular Accidents, Trauma, Head Injury.

Introduction:

Head Injury has been defined as, "a morbid state, resulting from gross or subtle structural changes in the scalp, skull, and/or the contents of skull, produced by mechanical forces" [1]. It has also been defined as physical damage to the scalp, skull or brain produced by an external force [2]. However, such force/impact, responsible for the injury need not be applied directly to the head. Depending upon whether or not the dura mater was torn, head injury may be termed as 'open' or 'close' type [3]. The extent and degree of injury to the skull and its contents is not necessarily proportional to the quantum of force applied to the head. According to Munro [4] "any type of cranio-cerebral injury can be caused by any kind of blow on any sort of head".

Severe head injury, with or without peripheral trauma, is the commonest cause of death and/or disability up to the age of 45 years in developed countries [5]. According to one study in Chandigarh [6] head injury accounted for 73% of all fatal road traffic accident cases. In a comparative study conducted by the authors [7], head injury was responsible for 63% road traffic accident fatalities in Jammu, 60% in Delhi and 58% in Chandigarh. It was a contributing factor to death in 11%, 13% and 15% cases respectively, in whom; the cause of death was other than head injury. This necessitated an in-depth analysis of the pattern of Fatal Head Injury in road traffic accidents.

Material and Methodology:

The present study is a retrospective analysis of cases of fatal head injury subjected to medico-legal autopsy at the department of Forensic Medicine, Government Medical College and Hospital Chandigarh, during the period 1996 to 2005. Those cases where the cause of death was directly or indirectly related to road traffic accidents were included in the study whereas other deaths following injuries sustained in any other manner were excluded.

The clinical data of the patient including investigations and procedures done, survival period, time and cause of death were ascertained from the hospital records. Information pertaining to the time and manner of road traffic accident was sought from the police personnel investigating the case. These were then correlated with the post-mortem findings to conclude the analysis of each case. The results were then computed statistically and tabulated.

Observations:

Between 1996 and 2005, a total of 3178 medico-legal autopsies were conducted by the Department, of which 1109 (35%) were of fatal Road Traffic Accidents. Though the annual number of medico-legal autopsies was fluctuating during the period of study, cases of fatal vehicular accident were found to be fairly constant at an average of 111 cases per year. (Fig. 1)

Male victims outnumbered the females with an overall male: female ratio of approximately 5:1. The ratio of male to female victims in the pediatric age group (<15 years) was about 2:1 while it was about 5.7: 1 in the age group of 16 and above. The maximum number of RTA fatalities 259 (22%) was recorded in the age group of 21 – 25 years. However, the major chunk of fatalities (781 cases,

70%) was observed in victims aged 16 to 40 years. Of these, males constituted 86%. (Fig. 2)

Pedestrians, 429 (39%), followed by motorcyclists, 378 (34%) constituted the majority (73%) of the victims. Passengers of buses accounted for the least number of victims, 33 (3%). (Fig. 3)

The vehicles implicated in the fatal accident were also analyzed and it was found that buses and minibuses were implicated in maximum deaths, 254, (23%) while the heavy motorized vehicles (HMVs/ trucks) were involved in 386 (35%) deaths. One hundred eighty four deaths (17%) were caused by unknown vehicles (hit-and-run cases). (Fig. 4)

Majority of the victims, 348 (31.38%) died on the spot, were brought dead or died within one hour of the accident. Again, 729 (66%) victims died within the first 24 hours of the accident. Of these, 517 (71%) died within the first six hours. After the initial 24 hours, the mortality was found to be decreasing with 17% deaths during the 2^{nd} and 3^{rd} day, 11% deaths during the 4^{th} to 7^{th} day and 7% deaths after the 7^{th} day (Table 1).

Head injury with or without cranial fractures (676 cases, 61%) topped the list of causes of death whereas hemorrhage and shock alone accounted for 266 (24 %) deaths. Head injury in association with hemorrhage and shock was involved in 124 (11%) cases, making head injury responsible for 800 (72%) deaths, either alone or in combination with other injuries. Majority of the cases of head injury (86%) were associated with cranial fractures. (Fig. 5)

Discussion:

Deaths due to road traffic accidents have attained epidemic proportions in the recent years [8]. Increasing affluence of the public in general coupled, with the feeling for attaining independence from the public transport system have resulted in the burgeoning of the vehicle population in almost all cities of India, particularly in Chandigarh where the vehicle population is 593326 as of 2005 [9]. Chandigarh is a city-state of Northern India with a well-planned architectural design with wide and well-laid network of roads. Traffic on Chandigarh roads usually is dense during the peak office hours in the morning and in the evening on working days and in the evenings on holidays and festivals. At other times, the traffic is usually sparse. Except for some leniency for an odd female vehicle driver, enforcement of traffic rules is otherwise pretty strict in this city.

A peculiar problem faced by road users in India is the sharing of the road space by vehicles of different speeds including pedestrians and even stray animals. However, Chandigarh differs in that there is a dedicated cycle path separate from the main road in addition to 'slip roads' for vehicles to enter and exit any sector without disturbing the traffic on main roads. Again, at busy roads, high grills have been placed at the road divisions and subways constructed to discourage the pedestrians from crossing the roads at such busy areas. In spite of these favourable conditions provided by the administration for safe driving, deaths from road traffic injuries continue to occur at a steady rate. Craze for speed (despite many advertisements highlighting the top speed of the 'mean machines'), restlessness and impatience of the public in general and the youth in particular, disregard for traffic rules, etc. may be some of the reasons for the continued incidence of fatal road traffic accidents. Indian society, though trying to give equal importance to both genders, is still a male-dominated one with the male member engaged in bread-earning and the female member in doing the household chores. This may explain the male preponderance observed by us and other authors [7, 10-15] in fatal RTA. The young college-goers with their rash and fast lifestyle are another reason for the peaks observed in the number of deaths from RTA in both genders for the age group 21-25 years. This finding is consistent with that of almost all others [7, 10-17]. Sharma et al [6], however, noticed a 'surprise' increase in the incidence of female victims in road traffic accidents during the years 1999 and 2000.

All victims of fatal RTA were studied as to their road usage/ vehicular occupation at the time of accident. Pedestrians topped the list with 39% deaths closely followed by motorcyclists with 34%. The findings are consistent with those of Rautji et al in South Delhi [17]. Bannerjee et al [12] have reported a figure of 55% for pedestrians and 7% for motorcyclists for victims of RTA suffering from thoraco-abdominal injuries only whereas Kiran et al [13] have reported the pedestrian involvement in RTA as 60% and that of motorcyclists as 23%. A study conducted in Athens, Greece in 2006 reports a higher figure of 60% for motorcyclists and a small proportion constituting 11% pedestrians involved in RTA [16]. Enforcement of traffic rules for the pedestrian is still not strict in India and thus this is the group of road users that are affected the most in road traffic accidents of any city of India. (Fig. 4)

Heavy vehicles like buses, mini buses and trucks have been implicated as the principal offending vehicle in most studies conducted in India [10, 11, 17]. These observations have been replicated in the current study. Light motor vehicles (cars and jeeps) were found to be involved in 19% cases while in 17% cases the offending vehicle was not known (hit-and-run accidents). Rautji et al [17] have reported involvement of cars in fatal RTA as 14% from South Delhi. The greater number in the current study might

be attributable to the wide and relatively well-maintained roads of Chandigarh with negligible number of speed breakers (enticing fast driving) and a large car population in the city. Incidentally, Chandigarh boasts of a per capita car number of 3 perhaps the highest in the country [9].

Fifty one percent victims of RTA were found to have died on the spot, brought dead to the hospital or died within an hour of the accident, 21% victims were found to have died between one and twenty four hours of the accident and 10% victims were reported to have survived for more than a week by Rautji et al in their study [17] whereas Singh and Dhattarwal [10] have reported 40% deaths within one hour of admission to the hospital, 32% deaths between one and twenty four hours of the accident and 9% victims to have survived for more than a week after the accident. In the present study it was found that 31% victims died at the spot, were brought dead to the hospital or died within an hour of the accident, 34% victims died between one and twenty four hours of the incident and 7% victims survived for more than a week following the accident. The lower number of deaths within the first hour of accident in Chandigarh probably is because of the good road network and effective measures in place for immediate transfer of the injured to the hospital. The use of PCR (police control room) vans has been found to be effective for transportation of victims of road traffic accidents to the nearest hospital in South Delhi [17] and presence of such a van at every roundabout of Chandigarh could be the reason for the low death rate in the early period following the accident.

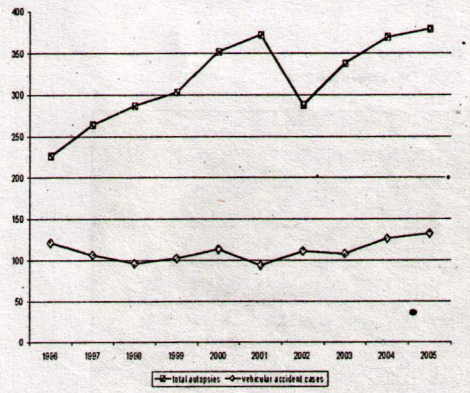
The most common cause of death observed in victims of accident during the period of study was head injury (61%) and most of these cases (52%) were associated with cranial bone fracture. Kual et al [11] found a 29% incidence of death due to head injury alone in RTA, Singh and Dhattarwal [10] have reported an incidence of 77% of head injury in RTA and Rautji et al [17] have reported an incidence of 44% of deaths due to head injury among the victims of RTA. In a study conducted by Tham and others in Singapore [18], it was found that 46% of victims of motor vehicle injuries excluding motorcyclists suffered head injury. Other studies have reported a higher incidence of head injury among motorcyclist victims of road traffic accidents (54% in Taiwan and 63% in Thailand) [18, 19]. Other studies also have shown a greater incidence of cranio-cerebral injuries in motorcyclists and pedestrians as compared to car occupants [18, 20]. Overall it appears that head injury is increasingly becoming the leading cause of death in victims of vehicular accident be it motorcycles, cars, buses or trucks or even pedestrians. The high numbers of cranial fractures among the victims suffering head injury stresses for the realization of importance of protective gears like helmets and other safety measures like the vehicle design and appropriate road conditions.

Conclusion:

Discovery of wheel, years ago, ushered in an unending era of revolution in the field of transportation, that still goes on with men's persistent hunt for better, faster and comfortable automobiles. A byproduct of this revolution is the road traffic accident, of which, fatal head injury is an important consequence. Over the years, youth, especially the males, in their most productive and active years of life continue to be the commonest victims of head injury.

Hospitals should establish 'Trauma Teams' to initiate rapid assessment and resuscitation of trauma victims in general, and head injury, in particular. Primary Health Care Centers need to be equipped with life support measures and proper transportation facility for referral of suitable head injury cases to the nearest specialised centers. Finally, the follow up of fatal head injury cases should be extended up to the autopsy table, by establishing proper co-ordination with the doctor conducting the autopsy.

Fig. 1: Fatal road traffic accidents in relation to total autopsies



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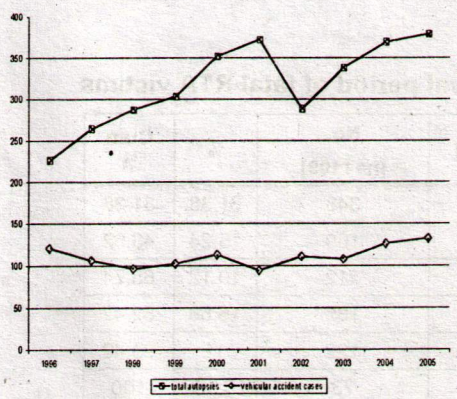

Fig. 3: Type of road user

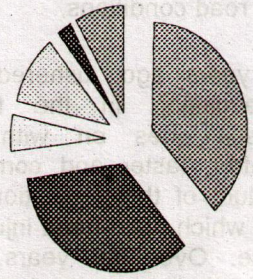

Fig. 4: Vehicles involved

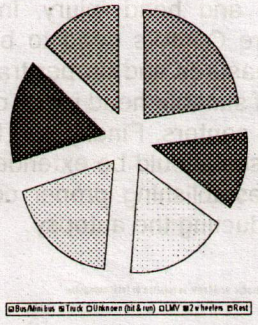

Fig. 5: cause of death

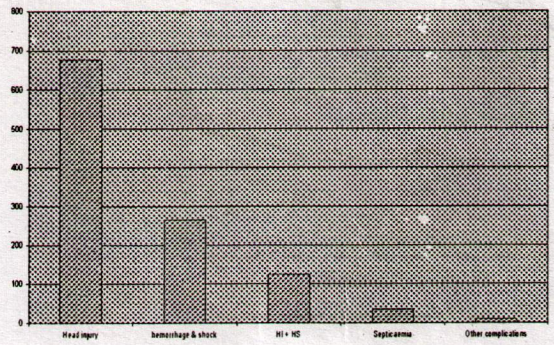

Table 1: Survival period of fatal RTA victims

Survival period	No. [n=1109]	%	Cum %
SD/BD/<1 hr	348	31.38	31.38
1 - 6 hrs	169	15.24	46.62
6 - 24 hrs	212	19.12	65.74
1 - 3 days	185	16.68	82.42
3 - 7 days	122	11	93.42
> 1 week	73	6.58	100

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Rifled Ammunition in Country Made Weapon: A New Trend

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Abstract

Country made weapons are favorite among lower socioeconomic group of criminals. With advancement in knowledge people are using easily available rifled firearm ammunition even for these weapons. They sometimes produce injuries not consistent with the known patterns of firearm injuries. The present article focuses on these issues with a case study where a person was assaulted with a country made weapon producing a peculiar single entry double exit wounds over his left lower limb, without any bony injury.

Key Words : country made weapon, ammunition, firearm injuries, entry wound, exit wound.

Introduction:

Broadly firearm weapons can be classified under rifled and smooth bored, using single bullet and multiple pellets in a cartridge as the ammunition respectively (1-2). Both types of weapons produce characteristic pattern of injuries on the body. But nowadays local criminals are increasingly using the ammunition meant for branded firearms for their own country made weapons. These ammunitions fired from local made weapons produce confusing pattern of injuries putting investigating agencies in great dilemma while locating the weapon.

Case study:

The deceased was around 55 years old man who was assaulted by a group of 10 – 12 persons who entered his house with the purpose of dacoity around midnight. He was assaulted with firearm, sharp and blunt weapons. He suffered injuries all over his body, mainly head, abdomen and left lower limb. He underwent exploratory laparotomy for perforation peritonitis and was managed conservatively for the rest of the injuries. The bullet was not recovered from the site. The cause of death was given as shock due to septicemia consequent to perforation peritonitis due to blunt trauma to abdomen.

Firearm injury:

There was 0.5 x 0.4cm firearm entry wound along with abraded zone of 2 x 1.5 cm surrounding it with little blackening of inner lower margin of abraded skin was present over inner aspect of lower front of left thigh, 5 cm above left patella (fig 1).

Firearm exit wound in the form of two lacerated wounds of 2 cm and 1.8cm respectively were present over upper aspect of back of left knee joint, the intervening distance between the two wounds being one cm. (fig 2) Both these wounds were communicating separately with the entry wound. However they were almost merged just below the entry wound. The lower one was deeper with a characteristic tract (fig 3).

Discussion:

Firearm related injuries are becoming a leading cause of morbidity and mortality across the world (3-6). While the rifled firearms are more commonly used in the developed world, in India country made firearms are more prevalent (2). The ammunitions used in these weapons are not uniform. Therefore the pattern of injuries creates confusion among investigators locating the specific weapon. This gives the accused an opportunity to get the benefit of doubt on the basis of loose chain of evidence.

Causes of single entry multiple exit wounds:

1. Bullet getting fragmented due to collision with a bone or otherwise.
2. Bullet striking and resulting in multiple chipping of bone pieces which in turn result in multiple missile injuries.
3. Malfunctioning of firearm resulting in multiple bullets entering from a single wound and exiting from multiple sites (piggyback bullet)
4. Separation of the bullet's jacket resulting in a separate exit wound.

In this particular case rifled ammunition was fired from a country made weapon which resulted in a single entry and two exit wounds. Since the ammunition had not been recovered, it could not be ascertained what was the cause of two exit wounds. Various possibilities like the bullet getting fragmented just at the entry or two bullets entering one after the other or the bullet's jacket getting separated were considered. As the eyewitnesses suggested that only a single shot was fired from a country made weapon, the possibility of the bullet getting fragmented and producing the said injuries are more. Therefore these facts should be kept in

mind by investigators so that the perpetrators of crime should not go scot-free due to insufficient chain of evidence.

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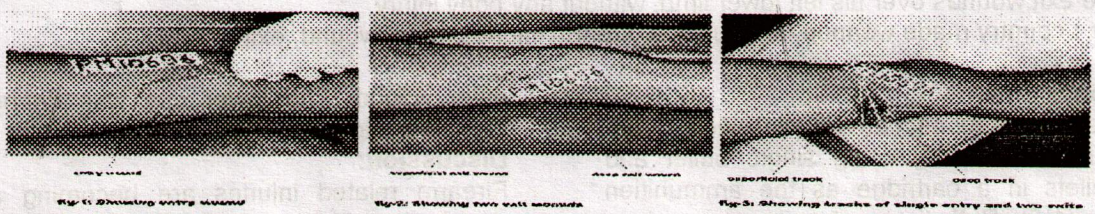

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Skeletal Remains also Speak

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A Case Report:

Crime rate in our country is on the increase. The criminal after the murder tries to destroy the evidence of crime by throwing the dead body in the outskirts or burring them or mutilating or burning the bodies.

Nature also play havoc, extreme temperature and predators they also skeletonize the body and in many cases. It is only keen observation on autopsy of such skeleton decomposed body; the autopsy surgeon is able to give the opinion related to crime. But a detail and thorough autopsy is always useful to arrive to some conclusion. Similar case was sent to department of Forensic Medicine from District Hoshiarpur on the request of Civil Surgeon whose team was unable to give any opinion regarding skeletonized body. The case was received in the department on 21.10.2003 along with police request U/s 302, 201,34IPC and examination was conducted following observations were made.

Humid, foul smelling, skeletonized dead body wrapped in white chadar with black beetles and pupa on it. Bones were partly joined with one another with blackish putrid ligaments and soft tissues skeleton was incomplete and was devoid of portions of lower limbs including feet. The chest and abdominal cavities were lying open and did not contain any body viscera except scanty amount of blackish putrid soft tissue. Bones were subjected to boiling. After cleaning and drying the bones following bones along with their finding were observed. Teeth were loose in their sockets. The bones were rugged, heavy with prominent muscle markings.

Skull: dark brownish coloured infiltration of blood was present in an area measuring 7 X 3 cm on the front and center of frontal bone, 5 cm above nasion, transversely placed. Similar dark reddish brown infiltration of blood in both the supra orbital areas including glabella of frontal bone in an area of 3 x 2.5 cm was the present on the part of frontal bone. Dark brownish infiltration of blood was present on the nasal bones. Partial closure of saggital suture was seen externally basilar suture was fused rest of sutures were not fused. No fracture was seen. All the sockets i.e. 16 in each jaw present. Orbits were larger and squarish, external occipital protuberance, supra ciliary ridges, mastoid process and nasion were prominent. On opening the skull clotted blood was present in an area of 3.5 x 3 cm on left side of anterior cranial fossa on the roof of orbit. (Fig. No. 1) Saggital sutures show partial fusion endocranial. Rest of sutures not fused.

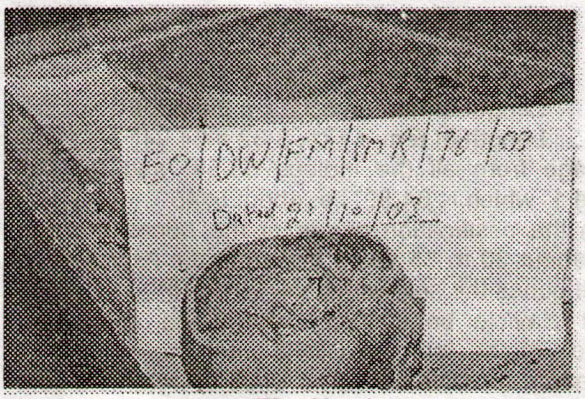

Fig. No. 1

Mandible: Chin was squarish, angles everted. Mental foramen midway, condyles and coronoid processes were at same height. All centers of ossification fused. No fracture was seen.

Vertebrae: all the vertebras present. The sacrum in its terminal part was nibbled. No fracture of any vertebrae present. All ossification centers were fused.

Ribs: twenty-two in number, 2 floating ribs were not present. Anterior ends of all ribs except first rib of both side nibbled. No fracture of ribs present.

Sternum: Was not present.

Clavicles: Both clavicles were present. No fracture was seen. All centers of ossification fused.

Scapula: Both scapule were present, medial and inferior angles were nibbled.

Humerus: Both Humerus were present, head of right humerus was nibbled partially.
Radius & Ulna: Both sides present, lower end of right radius & ulna were nibbled.
Carpel Bones: Seven bones of both hands were present.
Metacarpal: Nine bones were present. No fracture was seen.
Phalanges: Two bones nibbled, no fracture present.
Pelvic Bones: Both pelvic bones present. Sub pubic angle was acute. Iliac crest showed, nibbling, no fracture was seen.
Femur: Both femore were present. No fracture was seen. Head had greater than 2/3rd sphere of articular surface, neck and shaft angle was more then 90^{0}.
Tibia & Fibula: All bones present, lower ends of both sides were gnawed. No fracture was seen.
For determination of stature Following indices were used

1. Length from top of head to symphsis pubis 31"x 2 + 1 = 63" .
2. Sternal notch to pubic symphsis 21"x 3 = 63" .
3. Height of skull from top of skull to symphsis menti 9" x 7 = 63"
4. From the length of skull 8" x 8 = 64"
5. Length of humerus 12"x 5.3 = 63.6"
6. Length of femur 17"x 3.82 = 64.94"

Average from all the indices 63.59" and for soft tissue 1" which is 64.59" i.e. about 5'-459"
From the ossification center of the bones the age was about 30 to 35 years and from the examination of the bones the sex was male.
Right clavicle bone along with blood sample of alleged mother sent to CDFD after the request of procedure for DNA test. The ends of right tibia sent for chemical analysis for evidence of any poison.
DNA report from CDFD concluded that bone of the deceased was the biological offspring of the source of blood of mother (Smt. Shankar Kaur). (Fig. No. 2 & 3). After the receipt of chemical examiners report for poison, no poison was detected.

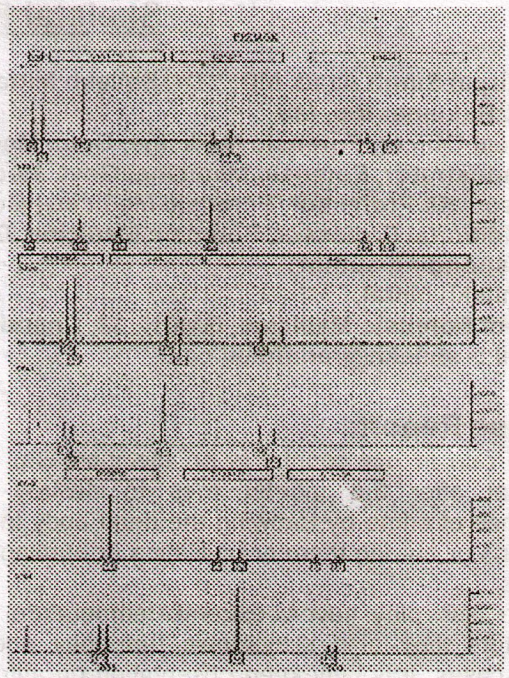

Fig. No. 2

Center for DNA Fingerprinting and Diagnostics Table

Genotype Analysis for Establishing Identity Using microsatellites i. D18S51, ii D7S802, iii. FGA, iv. D13S317, v. D21S11, vi. vWA; vii. D5S818, viii. D8S1179, ix. D3S1358 and x. Amelogenin

Locus	Sample Nos.	
	5760 Exhibit A	5761 Exhibit B
D18S51	14, 17	14, 17
D7S802	8, 11	10, 11
FGA	22, 25	22, 24
D13S317	9, 12	12, 12
D21S11.	29, 31.2	29, 29
vWA	17, 19	17, 17
D5S818	11, 11	10, 11
D8S1179	10, 10	10, 15
D3S1358	15, 16	15, 16
Amelogenin	X, Y	X, X

Sample No. 5760: Allele data of the source of exhibit A (Small bone, said to be of deceased)
Sample No. 5761: Allele data of the source of exhibit B (Blood sample said to be of Smt. Shankar Kaur)
The cause of death was declared extra dural haemorrhage, which was ante mortem in nature and was as result of blunt force and 100% identity of individual was established.
The observations by the autopsy doctor were very useful to investigating officer to conclude about the crime.

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Unusual Mummification of Dead Body in The Burial

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Abstract

Mummification is a process of arrest of putrefaction due to desiccation of body but rarely body buried in common salt can also undergo mummification.
Key words: - common salt, mummification, Desiccation, Putrefaction.

A Case Report:

Mummification is the process of desiccation of the body after death, if favourable circumstances are available i.e. dry, hot, flowing air. Usually mummified bodies are seen in sandy regions and porous sand with hot climate like deserts of Rajasthan or if the body is perched on ceiling raft of well ventilated room having adequate temperature. Mostly mummified bodies are seen on the surface but sometimes if the graveyard is shallow and earth is sandy and porous and other conditions are available it may seen even in bodies buried under the earth. It is also possible that partially covered bodies with soil may show alternate areas of adipocere formation and mummification. Ordinarily after death whether the body is lying on the surface or on the burial or under water undergoes putrefactive changes. Though the rate of putrefaction approximately follows Casper dictum. A case in mummified condition was brought to the mortuary with entirely different situation. The story of case goes like this as per the police investigation. The son with the help of few associates in lurch of father's property killed his father by striking rod on his head and then buried the father in the house after digging six feet deep grave. This grave was dug by the labourers on hire with giving false history that he wanted to make a sewerage tank in his house as he wanted to implant sanitary latrine in his house. The house was owned by his father. The father had married another lady illegally who was staying in U.K. and he used to spend half the year at U.K. and remaining period at his residence in Kapurthala. While at burial the son had notion in his mind that the common salt if put all around the body this will liquefy the body at the earliest and no traces will be left. The mother of assailant was also living in the same house. The boy asked her to vacate the house so that he may be able to dispose the property of his father. When the mother showed her helplessness and was disturbed about her future she made a complaint to the police. The mother had no knowledge of the death of her husband. In her complaint she had stated that my son was illegally disposing her husband's property. He should be forbidden. The police interrogated the son. The assailant had produced the will of his father and further enquired about his father. He told that he had gone to U.K. In the interrogation the assailant was trapped as he could not prove the whereabouts of his father and even confessed that he had killed him with his complacies and buried him in his house. The body remained under earth for continuous period of about 6 years. On recovering the body the body was in mummified state and showed ante mortem evidence of injury on his head. The details of autopsy are as follows:-

The length of dead body was 5 feet 6 inches. Mummified naked dead body of old male soiled with mud and lumps of common salt attached to the surface of the body and also lying by the side. On cleaning the body a piece of T- shirt was on left forearm. Scalp hair and beard could be easily removed. Color of hair was mixed grey and white. The body was skeletonised in the lower limbs in the terminal parts and also in upper limbs. Hands and feet were in the form of small bones. Left femur showed postmortem fracture at its lower end. A skin defect of 8x 7 cm was seen in the frontal region of the head in the scalp. The eye sockets were empty. There were14 permanent teeth in the maxilla and 13 in the mandible. Rests were missing. All the sockets for remaining teeth were intact. Male organ was identifiable. On dissection of skull and on reflection of scalp, there was a linear fracture of right occipital extending forwards to right squama of temporal bone. Infiltration of blood was present in skull bone.

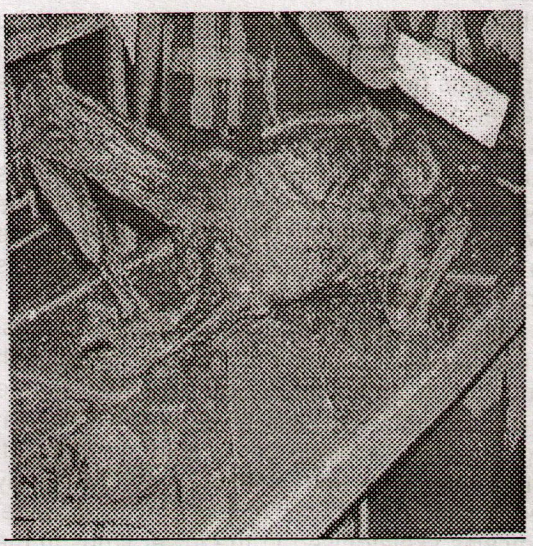
Clotted blood also was present in coronal and sagittal suture which had already fused endocranially and ectocranially. Parietosquamous suture has not fused as yet. On opening the cranial cavity membranes were intact, shriveled, blackish brain matter was visible along with clots. All organs were mummified, shriveled, blackish and identifiable.

Opinion:

It was a dead body of aged male of about 60 years ± 5 years which tallied with its actual age. This was collaborated with other evidences of age. The cause of death in this case was intracranial haemorrhage as a result of injury described. The time elapsed between death and postmortem was about 12 months to many years. The viscera were subjected for poisoning and no poison was detected.

Discussion:

It is not only the usual precondition which can lead to mummification of body as quoted in modern textbooks. Sometimes hygroscopic chemicals like common salt can take out moisture and desiccate the corpse, not allowing the putrefaction but favouring mummification. Following is the photograph:



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Medico-Legal & Ethical Aspects of Artificial Insemination

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Abstract

Infertility of women and quest for offspring's always encourages medical community to go on experimenting to solve the problem. Over the last decade, there has been a mushrooming of IVF (Infertility) Clinics and services provided are questionable. But advancement of technology also leads to many legal, ethical and social issues before the medical fraternity. This paper deals with the critical review of the issue of artificial insemination legal, ethical and social issues, ICMRI Guidelines and recommendations to solve the problem.

Kew Words: Assisted Conception, Assisted Reproduction, Artificial Insemination, Legal, Ethical, Surrogate.

Introduction:

The first reported use of this method was by **John Hunter**, at the end of the **13th Century**, on wife of a linen draper; a normal pregnancy was ensured. [1]

The birth of **Louse Brown** on **July 25, 1978** made headlines around the world. Louse Brown, 28 years old, the world's first test tube baby, has given birth to a child of her own-a boy. Unlike her parents, Louise was able to conceive naturally and did not need IVF treatment. When she and Wesley Mullinder, 37 married in 2004, she had feared she would have trouble becoming pregnant as problems with infertility can often be inherited. But two years later, the couple, which lives on the outskirts of Bristol, announced that they are expecting their first baby. It was the culmination of 12 years' research by a British team headed by **Robert Edwards** and **Patrick Steptoe.** The success paved the way for infertile couples all over the world to have children through IVF Technique. Louise's parents, John and Lesley, had tried for nine years to conceive naturally before turning to the pioneering IVF treatment being developed by Edward and Steptoe. Their daughter was born by caesarian section of Oldham General Hospital. Since then, million of babies have been born through IVF, including Louise sister, Natalie, 23. Steptoe died ten years after the birth of Louise Brown, but Edwards was guset of honour at her wedding at St Mary Redcliffe Church in Bristol. [15]

It is also claimed by some that the first successful births after freezing, thawing, and implantation of human embryo were in **1984** by groups in **Australia** and the **Netherlands** [1]

Instance of IVF or Test-Tube baby is also reported in Ramayna, it is claimed that birth of 'Sita' was as a result of IVF. There are strong religious objections from some quarters, notably **The Roman Catholic Church**, as with sterilization and other forms of conception control. (11)

Over the last decade, there has been a mushrooming of IVF (Infertility) Clinics and services provided are questionable. Since the birth of the 'first test-tube baby' in 1978, ethicists, in the West have warned that such technologies will create scope for many disputes and called for laws which set down procedures for all aspects of the process. Nirmala's desire to become India's first **'Commercial Surrogate Mother'**- and her unconventional way of becoming one- is for the first time forcing India to address an issue laden with ethical, legal, and moral ramifications. [12]

Theses **'Infertility Clinics'** are **'essentially a commercial venture'** with consequences in the form of **'female foeticide'**. Thus, contributing to adverse **'Child Sex Ratio'**.

Definition: Artificial Insemination is defined as "The introduction of semen into the vagina other than by coitus or sexual intercourse". [1]

In more comprehensive terminology, the introduction of semen into the vagina, cervix or uterus by artificial means to assist conception is called **'Artificial Insemination'**.

Types:

(1) AIH (Artificial Insemination Homologous Donor: when semen of the husband or homologous donor is used),

(2) AID (Artificial Insemination Heterologous Donor: when semen of a person other than the husband is used),

(3) AIHD (Artificial Insemination Heterologous Donor - when **'pooled semen'** is used). The use of frozen semen stored in semen banks for Artificial Insemination Heterologous Donor, in this pooling of the husband's semen with that of a donor, which is psychologically advantageous to both the husband and wife.

Success Rate: It is claimed that in 70 to 75% of attempted 'Assisted Conception' pregnancy occurs within 3 to 4 months of the start of treatment.

Indications:

1. When the husband is impotent but fertile (AIH),
2. When the husband is unable, to deposit the semen in vagina due to presence of Hypospadias or Epispadias, etc.

Delhi AI Act 1995

3. When the husband is sterile (AID),
4. When there is Rh-blood group incompatibility between the husband & wife,
5. When the husband is suffering from hereditary diseases, genetic defects, carrying a high risk of infant mortality.

Precautions:

1. Consent of the donor & his wife (No act of ***In-Vitro*** fertilization or Artificial Insemination shall be undertaken without the informed consent of the female patient and her spouse) as well as donor. Such consent shall be obtained in writing only after the patient is provided, at her own level of comprehension with sufficient information about the purpose, method, risks, inconveniences, disappointments of the procedure and possible risks and hazards- **(Para 7.21, Chapter-VII).** [8]
2. Identity of the husband & wife should not be disclosed,
3. Donor should not be known to the recipient & the result of Insemination,
4. Donor must be mentally & physically sound,
5. Donor must not be a relative of either spouse, & he should have had children of his own,
6. It is usually wise to use **"Pooled Semen"** i.e. husband's semen is mixed with that of a donor, there is technical possibility that the husband may, in fact be 'the biological father' of the child.
7. A witness must be present.

Collection and Storage: The semen should be collected by **masturbation** into a wide mouthed sterile container, after three day's abstinence. No legal problems whatsoever are concerned in India, but in England though The Roman Catholic Church only approves the use of semen obtained from the **post-coital vaginal pool**, rather than the usual procedure of utilizing a masturbation sample. (11)

The specimen should be **used within two hours** of collection, during which it should be subjected to examination to ensure its normalcy with respect to its physical characteristics and the quality of spermatozoa (i.e. **Number, Morphology & Motility**) use of frozen semen for AIDH is becoming increasingly popular.

This is achieved by addition of glycerol, slow cooling, rapid freezing & storage at –79 0c.

Introduction of Semen: Next step involves use of a sterile syringe to introduce one ml. of semen near or into the cervix at or about the time of ovulation, since this period of time is important for fertilization hence prove effective i.e. chances of success are very high.

Issue of Adultery, Divorce & Nullity of Marriage (Voidable):

No legal guidelines for doctors exist except in Delhi, it being left to the individual practitioner's conscience.

The donor and recipient cannot be held guilty of adultery in India **(u/s 497 IPC),** as this offence **requires sexual intercourse** as necessary ingredient for charge of adultery. There is doubt as to whether adultery has committed, when the woman becoming pregnant by a man not the father. As adultery is not strictly defined in English law, this might prove grounds for divorce, though as the husband consented to the act, this might well prove a defence. In Scots law, a judicial decision has been made that A.I.D. does not constitute sexual intercourse and thus could not be adultery. [11] However, if it is without the consent or knowledge of husband, an allegation can be made as a ground for divorce under The Hindu Marriage Act, 1955, provided husband is sterile or impotent. A doctor could be sued for damages. If artificial insemination is due to impotence, it is a ground for **'voidable marriage'**. Consent of husband is immaterial, the wife may ask for decree of nullity of marriage, even of a child born out of artificial insemination homologous.

In British Court, in a case of a mother of a child conceived by A.I.D. was granted a decree of nullity of marriage on the ground of her husband's incapacity to consummate the marriage. (11)

When giving information for registering birth according to **'The Birth and Death Registration Act, 1969'**, it is necessary to give details of the father. In A.I.D., if the father's name is entered, this might amount to perjury, the birth certificate being a statutory document. The new form of certificate or entering the name of only mother as the natural guardian of the child or legally adapting the child can overcome this problem.

Issue of Morality or Test-Tube Incest:

There is a risk of Incest between the children born by artificial insemination and children of the donor, but this is not a defined offence in India, except a ground for void marriage under the prohibited degree of marriage according to The Hindu Marriage Act, 1955. But there is no question of Incest between donor & recipient as there is requirement of sexual intercourse between the male and female who are falling in the prohibited degree of relationship for marriage. "In a chilling report that raises ethical concern about fertility procedures, a woman recently delivered her brother's child, fertilized *In-Vitro* with another woman's egg, just to inherit their mother's property." [2, 3]

"France's oldest ever mother (62 years) sparked horror when she revealed in an interview that her brother was the biological father of the baby. The

procedure was carried out in the United States, because it would be illegal in the France, it provoked furious debate in France about the morality of artificial insemination. [3]

Risk of HIV transmission: there are chances of transmission of HIV during the procedure if proper precautions are not taken. Asia's first case of HIV from artificial insemination, in which a woman fertilized with sperm from an unknown donor, has contracted the dreaded virus. The case has stunned doctors of the **School Of Tropical Medicine (STM)** here, but they said similar instances have been reported from the United States, Australia, Canada, and Italy. [4]

Issue of Legitimacy: The legitimacy of the resulting child is in doubt. Though it is a **'law of presumption'** in both Indian and English law that a child born during the subsistence of marriage is legitimate, this presumption may be rebuttable by evidence of impotence or sterility but it is possible to legally adopt the child to overcome this problem (see court ruling) If an unmarried or widow may have child from 'Artificial Insemination', but that child would be illegitimate unless adopted legally. If a child is born naturally sometime after a child born by 'Artificial Insemination', the status of child born by 'Artificial Insemination' remains illegitimate unless it is adopted, and the status of the natural born child remains legitimate. But, if the parents do not declare 'Artificial Insemination', the child remains to be a natural born child for all practical purposes.

There is no statutory law in India for artificial insemination except in Delhi.

Purpose of the Act: The main purposes are-

1. To allow the issueless couples to have a child through artificial insemination and give it a legal status.
2. To control spread of HIV infection through artificial insemination.
3. To ensure it the semen bank before accepting the semen for artificial insemination shall test the donor for the presence of- **Human Immuno Deficiency Virus Type** I & II (HIV I & II).
4. Antibodies by Enzyme Linked Immuno Sorbent Assay **(ELISA)** kit and
5. Screening for HIV surface antigen, only then, the donor shall be allowed to donate.

Storage Guidelines: The donated semen shall be stored either by Cryo-preservation of liquid Nitrogen freezing or any other safe method for a minimum period of three months in order to exclude **'window period'** of HIV – I & II infection in the donor. Second ELISA test to be performed on the donor after three months, and if negative, the semen then be used.

Other Prerequisites: The medical practitioners involved in Artificial Insemination are required to:

- Test the recipient for HIV – I & II and other Sexually Transmitted Diseases before performing Artificial Insemination.
- Seek the written consent of the recipient for using the semen on the basis of only one ELISA test, being negative, where facilities for Cryo-preservation and liquid nitrogen for semen storage are not available.
- It regulates the donation, sale or supply of human semen or ovum for Artificial Insemination,

To make obligatory on the part of the medical practitioner:

1. Not to indulge in segregation of the XX or XY chromosomes for Artificial Insemination, (On no account sex determination test shall be undertaken with the intent to terminate the life of a female foetus developing in her mother's womb unless there are other absolute indications for termination of pregnancy as specified in **'The Medical Termination of Pregnancy Act, 1971'**. Any act of termination of pregnancy of normal female foetus amounting to 'female foeticide' shall be regarded as 'professional misconduct' on the part of the physician leading to 'penal erasure' besides rendering him liable to criminal proceeding as per the provision of this Act, - **(Para 7.6, Chapter-VII)** [8]
2. Not to disclose the identity of the donor or recipient.
3. To prohibit to carry on **'Semen Bank'** without registration and there yearly renewal.

Issue of Surrogacy:

India has more than 16 Milian **'Infertile Couples'**. Though sophisticated medical techniques of assisted reproduction are spreading, sometimes they just don't work. The only option then is to hire another woman's womb. [12] Ever since the somewhat recently introduced issue of **'Surrogate Motherhood'** arising out of advancement in scientific technology in modes of natural birth process has been converted by human ingenuity into a commercial venture, a number of legal issues have cropped up, answers whereof would have to be determined with due regard to provision of **'The Law of Contract'** and **'Indian Constitution'**.

In legal parlance, any transaction of surrogate motherhood would mean the **'lease'** of the carrying of mother's body, particularly of her womb, to the biological parents of the embryo for rearing it to a stage where it becomes a developed child to be handed over at delivery.

Often referred to as **'parenthood by proxy'** or **'renting of wombs' or 'surrogacy contract' or 'commercial surrogacy'** in consonance with its

commercial ingredient, the goods that is, the child being an outcome of ***In-Vitro*** fertilization, involves the appointment or hiring of a compatible woman to bear the child for the whole or part of the gestational period as the circumstances might require.

'Surrogate Mother' is a woman who agree to become pregnant and handover the child to a couple with infertility problems. The mode of fertilization is ***In-Vitro***. [6]

Issue of Health Risks to Baby: [5]

In a comprehensive study done on IVF (440 children) and ICSI conceived children (541). After a follow up until the age of five years and assessment for the health in terms of genetic malformations, cognitive skills, psychological and social development and emotional balance. Conclusion came out that children conceived artificially are as healthy as children conceived normally. However, two other studies in the past 18 months have painted a starkly different picture.

Test tube boys more likely to be infertile:

A study of hundreds of young men revealed that those conceived through fertility treatment were 50% more likely to be infertile themselves than those conceived naturally. Drugs used to treat women having trouble conceiving may actually damage the fertility of the babies, experts have warned. [16]

In **England,** in the year **1960,** a **Departmental Committee** studied the problem and advised the following guidelines: [11]

1. The practice of A.I.D. is strongly to be discouraged, but should not be regulated by law, or held to be a criminal offence.
2. The birth of a child as a result of A.I.D., to which the parties of the marriage consented, should be a bar to proceedings for nullity of marriage on the grounds of impotence.
3. There should be no alteration in the procedure for registration of birth or of the laws relating to legitimacy.
4. Insemination of a wife with donor semen without the consent of the husband should be made a ground for divorce or judicial separation.

I.C.M.R. Guidelines for (IVF) Clinics:

A Committee constituted by the ICMR and the National Academy of Medical Sciences have proposed following National guidelines, for the regulation and control of these clinics. These code include:

1. Sex detection at any stage of the fertilization procedure is not to be permitted.
2. The clinic will obtain sperms only from a semen bank and not through a relative or known friend of either spouse.
3. Surrogacy would be considered only for parents for whom it would be physically or medically impossible to carry a baby to term.
4. The embryos may be stored for five years if the couple agrees and used either for other couple or for research.
5. The sale or transfer of the human embryo or any part of it is prohibited.
6. Human cloning should be banned.
7. A child born through assisted conception would be presumed to have all right of parentage, support and inheritance.
8. An HIV positive woman would not be refused such conception but counseled adequately about the possibility of transmission of the virus to the child.
9. Services should also be made affordable for the weaker section of the society.

A training program in 'Assisted Conception' should be started in the country and database started for infertility.

Conclusion: The practitioner in-charge of the procedure must keep all relevant documents in his possession, and never disclose them to the parties concerned. He must follow the ethical guidelines regarding maintenance of secrecy and preservation and destruction of record.

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A Study of Child Rape in Manipur

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Abstract

A retrospective study was done over a period of 20 years (1985 – 2004). Out of 212 cases that were brought with a history of sexual assault, 52 cases (24.53 %) were below the age of 12 yrs. It was found that the incidence of child rape was maximum amongst Hindus comprising of 92.33% and occurred in rural areas in 67.30%. The incidence was high in summer (36.53%). Maximum number of incident (36.53%) took place at the residence of the accused and the accused were known to victims in 86.54%. Injury to vulva was more common than hymenal injury.

Key words: Rape, child, Sexual Assault, injury, hymen.

Introduction:

There are various social organizations who along with the Government support, have been collectively been addressing menace of offence related to child victims. Efforts to prevent and save the child from such exploitations to which they are subjected is always carried out but, despite this it has been noted that such crimes are reported and it continues to rise in magnitude. Rape is one of the heinous offences ever encountered by women and female child. In fact, no age is safe in respect to this offence including the young, children and the old women.

As per the Supreme Court of India rape is not only a crime against a woman but a crime against the entire society; it destroys the entire psychology of a woman and pushes her into deep emotional crisis. There is no separate classification of offences categorized as offence against children. Generally the offences committed against the children or the crimes in which children were the victims are considered as crime against children. The general penal code of this country and the various protective and preventive laws specifically mention the offences wherein children are known to be victims. The present study was carried out with an aim to know the incidence, relevant factors and remedies of rape in children below the age of 12 years.

Material and Methods:

The present retrospective study included 52 cases of alleged rape victims, under the age of 12yrs, who were brought in the Department of Forensic Medicine, Regional Institute of Medical Sciences, Imphal over the period from 1985 to 2004. Their detailed informations were collected from the police as well as victim and their parents. The different data noted were recorded in the proforma framed for the purpose. These were subsequently compiled, tabulated and analyzed under different tables.

Results:

The incidence of rape in child was higher in the year 1996 and 2002 consisting of 11.54% respectively, where it was null in the year1985, 1986 and 1994; and the least was observed in the year 1987 accounting for 1.90% as seen in Table-1. As per the religion-wise distribution of the victims it was found that Hindus were 48 (92.33%) followed by Christian 3 (5.77%) and the Muslim victim was the least i.e. 1case (1.90%) as depicted in Table-2. Rural victims (67.30%) outnumbered urban victims (32.70%) as shown in Table -3.It was also found that the incident of rape was highest in the summer (May – July) constituting 36.53% and the least in winter comprising 17.31% as shown in Table-4. The most common place of occurrence was inside the house of accused (36.53%), followed by victims' house (21.15%), which was again followed by places like fields/jungle/ river banks (17.32%) and the neighbors house constituted 3.85% as shown in Table-5. Table-6 showed the relationship between victims and the alleged accused. It was found that 86.54% were known to the victim. Among them some were uncle, brother, father, grand- father, brother's friend, neighbors, grand-father's friend etc. and 13.46% were stranger. The age of the accused varied widely. One of the accused was 85 years old as displayed in Photograph –II. As per Table-7, evaluation of the mental status of the victim at the time of examination showed 75% as cool and calm, 15.39% depressed, 7.70% were excited. There was one victim who was mentally unsound. It was further observed that in 63 cases there were physical injuries. Injuries over vulva were seen in 49.21%. The injuries included abrasions, contusions and lacerations of labias, lacerations of posterior commissure and lacerations of fourchette. This was followed by hymenal injuries constituting 28.57% and 19.01% showed evidence of general injuries like

bruise, abrasions etc. on other part of the body. Injuries over the anal region were seen in two cases as shown in Table-8. It was found that the hymenal tear was more in the posterior quadrant.

Discussion:

Of all the violent acts, rape is the least reported one and especially amongst child victims, as it has very bad repercussion to the family, to the victim and also due to the prevailing social stigma for rape victims. Even in Western countries only 10-50% of rape incidents were reported to the police[1]. The incident reported in the present study was quite low as compared to that of child sexual abuse in Zimbabwe where it was 40-60%. The myth "HIV/AIDS virgin cure" which is prevalent in some community in Transkei, South Africa [2] was not reported in Manipur.

Majority of the victims were Hindus (92.33%). This picture reflected the population distribution in the State, Manipur, where Hindus were the most populous group. According to 1991 Census report[3] out of total population of 18,37,149 Hindus were 10,59,470; Christians 6,26,669 and Muslims were 1,33,535. Higher incidence of rape in the rural area (67.30%) as compared to urban area (32.70%) could be due to the lack of physical outlet such as entertainment and other recreation facilities or due to increased pressure from urbanizing process in the rural areas. This findings were in agreement with other studies[4,5]. In the present series, majority of the incident occurred during summer accounting for 36.53%. This is the time when most of the schools and colleges are having vacation. Maximum number of the incident 36.53% took placed at the accused home and perpetrator of the alleged crime were known to the victim in 86.54%. Their age ranges varied widely. Children are soft targets as they are less defensive, easy to lure and easy to access. These findings were in accordance with that of other authors [4,5,6]. The mental status of the victims was cool and calm in 75%. These findings could not be exceptional. The reason could be the children are less aware of the incident. There was one mentally retarded victim in this study.

It was further seen that in 63 cases, there were physical injuries either local or general or both. Injuries over the vulva were seen in 49.21% followed by hymenal injuries in 28.57%. In children since the hymen is situated high up, extensive injuries to the vulva is more common than hymenal tear. General injuries were detected in 19.01%. Since the children are weak, less defensive and less aware of the incident, their resistance to the accused is less. So, the amount of injuries produced on other part of the body is generally less as compared to that of adult.

A victim of rape not only receives physical injuries but also a scar on the most cherished possession that is her dignity, chastity, honour and reputation. In children as a consequence of the act there may be psychological effects like phobic or fear psychosis, depression, anxiety, post-traumatic psychosis etc. and may develop sexual dysfunctions including frigidity, sexual aversion disorder, sexual anhedonia and female anorgasmia etc. when the child become adult [7]. Children can not form a union to topple the govt. as they do not posses the required intellect, maturity and physique; therefore no govt. is bothered about their right. When rape occurred there is nobody to listen to their cry. The honour of the family, inaction on the part of investigating agencies and complex legal procedures do not allow them to get justice. Announcing new legislation, commissions or programme without a will to implement can bear no fruits. Giving education to parent and children about the damage of sexual crime and benefits of early reporting to the police and medical examination so as to book the culprit is a must. The victims should be given due sympathy and support. Prudent steps for better recreation facilities for the youth, better appreciation and recognition of human rights by the public and police are also necessary. So, in order to deep rooted out of this heinous crime of mankind, every person in the society including victim, public, law enforcement agencies and Judiciary should go hand in hand.

Table-1: Year-wise distribution of rape in Children below 12 years

Year	Total number of cases	%
1985	0	0
1986	0	0
1987	1	1.90
1988	2	3.82
1989	3	5.76
1990	3	5.76
1991	3	5.76
1992	2	3.82
1993	2	3.82
1994	0	0
1995	3	5.76
1996	**6**	**11.54**
1997	2	3.82
1998	3	5.76
1999	2	3.82
2000	3	5.76
2001	3	5.76
2002	**6**	**11.54**
2003	4	7.80
2004	4	7.80
Total	**52**	**100**

Table – 2: Religion-wise distribution

Religion	No.	%
Hindu	48	**92.33**
Muslim	1	1.90
Christian	3	5.77
Total	**52**	**100**

Table – 3: Rural & Urban Distribution

Region	No. of cases	%
Rural	35	**67.3**
Urban	17	32.7
Total	**52**	**100**

Table-4: Season – wise distribution

Season	No. of cases	%
Winter (Nov – Jan)	9	17.31
Spring (Feb – April)	10	19.23
Summer (May – July)	19	**36.53**
Autumn (Aug – Oct)	14	26.93
Total	**52**	**100**

Table-5: Place of Offence

Place of offence	No. of cases	%
Victim house	11	21.15
Accused house	19	**36.53**
Neighbors house	02	3.85
Field/Jungle/river bank	09	17.32
Others	11	21.15
Total	**52**	**100**

Table – 6: Relationship between the Victim and the Accused

Accused	No. of case	%
Known	45	**86.54**
Unknown	7	13.46
Total	**52**	**100**

Table-7: Mental Status of the Victim

Mental Status	Number	%
Cool & Calm	39	75
Depressed	8	15.39
Excited	4	7.70
Abnormal	1	1.90
Total	52	100

Table –8: Injuries present

General	Vulva	Anal region	Hymenal	Total
12	31	2	18	63
19.01	49.21	3.21	28.57	100%

Photgraph- I
Showing bruise & laceration of the vulva of eight years old child victim

Photograph-2
Eighty-five years old accused of the above rape victim

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Fatal High Tension Electrocution

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Abstract

In this paper, a case of High tension electrocution is being reported to highlight the features present and the manner and caused of death as well as to suggest precautionary measures.
Key words: High-tension electrocution, dermo-epithelial burns, charring, crocodile-flash burns.

Introduction:
Injury by high-tension current is either by contact or an indirect result of arching or flash over. Severe thermal burns to the heat generated by the flash and 'knock down' by the sudden increase in the local atmospheric pressure are the additional risk involved. This case report highlights some of the typical features seen in high-tension electrocution.

Case Report:
On 01-10-2001, at about 07.30 am, a 25 year old Meetei man from Iregbam village, Manipur, was brought for PME to the RIMS, Imphal, Morgue, in C/W UD case no. 2/LSG-PS/01 dt. 01-10-2001. The history indicated electrocution while he was trying to take down a festoon from a metallic gate, which was just under a high-tension overhead electric cable.

The Post Mortem Examination was done in the RIMS, Imphal, Morgue on 01-10-2001 at 01.15 pm., under P.M. no. 350/01. On external examination, the body was 5'5" in length, weighing 54 kgs, of normal average physique with good nutrition. The wearing apparel consisted of a charred, dark blue nylon shirt, faded white torn jeans long pants and a printed underwear burnt in the front.

Post-mortem appearances showed the presence of rigor mortis all over the body, post-mortem staining present on the back and which was not fixed, congestion of the conjunctivae, cyanosis and singeing of the public hair.

External injuries of dermo-epidermal burns on the neck, chest, abdomen, right arm. Left thigh and the inguinal area, with reddened surfaces, mingled with regions where the skin had peeled off leaving behind yellowish and hardened spots, the so called 'Crocodile flash burns'.

The burns over the neck showed charring and the pattern of a metallic chain necklace around the neck. Internally, all the viscera were congested edematous. Heart was full.

Discussion:
High-tension electrocution is not so common as the domestic low-tension type accrording to certain studies in India (2,3). It is not so common in the western countries too where it occurs mostly in the electrical industry (1). For this rarity the cases is reported to illustrate the typical features.

Autopsy examination of the victim in case of high-tension electrocution usually reveals burns and the non-specific findings of asphyxia (4), which is seen in this case. Most of the victims of the high-tension electrocution die at the scene and not all the case show typical entrance and exit wounds, which is similar with this case. Charring of the skin is frequently present (1,5) as seen in this case too.

Metallisation which is a specific feature of electric injury (1),was not seen here though the silver chain worn around the neck of the victim left a patterned burn on the skin of the neck. This supports the fact that any metallic object on the body will produce corresponding burns on the skin because it becomes by the passage of current (6).

Electrocution by high-tension is usually associated with gross thermal injuries, the result of direct contact or flash over or thermal burns, or to the ignition of clothing and the circumstances rarely leave room for doubt as to the cause of death (1). All these features including crocodile flash due to arching (6) are seen in this case.

Conclusion:
High-tension electrocution is rare according to various studies mentioned above. The case repot highlight the typical features. Since high-tension electrocution is invariably fatal, it is suggested that overhead high-tension wires should be replaced by underground cable system and the people handling electricity should wear protective gear. Anybody working under high-tension lines than 50 kilovolts should have a clearance of 10 feet from the

proximity. Free safety training should be provided to the group of employees in particular and to the public in general.

Plate-1: Profile of a fatal high tension electrocution

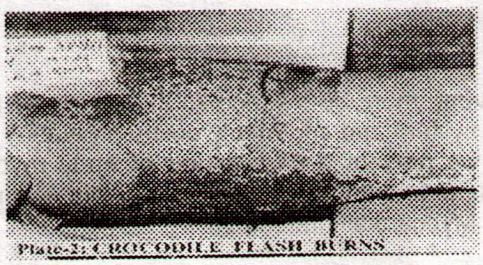

Plate-2: CROCODILE FLASH BURNS

Plate-3: Burns showing charring and pattern of a metallic chain necklace around the neck.

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Sudden Cardiac death due to Myocardial Infarction in a Young Female - A Case report

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Abstract

Sudden death, the name itself suggests unexpected nature of event, more so if it occurs in apparently healthy young individuals. Majority of events are related to cardiovascular system and commonly occurs in elderly males. Cases are uncommon in females that too in young age. Here we present a case report of early myocardial infarction in a young female resulting in death. Final diagnosis was made after histopathologial examination.
Key words: Sudden Death, Cardiac Death, Myocardial Ischemia, Myocardial Infarction.

Introduction:
In India, sudden natural deaths form a large proportion of medico legal cases subjected to post mortem examination. Mostly the cases are clear cut with proper history, prominent findings at autopsy and can be easily disposed. Suspicion arises if the deceased is young and apparently in good health. It is difficult to convince the relatives about the 'illness' of their family member. Further problems arise if victim is a female, even more if she is young and married. Police as well as the relatives may suspect husband's family for some illegal act / dowry harassment. In such situations, medicolegal autopsy is the best means to solve the dispute.

Out of 1226 postmortems conducted over a period of 2 years in District Hospital, Mangalore, 78 were diagnosed to be natural deaths (69 males and 9 females). Out of natural deaths, 34 cases were related to cardiovascular system including five females. In this, two females died of ischemic heart diseases including a young female aged 30 years. The case is discussed.

Case report:
On 15-4-06 morning a 30 year old female, a known heart patient, collapsed at a bus stop. She died while being shifted to hospital. Hospital records showed previous history of ventricular tachycardia, left ventricular dysfunction, reduced ejection fraction & myocarditis.

External examination:
Dead body of an adult female, moderately built and nourished, measured 155 cm in length and weighed 49 Kg.
No external injuries were present on the body.

Internal examination:
Heart weighed 250 gm. Right and left ventricular wall thickness measured 0.5 cm and 1.0 cm respectively. Circumference of tricuspid and pulmonary valves measured 9.0 cm and 6.0 cm respectively. Left coronary ostia was narrowed and showed atheromatous changes.
Aorta showed fatty streaks and atheroma. Brain and lungs were congested and edematous. Liver, spleen and kidneys were congested.

Histopathology:
Heart: Right atrium and ventricles were normal. Apex of the heart revealed focal muscular changes with congested thin walled vessels (Fig 1). There was pericellular edema and focal nucleomegaly of cardiac muscle fibres (Fig 2). In addition, focal areas of atrophy with interstitial fibrosis and congested vessels were seen amidst myocytosis. Left coronary ostia showed ulcerated atheroma with mild myxoid changes (Fig 3).
Aorta showed atheromatous changes.
Pancreas showed normal architecture and reactive hyperplasia of lymph nodes. Liver, spleen and kidneys were congested. **Opinion as to cause of death:**
Early myocardial infarction secondary to atherosclerosis of left coronary ostia.

Discussion:
In Medico legal practice, one of the most frustrating challenges is the inability to determine the cause of death in a previously healthy individual. In young age, males are three times more prone for sudden

death.[1] In sudden cardiac deaths, at autopsy, coronary anomalies and hypertropic cardiomyopathy are the commonest findings observed in young people and coronary atherosclerosis and acquired forms of cardiomyopathy in adults.[2] Coronary atheromatous disease was common over 30 years of age and myocardial diseases and conduction system abnormalities were common between 15 and 29 years of age.[1]

Sudden cardiac deaths are less commonly reported in females. Long QT syndrome leading to life threatening ventricular tachycardia [3] and spontaneous coronary artery dissection [4] are seen in young females in the post-partum period. Sudden cardiac death due to AV node tumor[5], partial hypoplasia of bundle of his [6], anomalous origin of left coronary artery [7] and interstitial myocarditis due to Systemic Lupus Erythematosus [8] have been reported in young females.

Sudden cardiac death due to myocardial ischemia is uncommon in young females. The most common cause of ischemic heart diseases is reduction in coronary arterial blood supply due to atherosclerosis. In Indian females, low incidence of risk factors such as alcoholism, smoking, sedentary life style makes them less prone for atherosclerotic heart diseases. Moreover, high level of High Density Lipoprotein (HDL) as compared to same age males gives them additional protection in premenopausal age group.[9]

In present case, an apparently healthy young female collapsed at bus stand and died raising suspicion. Postmortem examination ruled out any foul play but no cause of death was made out. Detailed history from relatives, past hospital records and histopathology examination confirmed the cause of death.

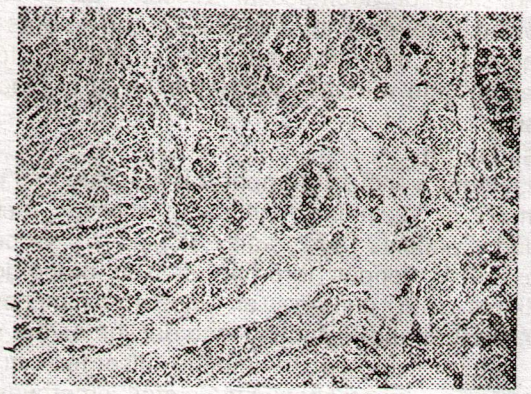

Fig. 1: Myocardium showing congested blood vessels, hematoxylin and eosin, magnification x 20.

Fig. 2: Cardiac muscles showing nucleomegaly, pericellular edema and inflammatory cells, hematoxylin and eosin, magnification x 20.

Fig. 3: Coronary artery showing ulcerated atheroma, hematoxylin and eosin, magnification x 20.

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Sudden Death due to Mesenteric Vein Thrombosis in a Post Caesarean Section Case: A Case Report

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Abstract

Sudden or unexpected deaths may occur from natural as well as unnatural causes such as violence or poisoning. Sudden deaths in apparently healthy individuals especially under some suspicious or mysterious circumstances often give rise to questions relating to the cause, nature and circumstances of death of the person. In the present case, the sudden death occurred in an apparently healthy pregnant woman and the role of forensic pathologists was of immense value in establishing a proper diagnosis and solving the mystery behind such a death, which was diagnosed as mesenteric vein thrombosis on autopsy.
Key words: Mesenteric vein thrombosis, DIC, sudden death.

Introduction:

By sudden death is meant death which comes on quickly and unexpectedly whether the victim is apparently healthy or suffering from some disease. Sudden natural deaths can occur immediately or within 24 hours of the onset of the terminal symptoms[1]. Sudden natural deaths can result from diseases of the cerebro-vascular system, respiratory system, central nervous system, gastro-intestinal system, genito-urinary system, systemic diseases, etc. At times, sudden deaths may even occur out of fright, dread or anger in persons with unstable nervous system and also in simple procedures such as catheterization of bladder, removal of fluid from body cavities e.g.: pleural or peritoneal cavities. But if sudden deaths occur in an apparently healthy person especially under some suspicious or mysterious circumstances, a meticulous medicolegal investigation is often required.

Case report:

A 26 years old female underwent caesarean section under spinal anaesthesia. On the very next day, she started complaining of abdominal pain, blurring of vision and feeling of faintness and died within a short time. A case of negligence was filed against the doctors by the husband of the deceased.

On examination, cyanosis was observed and a stitched surgical-incised wound was seen on the lower abdomen. About 1.5 litres of blood tinged fluid was observed in the peritoneal cavity, the abdominal viscera and retroperitoneal tissues were inflamed (Fig. 1 and Fig. 2). Multiple petechiae were present on the surface and mucosa of the stomach. Intestines and mesenteries were also inflamed with multiple petechiae. Some of the petechiae were large and coalesced giving a spotted appearance (Fig.3), and thrombi were detected in the mesenteric veins. The uterus was in the stage of involution with stitches on its anterior wall (lower segment) and the inner surface showed a haemorrhagic appearance. The liver, spleen and kidneys were markedly congested. The lungs were congested and oedematous with multiple petechiae. The heart also had multiple petechiae on its wall (Fig. 4).

On histopathological examination, fibrinous materials were seen in the alveolar cavities. Splenic sections showed marked congestion and haemorrhage. The stomach and omentum were congested with patchy necrosis and haemorrhage of mucosa. Marked haemorrhage was also seen in the omental tissue. Intestines and mesenteries showed congestion of submucosal vessels. Liver tissues showed dilatation of sinusoids, and uterus and ovaries had hypertrophied myometrium with foci of haemorrhage without endometrial lining of placental tissue.

Discussion:

Mesenteric venous thrombosis is classified as either primary or secondary. When an etiologic factor is found, patients are said to have secondary mesenteric venous thrombosis. The proportion of patients with primary, or idiopathic, mesenteric venous thrombosis continues to decline as the ability to detect inherited thrombotic disorders and to recognize hypercoagulable states improves [2,3]. Currently, an etiologic factor can be identified in about three quarters of patients. The most common causes are prothrombotic states due to heritable or acquired disorders of coagulation or to cancer, intraabdominal inflammatory conditions, the

postoperative state, and cirrhosis and portal hypertension[4]. Advances in imaging techniques have permitted the diagnosis of mesenteric venous thrombosis to be made before laparotomy is performed, but there is often a delay in the diagnosis because of a low degree of suspicion on the part of clinicians and the nonspecific clinical presentation. The present case showed thrombi in the mesenteric veins with multiple petechiae on the surface and mucosa of the stomach, intestines and mesenteries. The organs like the heart and lungs also showed multiple petechiae which showed that the cause of death was due to acute mesenteric vein thrombosis with acute disseminated intravascular coagulation (DIC) which is a pathophysiologic term describing a continuum of events that occur in the coagulation pathway in association with a variety of disease states. This is characterized by generalized bleeding, which ranges from petechiae to exsanguinating hemorrhage, or microcirculatory and macrocirculatory thrombosis leading to hypoperfusion, infarction, and end-organ damage[5].

Conclusion:

Sudden deaths due to a condition like mesenteric venous thrombosis and DIC (disseminated intravascular coagulation), especially in a postoperative patient may give rise to negligence charges against the doctors. Thus, a meticulous medicolegal autopsy helps in proving or disproving a contentious issue arising out of such sudden deaths in apparently healthy individuals. A careful examination should be supported by corroborative history and an active cooperation from the investigating officer for the administration of justice.

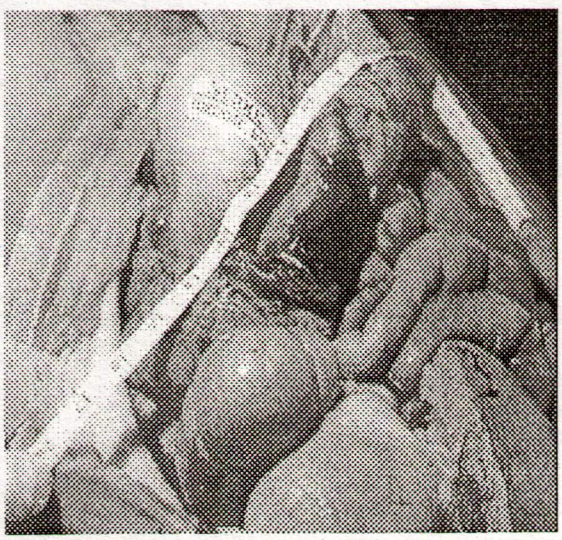

Fig. 1: Inflamed Abdominal Viscera and Retroperitoneal Tissues.

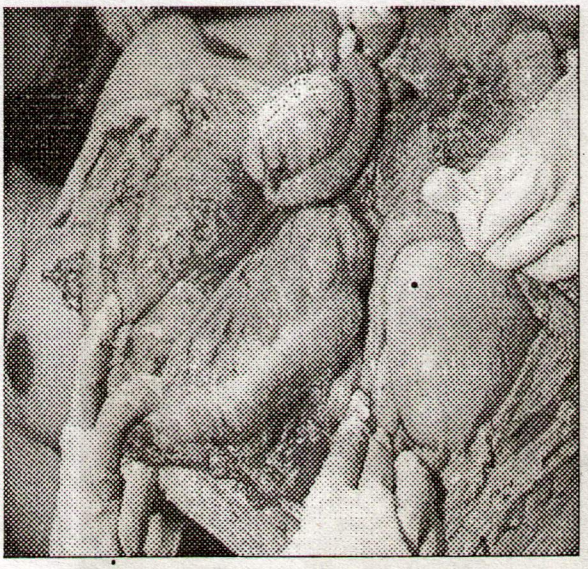

Fig. 2: Inflamed Abdominal Viscera and Retroperitoneal Tissues.

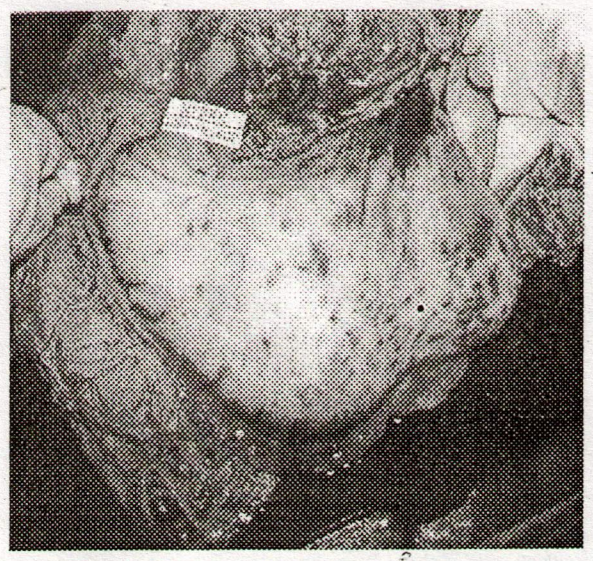

Fig..3: Multiple Petechiae giving spotted appearance

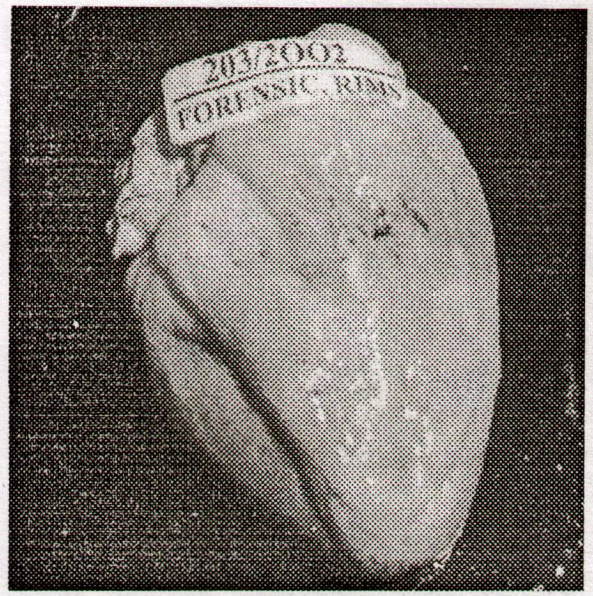

Fig. 4: Heart showing Multiple Petechiae

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Systematic Analysis of Injury: A Case Report

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Abstract

A 50-year-old male was found dead in suspicious circumstances in a hotel (dhaba) at night where he was working. Medico legal autopsy examination was done in the mortuary of Gandhi Medical College, Bhopal the following day. On autopsy examination a circular lacerated wound was found over forehead and another lacerated wound was seen over left temporal region along with abrasion and contusion. Depressed fracture was seen over the skull underlying the scalp injury. Detailed examination of wound in terms of its size, shape and trace evidence lead to identification and seizure of weapon of offence and thus the accused. Case is being presented with brief discussion emphasizing the importance of reconstruction and biomechanics of lesions in interpretation of such injuries.

Key Words: Head Injury, Signature Wound, Blunt Injury, Depressed Fracture.

Introduction:

Forensic analysis of trauma and reconstruction constitutes a major part of autopsy examination. At the same time analysis of the injury caused, gathering information and evidences from the wound and drawing inferences from it helps the investigating agencies to find out the offending weapon and the offender. Any injury depends on how it was caused, with what it was caused, and by whom it was caused and all these information can be gathered by examining the wound itself, if one is well versed with the biomechanics of the injury and the reconstruction of the event.Case History:

Dead body of a male aged about 50 years was brought for medico legal autopsy examination at Gandhi Medical College Bhopal.

History from the police revealed that the deceased was a worker in a hotel where he used to stay at night. One morning, he was found dead by the owner of the hotel.

Post-mortem findings: On external examination the deceased was a well-built male aged about 50 years. He was in his nightclothes with baniyan and lungi. His face and head were smudged with blood and injuries were evident over the head and face. Both eyes were black eyes.

Injuries:

1. Contusion with laceration present over left temporal region of the scalp extending from just anterior to upper border of pinna to lateral end of left eyebrow in a nearly transverse area of 3x7 cm. At the anterior end there was a lacerated wound, which was semicircular in shape with convexity directed anteriorly of size 3x0.5 cms. The posterior end of the wound had another linear laceration of 5 cm length adjacent to pinna. The scalp was ecchymosed internally all over fronto temporal region. Left temporalis muscle was ecchymosed. Skull bone was fractured in 3x6 cm irregular area over temporal region. (Photograph 1)

2. Lacerated wound with marginal contusion was present over left side of forehead extending from 1 cm left to midline and just above the eyebrow in nearly circular area of 4x4 cm. The lacerated wound was triangular in shape with the base directed upward and apex pointed downward and medially, the base was 3 cm in length and the lateral and mediai limbs of the wound were 4cm and 3.8 cms respectively. Underneath part of skull bone was depressed and exposed through the wound with fine black soot like particle seen sticking in this area. Depressed fracture of Skull bone was present in 3x2.5 cm area with irregular margins over left frontal bone and part of this bone was depressed inside. **(Photograph 2)** Base of the skull showed fracture of both orbital plates.

Dura was torn underneath the injury no 2 and brain was lacerated against the fracture site. Subdural and subarachnoid hemorrhage was evident beneath the fracture. No countercoup injury was evident.

The swab of black soot like particle from the wound, scalp hair from the wound site, viscera, clothing and blood of the deceased were preserved for further analysis.

Inference & Reconstruction:

The wound no 2 appeared to be a typical signature wound and the inference drawn from it were given to the investigating agency. The police was advised to look for a hard, blunt and heavy object with a circular

convex surface of about 4x4 cm, with black soot like particles and probably blood sticking on it. The police was also asked to look for the accused who was more likely to be a male. Working on the above clues, the police recovered the weapon of offence, which was a hammer, used for breaking coal. **(Photograph 3)** The size convex surface of hammer correlated with the injury and the coal particles sticking on it matched with those found at the site of the injury.

Discussion:

Upon encountering a victim with a head injury several considerations need to be made in regards to the method in which the injury was sustained. The movement of head (or lack thereof) in relation to impact, condition of victim's scalp at the time of impact, location of impact and the mass and velocity of the object which come in contact with the impact site, must all be examined. (1)

Whenever a 'force' is applied to an organism (e.g. human body) interplay exists between the physical factors related to the force and the biomechanical factors to the organism. The final product of these factors will determine the nature and the extent of any injury. (2)

The wounding potential of an impact depends on the amount of energy liberated or transferred by the blow. The rate at which energy is liberated and the size of impacted area are critical in determining the degree of injury. (3)

Scalp on many occasions assists the examiner in determining what type of instrument caused the injury. In the present case the scalp was showing abrasion, contusion and laceration. Skin is more plastic (resilient) than the blood vessels; therefore, skin breaks (lacerations) require higher forces than blood vessel rupture (contusion) (2). The scalp, which covers the skull, is 5-layered area of the skin. These layers consist of outer skin with hair, subcutaneous tissue, epicranial muscles, loose connective tissue and periosteal connective tissue. The injury no 2 in present case was a signature wound with circular impact abrasion and a lacerated wound in mid indicating the use of a hard, blunt and heavy object with a circular surface of about 4 cm diameter.

Fractures of the skull vault are influenced by various factors, which include the thickness of the vault and the force of impact. Fractures occur when localised pressure due to force exceeds the stress tolerance of the part affected and the break point results. The thickest portions of the bone of skull are the occipital and the frontal with the thinnest portion of the bones at temporal region. Rapid dynamic loading occurred in this case, with the force probably acting for a very short time (<200ms). The size of impacting device (in this case the hammer) and the force of impact are directly related to the magnitude of the dynamic load. (3, 4) In this case, a large amount of kinetic energy made contact with skull over a small area (4x4cm^2 area). The signature injury over left frontal bone in this case indicates the amount of force was considerably larger. Either using a heavy weapon or bringing the weapon with great velocity to result in forceful impact could attribute to this large amount of force. As K.E= ½ mv^2, increase in mass or the relative velocity between the striking object and the part of the body will increase the energy produced and hence the severity of the impact. Here increase in velocity is more important than mass as doubling the mass will double the energy while doubling the velocity will increase the energy four times. Fracture of the frontal bone indicates use of heavy weapon and a large amount of force both of which point towards the accused as more likely to be a strongly built male.

The lacerated wound in the centre of the signature injury and the presence of depressed fracture of skull underneath indicates that the weapon was held nearly perpendicular to the surface of head and that the circular part of the weapon has convex surface rather than the flat surface, the highest apex of which corresponds to the greatest depth of the wound.

The slide of hair preserved from injury site revealed split lacerated ends of the hair thus corroborating the use of hard and blunt weapon.

The presence of coup and absence of contrecoup injury in the brain indicates that the head of the victim during the assault was stationary. When head is hit by a heavy object, at sufficient force two subsequent actions occur- Acceleration of head away from the blow and deformation of the bone. Each of these actions possesses a definite reaction upon the brain. Once the head receives the blow, it accelerates away from the impact, which causes the brain to compensate by moving against the accelerations. This causes positive pressures between the point of impact and the brain, and negative pressure on the opposite side. A coexisting positive pressure is also caused by the deformation of the bone. This forces the brain away from the point of impact, causing the positive pressure on both sides of the brain, and negative pressure on the opposite side. There fore, two positive forces act upon the brain at the point of impact, whereas positive and negative forces act upon the brain at the opposite side. (1,5). The absence of contrecoup injury in this case thus rules out that the head was moving at the time of impact and hence rules out fall. It indicates that force was applied when the

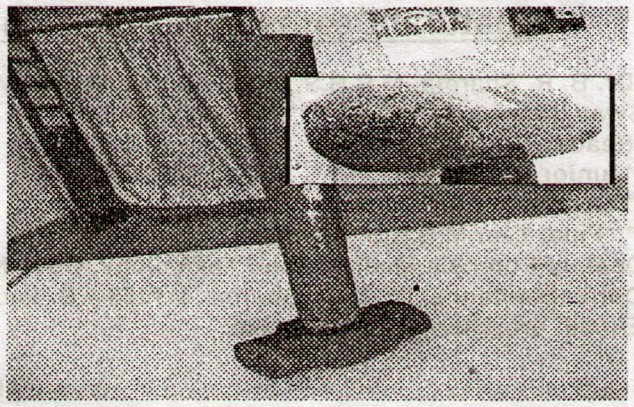
head was stationary by some hard blunt and heavy object.

Besides the injury the trace evidences not only provide the corroborative proof at the scene of crime but also provide conclusive proof regarding the identification of specific weapon of offence and the offender. The black soot like material recovered from the wound site contributed to pinpointing the weapon of offence thus helping the investigating agencies. Locards Exchange principal states that whenever two objects come into contact, a transfer of material will occur (6). Understanding of transfer and persistence of trace evidence assists the examiner in interpreting the significance of analytical results – as was evident from the present case.

'Dead men do tell tales', but these tales could only be understood when effort is made to do a meticulous autopsy examination with detailed study of wound and trying to draw inference and collect the available evidences, so that no aspect of the tale is left unheard of.

Photograph No. 1. - Injury No 1: with contusion and lacerated wounds over temporal region with underlying fracture of skull.

Photograph No. 2. Injury No. 2: A signature wound with a nearly circular abrasion and a lacerated wound in the middle with exposed skull bone showing deposits of black soot like particles seen more clearly in the inset and marked with arrow.



Photograph No 3.
The Weapon of Offence: the Hammer. Insert showing close up with soot like particles sticking to the convex surface.

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Unnatural Deaths in Northern India: An Overview of Social Etiology

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Abstract

This retrospective study was aimed at describing the contribution of social conditions towards the main causes of accidental and intentional injuries leading to unnatural deaths among the adolescents and the youth in Northern India. The main objectives of the study were: a) to ascertain the various aspects of unnatural deaths, b) to analyze the probable reasons for the same & c) to find remedial measures to bring down the incidence. Vehicular accidents followed by poisoning, burns and physical violence, respectively were the main causes of unnatural deaths. Poisoning was more prevalent among male suicides whereas females preferred burns to end their own lives. Majority of the victims of unnatural deaths belonged to the lower socioeconomic category. Suggestions relating to road safety, decreasing the stress of the modern mechanical life-style, educating the public in general and regarding the availability, use and storage of poisonous substances in particular have been put forward, while highlighting the social evil of dowry system prevailing in India.

Key Words: Vehicular Accidents, Suicides, Poisoning, Burns, Dowry Deaths.

Introduction:

There is ample evidence linking socioeconomic position and circumstances to the health of an individual. However, the explanations and the underlying causal mechanisms of social inequalities in health are a subject of debate [1, 2]. Over the last two decades of 20th century, there has been considerable research interest into specific pathways like employment conditions [3] household conditions [4] and local area conditions [5] in relation to the health. Disentangling these related but distinct factors could clarify the causal narratives linking social factors to health [6]. A study reported that socioeconomic inequalities in disability are likely to result from life time exposures to both poor living conditions and adverse occupational exposures [7].

Accidental and intentional injuries are the leading causes of death in children and youth all over the world. Socioeconomic conditions are determinants for this health problem. The rate of injury deaths has been reported to be two to three times higher in low socioeconomic status groups as compared with the high status group, in Australia [8], Canada [9], New Zealand [10], Sweden [11], UK [12,13] and USA [14,15]. Yet assessment of social determinants has seldom been presented as an etiological factor.

Injury is a heterogeneous phenomenon. Thus, social conditions might contribute more to certain forms of injuries than the others. Understanding of the variations in social casualty, between different forms of injuries might help to explain the mechanism that conveys the effects of social disadvantage. Yet, a few authors including Roberts who studied injury mortality of children aged 0-15 years in England and Wales have only described cause- specific social class mortality differentials. He reported that the Odds Ratio, when social class V is compared with social class I, varied between 16.3 for injury deaths attributable to fire, 5 for drowning and suffocation deaths and 1.6 for motor vehicular traffic accidents [16].

Several studies have reported that low socioeconomic status is a risk factor for vehicle related injuries, a composite outcome that typically comprises motor vehicle driver and passenger injury and some times also includes pedestrian or cyclist injury [17 - 24]. Drivers not only injure themselves, but they frequently injure other types of road users also. It is plausible that the associations could differ quantitatively and perhaps even qualitatively. For example, whereas people in lower socioeconomic group may have higher risk of pedestrian or a cyclist injury, they might well have lower risk of driver injury. It has been documented that socioeconomic differences in healthy lifestyle are associated with the differences in attitudes towards life and accordingly the incidences of physical violence, suicides, etc. are encountered [25]. The present study attempts to examine the socioeconomic etiology of unnatural deaths

Materials and Methodology:

This 5-year prospective study was conducted in the department of Forensic Medicine, Government Medical College, Chandigarh, from January 2001 to December 2005. A total of 1746 cases brought for medico-legal autopsy to the department were the subject materials of the study. A standardized Performa was prepared and was filled in each case after detailed interviews with the investigating officials and the relatives of the deceased to gather information regarding the age, sex, socio-economic background, level of education, occupation, marital status, rural/urban residence status, etc. The results were then compiled, analyzed, and discussed. Alleged unnatural deaths, which later turned out to be due to natural causes and those cases, in which the cause of death could not be ascertained despite a meticulous autopsy, including toxicological and pathological analysis, were excluded.

Observations:

Of the 1746 medico-legal autopsies conducted by the department during the period of study, 1664 (95%) were unnatural deaths. Road traffic accidents (RTA) accounted for the maximum cases, 571 (34%), followed by Poisoning, 443 (27%) and Burns, 341 (20%). Deaths due to assault were the least, 71 (4%). The year 2003 recorded the least number of deaths, 295 (18%), while the year 2005 recorded the maximum deaths, 372 (22%). However, deaths due to Asphyxia were the maximum in the year 2003, 25 (27%). (Table 1)

Taking both the sexes into consideration, the age group of 21-25 years accounted for the maximum victims, 436 (26%), followed by the age group 26-30 years, 376 (23%). This 21-30 year age group alone was responsible for 49% deaths, the male: female ratio in these cases being 4.7: 1, as compared to the overall sex ratio of 2.3: 1. Least number of cases was observed in the <15 year age group, 38 (2%), followed by the >60 year group, 81 (5%). (Table 2)

In case of both males and females, majority of the victims were married, 736 (64%) and 315 (61%), respectively. Taking the individual manners of death into consideration, there was only a slight difference in the number of married and unmarried victims in case of Burns [46 (53%) & 40 (47%)] and Asphyxia [40 (56%) & 31 (44%)]; while it was the same in Asphyxia in case of females [10 (50%), each], with a minor difference in cases of RTA [58 (55%) & 48 (45%)], Poisoning [51 (55%) & 42 (45%)], and 'Others' [14 (56%) & 11 (44%)]. In the rest, in males, the ratio of married: unmarried victims were 1.6: 1 to 1.9:1. However, in case of females, it was 2.1: 1 in Burns and 1.6: 1 in Assault. (Table 3)

As regards the socio-economic status of the victims, the observations were on the expected lines with the Low socio-economic group of <Rs10000/month accounting for more than 60% deaths, 1050 (63%), of which the <Rs5000/ month group was 57%, 597 (36% of the total); while the upper most socio-economic strata was involved in only 13 (1%) deaths. In the >Rs50000/ month group, Poisoning, 4 (31%), was the most common manner of death, followed by Assault, 3 (23%); while in the rest of the groups, RTA, followed by Poisoning, claimed the maximum lives. (Table 4)

Maximum deaths were observed in the 'Workers'- both Skilled and Unskilled, 594 (36%), both sharing almost 50% each of this group. The Office group came a very close next to both these groups, 289 (17%), followed by the 'Home-bound' group, 241 (15%). Taking each of the manners of death separately, Office group accounted for the maximum deaths in RTA, 113 (20%), Skilled workers in Poisoning, 97 (22%), Home-bound in Burns and Asphyxia, 75 (22%) and 21 (23%), respectively; Unskilled worker in Assault and Others 21 (30%) and 33 (23%), respectively. (Table 5)

The level of education of the victims was also inversely proportional to their involvement in various unnatural deaths. Least number of cases was of those with post-doctoral qualification, 9 (0.5%), while maximum cases were of those who did not complete Matric level education, 561 (34%), followed by those with education between Matric and Higher-secondary, 432 (26%), and so on. This was also true of all manners of death considered separately. (Table 6)

Of the 1664 cases that were studied, 1196 (72%) were Locals of which 592 (50%) were from rural background, whereas 304 (65%) were from the rural background in the Non-local group. In both the Locals and Non-locals, the percentage of the male victims was more in the Rural group than the Urban, 73% vs. 68% and 70% vs. 62%, respectively. Taking the different manners of death into consideration, it was observed that in case of the Locals, Urban group dominated in deaths due to RTA, 263 (65%), Burns, 139 (61%) and Asphyxia, 40 (57%); while the Rural group dominated in the rest- Poisoning, 236 (68%), Assault, 37 (71%) and Others, 61 (63%), respectively. However, in case of the Non-locals, the Rural group was predominant in all the manners of death- RTA, 114 (67%), Poisoning, 67 (71%), Burns, 61 (54%), Assault, 13 (69%) and Others that included fall from height, electrocution, traumatic asphyxia, buried under debris, etc., 35 (70%), respectively. (Table 7)

Discussion:

Vehicular accidents claiming about one-third share of the total unnatural deaths in the present study, suggests that modernization and rapidity of the

various means of transport have accelerated the pace of human life on one hand, while on the other, it has added to the woes of mankind. An earlier study by the authors [26] revealed certain features of vehicular accidents which were unique to the city of Chandigarh: (a) rate of road-traffic fatalities have shown a marked decrease from 59%in 1994 to 38% in 2002 and (b) an appreciable increase in the number of female fatalities was observed, with a corresponding decrease in the number of male fatalities of two wheeler users (scooters, motor bikes, mopeds and cycles). The higher percentage of road-traffic fatalities among females in Chandigarh could be attributed to a higher number of office-going women using two-wheelers for conveyance but avoiding safety helmets. It has been documented that occupational status and educational level are important determinants of driver injury risk and its countermeasures should be targeted to people in low status occupations as well as to people with comparatively little formal education [27].

Poisoning was responsible for 27% of the unnatural deaths, of which, 53% were aged 21-30yrs. Various factors like lack of employment opportunities, urbanization and its pressures, inaccessibility of the various amenities of 'good- living', failure in love affairs. frustration caused by their inability to live up to the peer group, etc, may be some of the important reasons leading to an increase in the incidence of substance abuse among the youngsters, as well as the increase in the rate of suicide in this category [28].

The low income category (LIG) constituted 63% of the unnatural deaths in sharp contrast to the high income category (HIG) accounting for 4%. The ratio between the rural and urban population among those coming to Chandigarh from neighboring states was 2: 1 while among those belonging to Chandigarh no significant demarcation was observed. The rural and the LIG usually have a large family size, meager resources, low education levels, resulting in increased unemployment, inability to repay debt, ignorance, complete or partial dependence of livelihood on their crop, etc. These, perhaps, are the reasons for higher incidence of unnatural deaths in this category that need to be addressed. According to a recent study, 36% of Indian population lives below the poverty line, of which 80% live in Rural India [29].

Majority of the victims of unnatural deaths (64%) was the adolescents and young adults category of the age group 16 - 30 years. Furthermore 60% of these deaths had an educational status of up to matriculation, whereas a decrease in the number of these deaths was evident with the increasing level of education. These findings demand that serious deliberations and thought should be put into the various reasons responsible for it. Popularizing vocational courses, as per the caliber of the individuals, will go a long way in decreasing the insecurity of the unemployed, thereby boosting their self-confidence and preventing unnatural deaths particularly among the youth.

Marital status showed a definite trend among unnatural deaths. The ratio of married men to unmarried was about 2: 1 while this ratio among the females was 1.5: 1. Unusual large size of the family, higher illiteracy, ignorance and superstitions, etc. may be responsible for this trend. Promotion of the concept of 'Family Planning' can help bringing down the family size and its related problems, both in the rural and in the urban communities. Economic independence and social justice can enable women to enjoy equal rights and instill confidence and self respect in them. Psychosocial factors such as stress, depression, hostility, hopelessness etc., have been reported to be associated with physical and mental health of an individual [30] that in turn have a direct bearing on the unnatural deaths.

The prevailing evil of dowry system, despite the existing stringent laws (Section 498A, 304B Indian Penal Code) [31] to curb the menace, has shown an upward trend. There has also been some feminist movement in the society and at present, one finds women's organizations struggling for their rights and protesting against the atrocities on them. But the movement has not yet been much successful in correcting the wrongs at the grass root level and needs to be further strengthened. Marriage counseling, discouraging costly and ostentatious marriage rituals, strict implementation of anti-dowry laws may help in decreasing or preventing such deaths [32, 33].

Conclusion:

Unfortunately but realistically, there is a little that the autopsy surgeon can contribute to the elucidation of factors leading to the unnatural deaths. The most energetic efforts of physicians, other members of the health team, families, friends, social organizations and the authorities may never eliminate such deaths. However, in an attempt to at least try to decrease its toll the following suggestions are made:

1. Strict implementation of traffic rules, availability of safe vehicles, and safe driving conditions.
2. The storage and sale of commonly used agrochemicals should be controlled through strict regulations.
3. Various socio-economic factors responsible for the high incidence of suicidal poisoning need a practical and early redressal on the Govt.-front, by properly and honestly framing the policies and

implementing the same in such a manner that their benefits reach the needy.

4. Marriage counseling, discouraging costly and ostentatious marriage rituals, strict implementation of anti-dowry law.

Table 1 : Year wise distribution of unnatural deaths

Manner of death	Year											
	2001		2002		2003		2004		2005		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
RTA	94	16.46	111	19.44	108	18.91	126	22.07	132	23.12	571	34.32
Poisoning	100	22.57	89	22.09	71	16.03	92	20.08	91	20.54	443	26.62
Burns	81	23.76	55	16.12	51	14.96	70	20.53	84	24.63	341	20.49
Asphyxia*	17	18.69	09	09.89	25	27.47	24	26.37	16	17.59	91	05.47
Assault	11	15.49	12	16.90	14	19.72	19	26.76	15	21.13	71	04.27
Others**	31	21.09	35	23.81	26	17.69	21	14.29	34	23.13	147	08.83
Total	**334**	**20.07**	**311**	**18.69**	**295**	**17.73**	**352**	**21.15**	**372**	**22.36**	**1664**	**100**

*Asphyxia includes suffocation, hanging, strangulation, throttling, etc. **Others include fall from height, electrocution, traumatic asphyxia, buried under debris, etc. excluding natural and indeterminate cause.

Table 2 : Age and sex-wise distribution of the victims

Age in years	Male		Female		Total	
	No.	%	No.	%	No.	%
0 – 15	21	55.26	17	44.74	38	02.28
16 – 20	147	61.00	94	39.00	241	14.48
21 – 25	264	70.21	112	29.79	376	22.60
26 – 30	306	70.18	130	29.82	436	26.70
31 – 40	175	75.11	58	24.89	233	14.00
41 – 50	114	71.70	45	30.30	159	09.56
51 – 60	70	70.00	30	30.00	100	06.00
>60	56	69.14	25	30.36	81	04.90
Total	**1153**	**69.29**	**511**	**30.71**	**1664**	**100**

Table 3 : Marital status of the victims

Marital Status	Manner of death													
	RTA (n=571)		Poisoning (n=443)		Burns (n=341)		Asphyxia (n=91)		Assault (n=71)		Others (n=147)		Total (n=1664)	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Males	465	81.4	350	79.0	86	25.2	71	78.0	59	84.0	122	83.0	1153	69.3
Married	307	66.0	231	66.0	46	53.5	40	56.3	37	62.7	75	61.5	736	63.8
Unmarried	158	34.0	119	34.0	40	46.5	31	43.7	22	37.3	47	38.5	417	36.2
Females	106	18.6	93	21.0	255	74.8	20	22.0	12	15.9	25	17.0	511	30.7
Married	58	54.7	51	54.8	173	67.8	10	50.0	07	58.3	14	56.0	313	61.3
Unmarried	48	45.3	42	45.2	82	32.2	10	50.0	05	41.7	11	44.0	198	38.7

Table 4 : Socioeconomic status of the victims

Socioeconomic Status*	Manner of death													
	RTA (n=571)		Poisoning (n=443)		Burns (n=341)		Asphyxia (n=91)		Assault (n=71)		Others (n=147)		Total (n=1664)	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
High income group														
>50,000	02	00.4	04	00.9	00	00	02	02.2	03	04.2	02	01.4	13	00.8
25-50,000	17	03.0	14	03.2	11	03.2	06	03.3	05	07.0	06	04.1	56	03.4
Middle income group														
15-25,000	85	14.9	43	09.7	31	09.1	17	12.1	11	15.5	17	11.6	198	11.9
10-15,000	134	23.5	97	21.9	59	17.3	25	20.9	13	18.3	25	17.0	347	20.9
Low income group														
05-10,000	156	27.3	114	25.7	101	29.6	39	27.5	18	25.4	39	26.5	453	27.2
<5000	177	31.0	171	38.6	139	40.8	58	34.1	21	29.6	58	39.5	597	35.9

*Income in Rupees per month

Table 5 : Occupation of the victims

Occupation	Manner of death													
	RTA (n=571)		Poisoning (n=443)		Burns (n=341)		Asphyxia (n=91)		Assault (n=71)		Others (n=147)		Total (n=1664)	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Office going[1]	113	19.8	79	17.8	58	17.0	13	14.3	03	04.2	23	15.7	289	17.4
Shopkeepers[2]	69	12.1	35	07.9	42	12.3	07	07.7	05	07.0	12	08.2	170	10.2
Skilled[3]	95	16.6	97	21.9	55	16.1	16	17.6	10	14.1	28	19.1	301	18.1
Unskilled[4]	106	18.2	59	13.3	64	18.8	10	11.0	21	29.6	33	22.5	293	17.6
Students[5]	63	11.0	56	12.6	14	04.1	13	14.3	06	08.5	17	11.6	169	10.2
Ragpikkers[6]	78	13.7	44	09.9	33	09.7	11	12.1	15	21.1	20	13.6	201	12.1
Home Bound[7]	47	08.2	73	16.5	75	22.0	21	23.1	11	15.5	14	09.5	241	14.5

1. Office going - officer level + staff 2. Shopkeeper - also includes workers 3. Skilled worker 4.Unskilled worker 5. Student -- school and college going 6. Rag picker -- beggars and vagabonds 7. Home bound -- housewives, retired, non-school going children, etc.

Table 6 : Level of education of the victims

Level of education	Manner of death													
	RTA (n=571)		Poisoning (n=443)		Burns (n=341)		Asphyxia (n=91)		Assault (n=71)		Others (n=147)		Total (n=1664)	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Post doctoral	03	00.5	01	00.2	00	00	01	01.1	00	00	04	02.7	09	00.5
Post graduate	14	02.5	09	02.0	04	01.2	03	03.3	01	01.4	18	12.3	49	03.0
Graduate	94	16.5	43	09.7	68	19.9	16	17.6	08	11.3	25	17.0	254	15.3
Higher Sec.	122	21.4	91	20.5	81	23.8	22	24.2	14	19.7	29	19.7	359	21.6
Matriculation	151	26.5	119	26.9	88	25.8	20	22.0	21	29.6	33	22.5	432	26.0
< Matriculation	187	32.8	180	40.6	100	29.3	29	31.9	27	38.0	38	25.9	561	33.7

Table 7 : Rural/urban distribution of the victims

Place of stay	Manner of death													
	RTA (n=571)		Poisoning (n=443)		Burns (n=341)		Asphyxia (n=91)		Assault (n=71)		Others (n=147)		Total (n=1664)	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
LOCAL	401	70.2	348	78.6	228	66.9	70	76.9	52	73.2	97	66.0	1196	71.9
Rural	139	34.7	236	67.8	89	39.0	30	42.9	37	71.2	61	62.9	592	49.5
Male	112	80.6	186	78.8	25	28.9	23	76.7	32	86.5	52	85.3	430	72.6
Female	27	19.4	50	21.2	64	71.1	07	23.3	05	13.5	09	14.8	162	27.4
Urban	262	65.3	112	32.2	139	61.0	40	57.1	15	28.9	36	37.1	604	50.5
Male	219	83.5	88	78.6	26	18.7	32	80.0	12	80.0	31	86.1	408	67.6
Female	43	16.4	24	21.4	113	81.3	08	20.0	03	20.0	05	13.9	196	32.5
NON-LOCAL	170	29.8	95	21.4	113	33.1	21	23.1	19	26.8	50	34.0	468	28.1
Rural	114	67.1	67	70.5	61	54.0	14	66.7	13	68.5	35	70.0	304	65.0
Male	89	78.1	54	80.6	21	34.4	11	78.6	10	76.9	28	80.0	213	70.1
Female	25	21.9	13	19.4	40	65.6	03	21.4	03	23.1	07	20.0	91	29.0
Urban	56	32.9	28	29.5	52	46.0	07	33.3	06	31.6	15	30.0	164	35.0
Male	45	80.4	22	78.6	14	26.9	05	71.4	05	83.3	11	73.3	102	62.2
Female	11	19.6	06	21.4	38	73.1	02	28.6	01	16.7	04	16.7	62	37.8

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Dying Declaration: A Vital Medicolegal Evidence

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Abstract

The word 'evidence' is derived from the Latin word 'evidens' or 'evidere', which means "to show clearly; to make clear to the sight; to discover clearly; to make plainly certain; to ascertain; to prove". Dying declaration is a vital piece of medicolegal evidence, which if, found truthful and voluntary by the Court, it could be a sole piece of evidence for conviction. It is important for a doctor to understand its value and also the role of medical fraternity in recording dying declaration, to aid in the administration of justice.

This paper deals with review of various Court's decisions including principles laid down by the Apex Court of India in this regard to make the issue easily understandable by the medical fraternity. This will help in aiding to the administration of justice to the end of justice.

Key Words: Dying Declaration, Evidence, Apex Court, Justice, Administration.

Introduction:

"A statement, written or verbal, of relevant facts made by a person who is dead, or who cannot be found, or who has become incapable of giving evidence, or whose attendance cannot be procured without an amount of delay or expense which, under the circumstances of the case, appears to the Court unreasonable, are themselves relevant facts in the following cases:

When it relates to cause of death:

- When the statement is made by a person as to the cause of his death, or
- As to any of the circumstances of the transaction which resulted in his death, in cases in which the cause of that person's death comes into question". [Sec. 32, (1)] [1]

Principle of Admissibility of Dying Declaration as Evidence:

Principle, on which the dying declaration is admitted in evidence, is based upon the legal maxim **"Nemo moriturus praesumitur mentire" i.e. a man will not meet his maker with a lie in his mouth.**

- Before relying upon a dying declaration, the Court should be satisfied that the deceased was in a fit state of mind to make the statement.
- Once the Court is satisfied that the dying declaration was true, voluntary and not influenced by any extraneous consideration, it can base its conviction without any further corroboration as rule requiring corroboration is not a rule of law but only a rule of prudence. [2]

The law laid down and the principles propounded by the Constitution Bench of the Hon'ble Apex Court of India on the point of dying declaration and regarding the conflict of opinion as to the manner of testing the credibility of a dying declaration in a landmark judgment [3] are as follows:

Observations regarding dispensing with 'Oath' & 'Cross-examination':

"The **juristic theory** regarding acceptability of a dying declaration is that such declaration is made in extremity, when the party is at the point of death and when every hope of this word is gone, when every motive to falsehood is silenced, and the man is induced by the most powerful consideration to speak only the truth.

The Court further said, "Notwithstanding the same, great caution must be exercised in considering the weight to be given to this species of evidence on account of the existence of many circumstances which may affect their truth. The situation in which a man is on the deathbed is so solemn and serene, is the reason in law to accept the veracity of his statement". It is for this reason the requirements of oath and cross-examination are dispensed with. [4]

Since the accused has no power of cross examination, the Courts insist that the dying declaration should be of such a nature as to inspire full confidence of the Court in its truthfulness and correctness. The Court, however, has always to be on guard to see that the statement of the deceased was not as a result of either tutoring or prompting or a product of imagination.

Observations regarding need for 'Compos Mentis Certificate' from a Doctor:

The Court also must further decide that the deceased was in a fit state of mind and had the opportunity to observe and identify the assailant. Normally, therefore, the Court in order to satisfy

whether the deceased was in a fit mental condition to make the dying declaration looks up to the medical opinion. But where the eyewitnesses state that the deceased was in a fit and conscious state to make the declaration, the medical opinion will not prevail, nor can it be said that since there is no certification of the doctor as to the fitness of the mind of the declarant, the dying declaration is not acceptable. [4]

The challenge to an otherwise proper dying declaration was made on the basis of statement of Medical Officer that the patient had told him that some unknown person had shot at him. Since the Court found that an Executive Magistrate recorded the dying declaration and there was **no evidence of tutoring**, the same could not be rejected only because of the aforesaid statement of Medical Officer. [5]

Conflict of Opinion Resolved:

In a case the Court observed that "It is indeed a hyper-technical view that the certification of the doctor was to the effect that the patient is conscious and there was no certificate that the patient was in a fit state of mind especially when the magistrate categorically stated in his evidence indicating the questions he had put to the patient was in a fit state of mind where after he recorded the dying declaration. Therefore, the Judgment of Supreme Court in a case [4] from A.P. in 1999 must be held to be not correctly decided and SC affirm the law laid down by Supreme Court in another case [7] from Gujarat in the same year.

The aforesaid Judgment of Constitution Bench has overruled the view taken in 1999 case from A.P. and has approved the view taken in another case from Gujarat. The Constitution Bench has said that the view taken in A.P. case that in the absence of a medical certificate as to the fitness of state of mind, it would be risky to accept a dying declaration on the subjective satisfaction of the Magistrate is too broadly stated and is not a correct law. While in the Gujarat case a Bench of three learned Judges had rejected the contention that in the absence of a doctor while recording the dying declaration, the declaration looses its value and cannot be accepted. In that case the Hon'ble Court had observed that '..... The aforesaid requirements are a mere rule of prudence and the ultimate test is whether the dying declaration can be held to be a truthful one and voluntarily given'. [4]

It has been observed by the Hon'ble Apex Court that if the person recording the dying declaration is satisfied that the declarant is in a fit mental condition to make a dying declaration then such a dying declaration will not be invalid solely on the ground that the condition is not certified by a doctor. [4]

It has been held that where it is proved by the testimony of the Magistrate that the declarant was fit to make the statement even without examination by the doctor, the declaration can be acted upon provided the Court ultimately holds the same to be voluntary and truthful. A certification by the doctor is essentially a rule of caution and, therefore, the voluntary and truthful nature of the declaration can be established otherwise. [4], [5]

Evidential value of Dying Declaration:

What evidential value or weight has to be attached to such statement necessarily depends on the facts and circumstances of each particular case. What is essentially required is that the person who records a dying declaration must be satisfied that the deceased was in a fit state of mind. Where it is proved by the testimony of the Magistrate that the declarant was fit to make the statement even without examination by the doctor the declaration can be acted upon provided the Court ultimately holds the same to be voluntary and truthful. A rule of caution and, therefore, the voluntary and truthful nature of the declaration can be established otherwise". [4]

Observations on the Issue of non-examination of the doctor:

In a case [8] the Hon'ble Supreme Court has held that for not examining the doctor, the dying declaration recorded by the Executive Magistrate, who is a disinterested witness and is a responsible officer and as long as there is no material on record to suspect that he had any animus against the accused or was in any way interested in fabricating the dying declaration. No question arises to checking the genuineness of the dying declaration recorded by the Executive Magistrate. [4]

Observations regarding recording of Dying Declaration 'Oral' or in 'Writing':

A Dying declaration can be oral or in writing and any adequate method of communication whether by words or by signs or otherwise will suffice provided the indication is positive and definite. [4]

Who can record a Dying Declaration?

In most cases, however, such statements are made orally before death ensues and is reduced to writing by someone like a Magistrate or a Doctor or a Police Officer. When it is recorded no oath is necessary nor is the presence of a Magistrate absolutely necessary, although to assure authenticity it is usual to call a Magistrate, if available for recording the statement of a man about to die. There is no requirement of law that a dying declaration must necessarily be made to a Magistrate and when a Magistrate records such statement, there is no specified statutory form for such recording. [4]

On the issue of multiple Dying Declarations:

"The three dying declarations in the present case are clearly suggestive of the fact that in all the three dying declarations it has bee stated by the deceased that it was her husband who poured kerosene oil on her and thereafter set her on fire. Nothing has been elicited in the cross-examination to show that the dying declarations were not trustworthy. There is no reason why the deceased would entangle her husband when she was on the deathbed". "The **motive** as per the above dying declarations appears to be her husband's involvement somewhere else. In criminal cases, motive is not relevant but **whatever motive** has come in the dying declarations is to the effect that her husband used to harass her and he was responsible for the incident. The criticism which has been advanced regarding the testimony of the above three dying declarations appears to be of no substance". [4]

Evidentiary value of Dying declaration - Law summed up:

The Hon'ble Supreme Court in the case of [4] dealing on the point of dying declaration and defining meaning and reasons behind its admission in evidence, has given guidelines quoting the principles laid down in several earlier judgments as under:

- There is neither rule of law *nor* of prudence that dying declaration cannot be acted upon without corroboration. [10]
- If the Court is satisfied that the dying declaration is true and voluntary, it can base conviction on it, without corroboration. [11], [12] The Court has to scrutinize the dying declaration carefully and must ensure that the declaration is not the result of tutoring; prompting or imagination. The deceased had an opportunity to observe and identify the assailants and was must in a state to make the declaration. [13]
- Where dying declaration is suspicious, it should not be acted upon without corroborative evidence. [14]
- Where the deceased was unconscious and could never make any dying declaration the evidence with regard to it is to be rejected. [15]
- A dying declaration, which suffers from infirmity, cannot form the basis of conviction. [16]
- Merely because a dying declaration does contain the details as to the occurrence, it is not to be rejected. [17]
- Equally, merely because it is a brief statement, it is not to be discarded. On the contrary, the shortness of the statement itself guarantees truth. [18]
- Normally the Court in order to satisfy whether deceased was in a fit mental condition to make the dying declaration look up to the medical opinion. But where the eyewitness said that the deceased was in a fit and conscious state to make the dying declaration, the medical opinion cannot prevail. [19]
- Where the prosecution version differs from the version as given in the dying declaration, the said declaration cannot be acted upon. [20]
- Where there are more than one statement in the nature of dying declaration, one first in point of time must be preferred. Of course, if the plurality of dying declaration could be held to be trustworthy and reliable, it has to be accepted. [21]

Summary and Conclusions:

The principles which have been laid down by the Hon'ble Supreme Court indicate that **what is required is the satisfaction of the Court regarding the truthfulness of the dying declaration.**

It may, therefore, be taken to be well established that though the Court would subject the dying declaration to a close scrutiny to ascertain whether it was honest and truly the statement was made by the deceased, it would not reject the same on **extraneous consideration** such as admissions made by Medical Officer during cross-examination or the like. Indeed once the Court holds that the dying declaration contains the statement of the deceased as to the cause of death and if the same was recorded before anyone had the opportunity to tutor the deceased, the same will be accepted and relied upon. [5]

It is not necessary that a dying declaration cannot be acted upon in the absence of doctor's certificate. It is also further not the requirement of law that a doctor who certified about the condition of the patient should be examined. On the contrary, the principles which emerge out from the decisions is that the dying declaration is recorded by a magistrate after satisfying himself about the condition of the patient regarding making statement and thereafter, if the statement has been recorded then that can be acted upon even without corroboration. [4]

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Homicidal Cases Reported as Railway Accidents

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Abstract

Railways provide the commonest means of transportation for passengers & freight. Railway provides the bridge between different parts of our country to keep the cultural, social, economical setup intact. Railway accidents can occur even with smallest miscalculations. Sometimes criminals take benefit of open railway tracks to conceal murder so that it looks like railway accidents/ suicide but investigating officers and autopsy surgeon should be vigilant enough to reach at exact cause of death.
Keywords: Accidents, Homicide, Railway, Death.

Introduction:

Railway is an important means used by masses for traveling and communication. The railway tracks are stretched all over India and are important source of tragedy met by mankind. Though railway platforms are prohibited areas for unauthorized public but still the scene is quite different. Beggars illegally travel in the railway and even take shelter at the railway stations and platforms, which are not cared by the railway authorities. Due to old age, wraths of nature i.e. environment and prevalence of mass communicable diseases like tuberculosis, starvation are the common causes of unclaimed deaths in the railway premises. These beggars also meet with railway accidents because of their to and fro movements in the prohibited zones of railways.

Still further frustrated people also select railway track, which are lying open as best, places for committing suicide. As other tragedies like road traffic accidents, railway accidents, they form large number of cases brought for autopsy. Since thefts, burglaries, dacoity, snatching are also quite common in the railway station or in the running trains. The railway police also reported Assaults/homicides. Sometimes crime is committed at different place and bodies are placed in the railway compartments to ditch the crime investigation agencies regarding their identity to avoid punishment for the crime. Terrorism in relation to railway explosions in no way uncommon. Custodial death in railway police stations, they are also rarely dealt by the railway police. Because of lapses in tne investigations, homicidal cases are also reported as railway accidents. Present study is the study of such autopsy cases conducted in 2005 commencing from 01-01-2005 to 31-12-2005 in the Department of Forensic Medicine, Govt. Medical College, Amritsar.

Observations:

The study of autopsies in year 2005, from 01-01-2005 to 31-12-2005, indicated out of 1101 cases 171cases (15.53%) were brought by railway police.

There were 155 males & 16 females giving a distinct male preponderance. Male: female ratio was 9.69:1. As far as the age group was concerned a majority of the patients were i.e. 40 cases in the 21-30 years age group (38 males, 2 females) followed by 36 cases in the age group of 31-40 years (34males and 2 females), 33 cases in above 60 years age group (27 males and 6 females), 26 cases in 51-60 years (26 males), 25 cases in 41-50 years (22 males and 3 females), and10 cases in 11-20 years (8 males and 2 females). Only 1 female was reported in the 0-10 years age group.

Regarding social background of the victims, it was found that incidences were more in ruralities (21.64%) as compared to urbanities (18.71%). In 59.65% social background status was not known.

The information furnished by police in the inquest report showed that incidence of deaths due to railway accident/ suicide, natural causes/diseases, homicide were 71.93%, 25.73%, 0.59% cases respectively. In 1.75% cases alleged cause was not mentioned.

Manner of deaths observed on autopsy were 73.1% cases of railway injury (suicidal/accidental), 22.8% cases of natural causes/diseases, 2.92% cases of homicide, 0.59% cases of hanging & disposal of the body on track, 0.59% cases of intake of poison.

In our study only 0.59% cases were brought to mortuary with alleged history of strangulation but after autopsy 1.17% more cases of strangulation

were observed and 1.17% cases of homicidal injuries were found.

Observed causes of death in majority of cases brought by railway police were 29.24% cases by laceration of brain followed by 16.95% cases by compression of brain, 10.53% cases by severance of neck, 9.35% cases by hemorrhage and shock, 5.85% cases by severance of trunk, 2.34% cases by laceration of other vital organs, 2.34% cases by violent asphyxia, and 0.59% cases by poisoning. In natural causes 19.87% cases, 1.17% cases, 0.59% cases, 0.59% cases and 0.59% cases died of pulmonary tuberculosis, coronary artery disease, renal failure, meningo encephalitis and septicemia respectively.

Following were the deaths due to homicide detected on autopsy:

Case 1

On 14-03-05 an unknown dead body of about 50-55 years male brought to mortuary by GRP police at 12:50 PM. It was alleged to have died due to railway accident per police papers. It was a dead body of a male moderately built, moderately nourished. Rigor mortis was present all over the body. Post mortem staining was present over the back except areas of contact flattening. A tattoo mark 'SP' was present on the front of right forearm. The following injuries were observed on the dead body.

1 An incised punctured wound 2.7x 0.8 cm elliptical in shape, obliquely placed was present on right lateral aspect of neck 6 cm below the right ear lobule with 1.4 cm tail present on medial aspect. Clotted blood was present.

2 An incised punctured wound 1.8x 0.8 cm elliptical in shape, obliquely placed with 1.2x 0.3 cm tailing on lateral side and 2.5 cm long tailing on medial side was present on right lateral aspect of neck 1.7 cm below the injury 1. Clotted blood was present.

On dissection of injuries 1 and 2 infiltration was present in subcutaneous tissue and muscles of neck. Right common carotid artery was cut at the site. The tract was directed downwards, medially & posteriorly. The depth of the track was 7 cm.

3 An incised puncture wound 1.7x 0.4 cm elliptical in shape, obliquely placed was present on right lateral aspect of neck 2.6 cm below the injury 2. Clotted blood was present. On dissection infiltration was present in subcutaneous tissue and muscles of neck. It was directed downwards and medially and depth was 4 cm.

4 An incised wound 1.5 x 0.4 cm was present on the dorsum of right hand in between the web space of index and middle finger extending to palmar aspect. The wound was through & through. Clotted blood was present.

5 Two reddish brown abrasions, one on left side of fore head and another on dorsum of right hand were present.

6 A wound 72 x 31 cm was present on the back of chest and abdomen and extending to the right thigh. Margins of the wound were gnawed and nibbled. Soft tissue and muscles were absent in the wound. Thoracic and abdominal structures i.e. Heart, liver, both kidneys, spleen, intestine, stomach, urinary bladder, prostate were missing. Both lungs and great vessels were present. 2nd to 10th ribs of right side were missing .No infiltration was present (Post mortem wound).

Injuries 1 to 5 were antemortem in nature and injury 6 was post mortem in nature. The cause of death in this case was hemorrhage and shock as a result of injuries 1 and 2, which were sufficient to cause death in an ordinary course of nature.

Photograph of case I

Case II

On 10-04-05 an unknown female of 60-65 years was brought to mortuary at 3:10 PM. The cause of death was not mentioned in police papers. It was a putrefied dead body of 5feet poorly built, poorly nourished. Eyes were closed. Tongue was coming out of mouth. Red coloured fluid coming out from the nostrils. Skin peeling was present at places. Maggots were crawling over the body. No teeth were present. Hair was easily pulled out. Nails could not be pulled out. The following injuries were found:-

Circumference of the neck was 30.7 cm.

1 A ligature mark 17.4x 2.3 cm was present on the front of neck below the level of thyroid cartilage and it was horizontally placed. On dissection infiltration of blood was present in muscles & soft tissues.

2 A bruise 6.4x2.3 cm was present on right cheek below lower eyelid. On dissection infiltration of blood was present.

Organs showed putrefactive changes. Uterus was empty.

The cause of death in this case was asphyxia as a result of ante mortem strangulation which was sufficient to cause death in an ordinary course of

nature. However viscera were sent to chemical examiner and no poison was detected.

Case III

On 07-05-05 a dead body of Rajinder Singh was brought to mortuary at 1:10 PM. It was alleged to have died due to railway accident as per police papers. It was a dead body of male 5'7" of about 26-27 years, moderately built, moderately nourished. Rigor mortis was present in lower limbs. Postmortem staining was present on the back except areas of contact flattening. Skin slippage was present. Following injuries were found.

1 An incised wound 7.5 x 2.3 cm was present on left lateral aspect of neck 6.7 cm below the left angle of mandible. Clotted blood was present. On dissection infiltration of blood was present in the soft tissues. Muscles were found cut. Jugular vessels and carotid artery were found cut. Clotted blood was present.

2 A lacerated wound 2.2 x 0.5 cm was present just below the outer canthus of left eye. Clotted blood was present.

3 A lacerated wound 4.5 x 4 cm was present on anterolateral aspect of left forearm just below the cubital fossa. Clotted blood was present.

4 A reddish bruise 28.5 x 15.6 cm was present on anterolateral aspect of left arm extending to the left shoulder.

5 A reddish brown abrasion 18.6 x 5.6 cm was present on back transversely placed 4.6 cm below left inferior angle of left scapula.

6 A reddish brown abrasion 12.6 x 6.7 cm was present on back 4 cm below the injury no. 5.All the injuries were ante mortem in nature. The cause of death in this case was hemorrhage and shock, which was sufficient to cause death in ordinary course of nature. However viscera were sent to chemical examiner Govt. of Punjab, Patiala. No poison was detected.

Case IV

An unknown dead body of a male aged approximately 17-18 years, length 5'4", moderately built was brought to mortuary at 12:35 hrs on 22.12.2005. The alleged cause of death was railway accident as mentioned in the police records. Clotted blood was present in and around nostrils. Rigor mortis was present all over the body except eyelids & neck muscles. Postmortem staining was present over the back except areas of contact flattening.

1. A lacerated wound measuring 16.2 x 7.8 cm was present on the forehead extending from the centre of forehead to left temporal region of head. Underlying frontal, left orbital bone and left temporal bone were found fractured. No infiltration of blood was present.

2 A crushed lacerated wound 48 x 12.5 cm was present on left arm, extending from left tip of shoulder up to the forearm 5cms from the wrist joint. No infiltration of blood was present.

3 A depressed dry, hard, yellowish brown ligature mark 27.5x1.5 cm, horizontally placed and completely encircling the neck was present at the level of thyroid cartilage. On dissection subcutaneous tissues under the ligature mark were ecchymosed. Infiltration of blood was present. Lymph nodes were congested above and below the ligature mark. Tissues from injuries 1 & 2 sent for histopathological examination and viscera were sent to chemical examiner.

After going through the postmortem report, chemical examination report and histopathology report the injuries 1 and 2 were postmortem in nature while injury 3 was antemortem in nature. The cause of death in this case was asphyxia a result of antemortem strangulation. No poison was detected.

Photograph of case IV

Discussion:

The incidence of cases brought by railway police in current study is 15.53% of total autopsies conducted at Medical College Amritsar whereas Gargi et al 2002 reported in his study incidence of deaths due to railway injuries was 9.66%. So there is a clear increase in incidence in railway injuries. The actual cases of railway accidents reported in our study are 73.01%, which also includes suicidal injuries whereas Gargi et al 2002 observed 98.46% cases of railway accidents and suicides. The incidence of homicidal injuries in present study is 2.92% whereas Gargi et al 2002 observed 1.02% in their study.

So there is a clear increase of incidence of railway accidents as well as homicidal cases mimicking as railway accidents, which triggers the nerves of autopsy surgeon to be vigilant about such hidden crime.

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Marijuana- From Poison to Pills: A Review

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Abstract

Cannabis has been used as a natural therapeutic herb since early human civilizations. The abuse in India is common but exact incidence not known and this abuse is very common in Hilly regions of India. Cannabinoids exert their effect by interaction with specific endogenous cannabinoid receptors (CB) which are of two types as CB1 and CB2. The discovery of cannabinoid receptors lead to the synthesis of novel cannabinoid ligands as levonantradol, nabilone, CP55, and HU210. These ligands are used in various clinical disorders. Cannabinoids are usually smoked, they can also be eaten, drunk or, rarely, injected intravenously. Clinical trials have suggested that marijuana may have some beneficial effects in several disorders like reduction of intraocular pressure, nausea, vomiting, stimulation of bronchodilation and attenuation of the AIDS wasting syndrome and so the congeners of cannabinoids are been developed with potential therapeutic uses.
Key words: Cannabis, Marijuana, cannabinoid receptor, Hasish, Ganja, Bhang.

Introduction:
Cannabis has been used as a natural therapeutic herb since early human civilizations. Cannabis was first used as a medicine in Britain in the mid-nineteenth century by O'Shaugnessy, an army surgeon. While, in India O'Shaugnessy witnessed the use of cannabis for a wide range of medical conditions such as rabies, epilepsy and muscle spasms, and for pain relief. On his return to Britain, he advocated its use and cannabis was widely accepted as a medicine for about 70 years. The word "cannabis" is derived from Cannabis sativa, the name of the marijuana (hemp) plant. Cannabis has been valued for thousands of years throughout the world for making rope, thread and clothes, its psychoactive properties and medicinal purposes [1].
The various forms of cannabis are:

1. Marijuana: The most common form cannabis abuse, which is dried plant material including cut leaves, flowering tops, stems and seeds with THC content of 350 – 650 mg of Indian hemp. The concurrent use of marijuana with crack / cocaine and phencyclidine is increasing.
2. Hasish (charas): A dark brown resin exudates from leaves and stem plant which is smoked with 8 – 12 % of THC in form of Hasis oil.
3. Ganja: It is green rusty colored resin exudates of leaves & bracks from female plant with characteristic odor. It is usually smoked with little tobacco in pipe or chilam. The THC content is about 25 %.
4. Majun: It is a mixture of sugar, flour, milk and butter with sweet taste. Sometimes even dhatura is also mixed with it as well.
5. Bhang: It is generally ingested and consists of dried leaves with shoots. It is prepared by mixing black pepper, cannabis leaves and sugar.

The recent discovery of endogenous cannabinoids and cannabinoid receptors, the development of cannabinoid agonists and antagonists for medicinal purposes has stimulated interest in marijuana.

Epidemiology:
Marijuana use peaked in the 1960s, but it is still the most widely used illicit drug through out the world. The 1992 National Household Survey on Drug Abuse reported that approximately 5 million Americans were using marijuana weekly [2]. Many persons who abuse marijuana also abuse other drugs, particularly alcohol and cigarettes. The exact incidence of abuse in India is not known but this abuse is very common in Hilly regions like Himalaya, Hilly regions of Utter Pradesh.

Sources and Potency of Marijuana:
Fifteen years ago, 40% of seized marijuana was from United States. Colombia and Mexico were the sources of most marijuana, and much of the Mexican grown product was low-potency marijuana compressed into a kilo brick. Today, regular grade marijuana is more potent than that of 15 years ago,

yielding an active product that contains 9-tetrahydrocannabinol (THC) [3]. The concentration of THC varies in method of cultivation as it is ≥10 % in Hashish, ≥ in Hash Oil and about 3 5 in typical marijuana cigarette.

Structure and Function:

Cannabinoids exert their effect by interaction with specific endogenous cannabinoid receptors (CB). The neuronal cannabinoid receptor (CB1) was first cloned from the rat DNA library in 1990, soon after the human receptor was cloned.CB1 receptors are present in the brain particularly in regions involved in cognition, memory, reward, anxiety, pain, sensory perception, motor co-ordination and endocrine function. CB_2 receptors are found in the spleen and other peripheral tissues and may play a role in the immunosuppressive actions of cannabinoids. The physiological ligand for these receptors appears to be a family of anandamides which are derivatives of arachidonic acid, related to prostaglandins. The cannabinoid receptor belongs to the superfamily of G-protein-coupled receptors having seven transmembrane-spanning domains and an extracellular N- and an intracellular C-terminus [4]. The discovery of cannabinoid receptors was facilitated by the synthesis of novel cannabinoid ligands as levonantradol, nabilone, CP55, and HU210. These compounds are generally slightly more hydrophilic and are more potent than THC. In addition, the compounds had inactive stereo isomers that distinguished the non-specific effects of cannabinoids.

Pharmacokinetics:

Cannabis is obtained from the plant Cannabis sativa and some of its subspecies. Apart from cannabinoids, this plant contains approximately 340 other chemical compounds, and the smoke from a cannabis cigarette contains carbon monoxide, tars, irritants and carcinogens and some of them in greater concentrations [5]. Marijuana is made from the dried leaves and flowers of the hemp plant. The potency of marijuana depends on the method of preparation. Ganja is about three times more potent than marijuana, while hashish is five to eight times more potent. Although cannabinoids are usually smoked, they can also be eaten, drunk or, rarely, injected intravenously. Approximately 50% of the THC and other cannabinoids present in a cannabis cigarette enter the smoke and are inhaled. The amount absorbed through the lungs depends on smoking style as is better absorbed in experienced smokers. Subjective and objective effects start within seconds and are fully apparent within minutes. THC 2.5 mg in a cigarette is enough to produce measurable psychological and physical effects in occasional cannabis users. The amount of cannabinoids absorbed is 25-30% of that obtained by smoking and the onset of effects is 0.5-2 h, although duration of action may be prolonged [6]. On entering the bloodstream, cannabinoids are distributed rapidly throughout the body, reaching first the tissues with the highest blood flow (brain, lungs, liver etc.). Within the brain, cannabinoids are differentially distributed, reaching high concentrations in neocortical areas (especially the frontal cortex), limbic areas (hippocampus and amygdala), sensory areas (visual and auditory), motor areas (basal ganglia and cerebellum) and the pons [7]. However, because of lipophillicity, the tissue half-life is approximately 7 days and complete elimination of a single dose may take 87 up to 30 days. Peak plasma levels of THC are normally achieved within 10 minutes of smoking marijuana. The plasma elimination half-life of THC is approximately 56 h in occasional users and 28 h in chronic users. Cannabinoids are metabolized in the liver, with more than 20 metabolites, some of which are psychoactive and many of which have plasma elimination half-lives of the order of 50 hrs and some are inactive metabolites of which 15-30% are excreted in urine [8, 9]. Active and inactive metabolites are also excreted into the intestine and bile and approximately 15% are reabsorbed, prolonging the action of cannabis, while 35-65% is finally eliminated in the faeces.

Mechanisms of Action:

The proposed mechanisms of action of cannabinoids are multiple [10, 11, 12].

- Binding to cannabinoid receptors: Two endogenous cannabinoid receptors, CB1 (found primarily, but not exclusively, in the brain) and CB2 (found only in peripheral tissues), have been identified. Cannabinoid receptors are most prevalent in the hippocampus, cerebral cortex, basal ganglia and cerebellum, which may account for the primary actions of cannabinoids. Very few cannabinoid receptors are located in the brain stem, which may explain why marijuana used in high dosages does not suppress respiration and why it has a high therapeutic index.
- Change in dopamine in brain reward regions: Marijuana stimulates the dopamine pathway from the ventral tegmental area to the nucleus accumbens, which is believed to be a reward system of the brain.
- Increased fluidity of cell membranes.
- Modulation of inhibitory aminoacids GABA (g-amino butyric acid).
- Alteration of central neurotransmitters as adrenaline, noradrenaline, dopamine.

- Alteration of prostaglandins.
- Inhibition of calcium uptake by synaptosomes.

Potential Therapeutic Aspects:

Early clinical trials suggested that marijuana may have some beneficial effects in several disorders. These include reduction of intraocular pressure, nausea, vomiting, and stimulation of bronchodilation and attenuation of the AIDS wasting syndrome. It was also tried as a treatment for opium addiction, chronic alcoholism, delirium tremens, and a wide variety of painful disorders

1. **Antiemetic Effect:** THC and some of its synthetic analogues such as nabilone, levonantradol, and nabitan have been tested in mostly open clinical trials for antiemetic potency on cancer patients [13, 14] receiving chemotherapy and found to be effective in alleviating the invariable side effects of nausea and vomiting. In several controlled studies, THC was found to be at least as useful as prochlorperazine for controlling these symptoms in patients with cancer.
2. **Anticonvulsant Effect:** Extensive animal studies have shown that THC is capable of producing both convulsant and anticonvulsant effects [15]. The discovery that cannabidiol, a natural component of marijuana with practically no marijuana-like psychoactivity, exhibited anticonvulsant activity in animals generated considerable attention for future clinical use in Epilepsy.
3. **Analgesia:** Evidences have showed that marijuana is effective in controlling either acute or chronic pain. However, several controlled studies have been conducted with THC [15, 16]. THC is highly effective in almost all animal analgesic assays and has potency comparable to that of morphine. In addition, numerous analogues have been synthesized and are as much as several hundredfold more potent than THC. The endogenous cannabinoid ligand anandamide also has analgesic properties. However; the inability to develop a cannabinoid devoid of behavioral effects represents the primary limitation of cannabinoid analgesics.
4. **Glaucoma:** Marijuana, THC, and its synthetic derivatives have been seen to lower intraocular pressure in patients suffering from glaucoma [17]. The need for smoking marijuana or for systemic administration of synthetic cannabinoids for beneficial effects has tempered the enthusiasm for their use for managing glaucoma. One report describes a topical preparation of marijuana that is effective for glaucoma. However, no present evidence shows that marijuana or THC is more effective than other agents in controlling glaucoma.
5. **Hypertensive Shock:** During hemorrhagic and septic shock, anandamide and 2-AG may be released from macrophages and platelets, activate CB1-type receptors on the surface of vascular smooth muscle cells, and produce vasodilatation [18]. The physiological significance of this response is still unclear. Nevertheless, the fact that a CB1 antagonist reduces survival time in "shocked" rats suggests that activation of the endocannabinoid system may have beneficial effects, possibly by redistributing cardiac output to or improving microcirculation in vital organs such as the kidneys[20]. So the inhibition of endocannabinoid inactivation appear to exert direct vasoactive effects [19] could be used to prolong life expectancy in hemorrhagic and septic shock.
6. **Appetite stimulation:** Cannabinoids stimulate appetite and it has been suggested that they may have use in palliative care for anorexia, nausea and vomiting caused by opiod, antiviral drugs AIDS-related illnesses [21] or terminal cancer [22]. For these indications smaller doses of nabilone, either on its own or as an adjuvant to other drugs, may be effective and less liable to cause adverse effects, although clinical experience is lacking.
7. **Disorders of Dopamine Transmission [23, 24]:** Functional interactions between dopamine and endocannabinoids are well documented. CB1 receptors are highly expressed in CNS regions that are innervated by dopamine-releasing neurons. In one of these regions, the striatum, anandamide release is stimulated by activation of dopamine D2-family receptors. These findings suggest that one role of the endocannabinoid system in the CNS may be to act as an inhibitory feedback mechanism countering dopamine-induced facilitation of psychomotor activity.
8. **Other Medical Uses [25]:** The main therapeutic use of cannabinoids in man is as an antiemetic agent. Nabilone is currently used as an antiemetic in cancer chemotherapy and has been used as a potential analgesic. For the treatment of epilepsy and movement disorders (multiple sclerosis, Parkinson's disease, Huntington's disease) the evidence is again futuristic. Smoked cannabis has bronchodilatory activity that may be useful in the treatment of asthma. However, this possible benefit must be set against the longer-term harmful effects of tobacco inhalation.

Adverse Effects of Cannabis in Humans:

Many known physical and behavioral adverse effects accompany the use of marijuana.

A. Acute Effects:

The acute toxicity of cannabis is extremely low [26]. No deaths caused by direct toxicity have been reported, although coma has been reported after inadvertent ingestion by children. The pharmacological actions of cannabinoids are many and complex; they include a unique combination of some of the effects of alcohol, tranquillizers, opiod and hallucinogens, such as LSD.

1. CNS Effects.

***a)* Effects on mood [27, 28].**

- Euphoria. The euphoric potential of cannabis, the ability to produce a 'high', is probably the most important single action sustaining its widespread and often chronic recreational use. The euphoriant effect varies greatly with dose, mode of administration, environment and personality of the taker. A 'high' can be induced by doses as small as THC 2.5 mg in a cigarette and includes feelings of intoxication and detachment, with decreased anxiety, alertness, depression and tension, in addition to perceptual changes. The intensity of the 'high' is dose-dependent, being increased with higher doses. Cannabinoids have recently been shown to have actions in common with other 'rewarding' or addictive drugs, including nicotine, alcohol, opioids and amphetamines.
- Dysphoria [29, 30]. Dysphoric reactions to cannabis are not uncommon. Such reactions may include severe anxiety and panic, unpleasant somatic sensations and paranoid feelings. Anxiety-panic reactions are the most common adverse psychological effects of cannabis use. They may include restlessness, depersonalization, derealization, sense of loss of control and fear of dying. In some subjects euphoria and dysphoria, laughing and crying, may alternate.
- Flashbacks [31, 32]. Flashbacks, in which the original drug experience (usually dysphoria) is relived weeks or months later without further exposure to the drug, have been reported frequently. These are similar to the flashbacks described with hallucinogens such as LSD. It is possible, as they are often associated with a dysphoric or frightening cannabis experience, that they represent a psychological reaction similar to that of post-traumatic stress disorder.

b). Sedative and anxiolytic effects [33, 34]:

After an initial period of excitement after acute dose, cannabis exerts a generalized central nervous system depressant effect leading to drowsiness and sleep towards the end of a period of intoxication. These effects are similar to those of observed in alcohol and benzodiazepines poisoning.

c). Effects on perception [35, 36]:

Perceptual changes induced by cannabis and THC affect all sensory modalities. Color and sound perception may be heightened and musical appreciation increased. Temporal and spatial perception is distorted so that judgement of distance and time are impaired. Experimental studies of time perception have found that subjects consistently overestimate the passage of time even after small doses (e.g. four puffs of a cigarette containing 3.6% THC). Persistent subjective visual changes, lasting for months after cessation of chronic cannabis use, have been described. These may represent prolonged functional disturbance of visual pathways and have also been reported after use of LSD.

d). Effects on motor function:

An initial stage of excitement and increased motor activity after acute administration of cannabis is followed by a state of physical inertia with ataxia, dysarthria and general in coordination, which may last for some hours, depending on the dose. Impaired motor performance has been shown in many studies [37]. The impairments are demonstrable after commonly used social doses of cannabis in experienced users, although (as with alcohol) some degree of compensation is possible.

e). Effects on cognition and memory [38, 39, 40]:

The effects of cannabis on thought processes are characterized initially by a feeling of increased speed of thought, flights of ideas which may seem unusually profound and crowding of perceptions. Such feelings can also occur at certain stages of alcohol intoxication and are common with LSD. With higher doses of cannabis, thoughts may get out of control, become fragmented and lead to mental confusion. Cannabis causes a specific deficit in short-term memory, an effect which is demonstrable even after small doses in experienced cannabis users. Memory impairment induced by cannabis has been investigated in a large variety of tests; including immediate free recall of digits, prose material and word-picture combinations. The deficit appears to be in acquisition of memory and may result from an attention deficit combined with an inability to filter out irrelevant information and the intrusion of extraneous thoughts. Memory lapses may account in part for the time distortion and may contribute to poor psychomotor performance in complex tasks.

e). Effects on psychomotor performance [40]:

The effects of cannabis on perception, memory and cognition, motor co-ordination and general arousal

level combine to affect various types of psychomotor performance. Laboratory investigations show that 'social' doses of cannabis have minimal effects on performance in simple motor tasks and simple reaction times. However, even small doses (THC 5-15 mg) can cause significant impairment of performance in complex or demanding tasks, such as that involving fine hand-eye co-ordination, complex tracking, divided attention tasks, visual information processing, digit code tests, alternate addition-subtraction tasks and many others. Performance in all of these tasks deteriorates as the dose increases and can last for 2 h or more after single doses. These results have implications for performance in a variety of real-life situations and across a range of occupations.

f). Psychosis [41, 42, 43]

Although the most common adverse psychiatric effect of cannabis is anxiety, it can cause an acute toxic psychosis, a non-specific acute brain syndrome which can occur with other intoxicants. The clinical picture is one of delirium with confusion, prostration, disorientation, derealization and auditory and visual hallucinations. Acute paranoid states, mania or hypomania with persecutory and religious delusions and schizophreniform psychosis may also occur. These reactions are relatively uncommon and usually dose elated but appears to be becoming more common with the advent of potent preparations. They are usually self-limiting over a few days, but schizophrenic form psychosis in addition to depression and depersonalization can last for weeks and are often, but not always, associated with a family history of psychosis. Patients with mental illness and those with a family history of schizophrenia appear to be particularly vulnerable to the adverse psychiatric effects of cannabis. There are numerous reports of schizophrenic illness being aggravated or precipitated by cannabis and these reports also suggest that cannabis can antagonize the therapeutic effects of antipsychotic drugs in previously well-controlled schizophrenic patients. The question of whether cannabis can actually cause schizophrenia in patients who would not otherwise develop it is more vexed. It seems most likely that cannabis use is an associated risk factor rather than a cause, and rates of cannabis use in schizophrenic patients are high, probably more than 40%.

g). Aggression and violence [42]**:**

Although historically linked to aggressive acts in assassins (from which the term hashish is derived), cannabis in most recreational settings decreases aggressive feelings in humans and increases sociability. However, occasional predisposed individuals, especially if under stress, become aggressive after taking cannabis. Violent behavior may also be associated with acute paranoid or manic psychosis induced by cannabis intoxication, and polydrug use, mainly cannabis, appears to increase the risk of aggression and violence in affective disorders or schizophrenia. Cannabis, in common with alcohol is a potential contributor to violence and possibly to criminal behavior.

2. Cardiovascular Effects [46].

These include Sinus Tachycardia at lower dose and orthostatic hypotension at higher dose, impairment of exercise performance in patients with angina via increased myocardial oxygen demand. The exact cause for this is not clear may involvement of both sympathetic and parasympathetic has been described.

3. Respiratory Effects:

Marijuana is taken via inhalational route with smoking and the effects includes as bronchodilation, Rhinitis, pharyngitis, and voice hoarseness. This is typically referred as bronchitis-laryngitis symptoms after chronic use.

Management of Acute Intoxicated Patient:

Typically the patient presents with hyperemia of conjunctiva, irritation of mucous membrane of throat & nose, tachycardia, memory problems and effects on continuity of conversation, fluency of speech and performance of complex task. In excessive dose acute panic episode, anxiety reaction, acute toxic psychosis with hallucination and agitation may be seen. The management can be done with a quiet, supportive and protective environment with Benzodiapines as diazepam and patients with psychosis symptoms with Antipsychotics.

B. Chronic Effects:

The long-term effects on other body systems (e.g. immune systems), and the effects of smoke constituents other than cannabinoids (e.g. on the respiratory system) is still not known. In one survey, approximately 40 to 60 percent of persons who use marijuana reported unpleasant side effects. Users may be at increased risk for adverse incidents (e.g., motor vehicle crashes, industrial accidents).

1. **Effect on Reproductive System** [44, 45]**:** Many studies on animals and humans suggest that reproductive abnormalities may occur with the use of marijuana. Maternal exposure to marijuana during pregnancy may reduce the size of the fetus and the birth weight. Marijuana may also increase the risk of chromosomal damage (including breakage and translocation), but this damage seems to be confined to somatic cells. A 10-fold increase in the risk of nonlymphoblastic leukemia in children whose mothers used marijuana before or during

gestation has been reported. Some patients with pre-existing medical conditions who use marijuana are particularly at risk. In respiratory system, chronic use of marijuana results in epithelial damage to the trachea and major bronchi, and decreased diameter of the bronchial airways. Marijuana smoke does not contain nicotine but does have significantly higher tar content than cigarettes, contains many carcinogens and is smoked unfiltered. A serious adverse effect of marijuana is the risk of infection. For example, chronic use of marijuana may lead to impairment of pulmonary defenses against infection. Marijuana can be contaminated with microorganisms such as Aspergillus and Salmonella, as well as fecal matter. The risk of infection may be of particular concern in patients who have acquired immunodeficiency syndrome. The adverse effects of marijuana are mainly are of concern in older patients and in those with coronary artery disease, hypertension and cerebrovascular disease. For example, marijuana can increase heart rate (a dose-dependent tachycardia), increases cardiac output by as much as 30 percent, alters blood pressure, increases myocardial demand, decreases myocardial oxygen and increases angina. Long-term use of marijuana may lead to subtle cognitive deficits. In studies using animals, chronic exposure to marijuana changed the structure and function of the hippocampus in ways similar to the effects of the aging process. Acute exposure to marijuana leads to deficits in short-term memory, but long-term effects on cognition are not as well documented. Marijuana use can lead to abuse, tolerance and dependence. The Diagnostic and Statistical Manual of Mental Disorders, 4th ed. (DSM-IV) does not contain a diagnosis of "cannabis withdrawal"; however, some studies suggest that withdrawal symptoms can develop. If present, these symptoms are generally mild, presumably because of the long half-life of marijuana.

2. **Effects on Respiratory system:** Since Marijuana is taken along with cigarettes so the association of development of chronic respiratory symptoms likes chronic bronchitis, emphysema with Marijuana is not clear. A possibility of additive adverse effects on respiratory system remains unanswered.
3. **Immune System:** Human pulmonary alveolar macrophages obtained from marijuana smokers showed a delayed suppression of superoxide production. A marked suppression of humoral as well as cell mediated was also observed. Recently it has been reported that an increase in T cell CD4 to CD8 ratio. Several studies have suggested that cannabinoids decrease host resistance to infection with increased mortality due to Listeria monocytogenes and herpes simplex II virsus.

Tolerance, dependence and withdrawal effects [42, 46, 47]:

- **Tolerance:** Repeated use induces considerable tolerance, within days or weeks, to the behavioral and pharmacological effects. Tolerance develops to the effects of cannabis on mood, memory, psychomotor performance, sleep, EEG, heart rate, arterial pressure, body temperature and antiemetic effects. However, tolerance is not complete; the rate of onset and degree of tolerance depend on the dose and frequency of administration. However, casual cannabis smokers usually show more impairment of psychomotor and cognitive performance in response to a given acute dose than do habitual users. Cross-tolerance between cannabis and alcohol, barbiturates, opioids, prostaglandins and chlorpromazine has been observed, indicating that all of these drugs may have some actions in common.
- **Withdrawal syndrome:** The degree of physical and psychological dependence to cannabis developed is suggested by the advent of a withdrawal syndrome on cessation of use after chronic use. A cannabis withdrawal reaction has been demonstrated in laboratory animals and humans. In rats, acute withdrawal from a synthetic CB1 agonist precipitated by a specific antagonist is accompanied by a marked release of corticotrophin releasing factor (CRF). These changes are similar to those observed in opiod, cocaine and alcohol withdrawal. Human cannabis withdrawal syndrome are similar to alcohol and opiod withdrawal states and includes Nausea, Tremor, Perspiration, Weight loss, Salivation, Increased body temperature, Decreased appetite, Altered sleep/wake cycles, Insomnia,

  Restlessness/ agitation, Irritability, Depressed mood, restlessness, anxiety, dysphoria, irritability, insomnia, anorexia, muscle tremor, increased reflexes and several autonomic effects.
- **Marijuana dependence:** Interventions to be considered include education, monitoring of drug use, strengthening of social support, treatment of possible comorbid psychiatric disorders. Education about the adverse effects of marijuana may deter some patients like on the reproductive system. Acute panic reactions and

flashbacks during marijuana intoxication can usually be handled with low-dose anxiolytic medication. Withdrawal from marijuana does not require medical intervention. Patients who have a problem with marijuana abuse or dependence should be referred to substance abuse treatment program.

Summary and future prospects:

A detailed picture of the toxicolgy and pharmacology of cannabinoids is emerging. Both a central and peripheral receptor has been cloned and putative endogenous agonists identified. The pharmaceutical industry has provided researchers with a wide range of tools to probe the cannabinoid system, and antagonists for both forms of the receptor are available. Clinical research into cannabinoids is in its infancy, and existing information provides no more than indicators for future studies.

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Evidence of Doctor in Rape Cases not mandatory: Supreme Court

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Abstract

The crime of rape is a heinous crime, a crime against the society, a crime against human dignity, one that reduces man to an animal. So the Supreme Court has once again emphasized, in a case of rape, that non-examination of doctor who examined the victim and non-production of doctor's report is not fatal to prosecution, if evidence of victim is reliable. The court has to consider the plight of the victim in a case involving rape and the social stigma that may follow the victim to the grave and which in most cases, practically ruins all prospects of a normal life for the victim. Could a Court afford to forget these aspects?
Key Words: Rape, Examination, Medical Evidence, Supreme Court.

Introduction:

It is the spurt in the number of unmerited acquittals, recorded by the criminal courts, which gives rise to the demand for death sentence to the rapists. The courts have to display a greater sense of responsibility and be more sensitive while dealing with charges of sexual assault on a woman.

A doubt has to be reasonable and not an excuse for finding in favour of acquittal. An unmerited acquittal encourages wolves in the society being on the prowl for easy prey, more so when the victims of crime are helpless females.

Case History & Court Decisions:

In the night, the accused, who was relative of the victim entered her room in the guise of her husband and committed rape on her by removing all her clothes. On query by her as who he was, the accused pressed her mouth. Only then she came to know that the man who had intercourse with her was not her husband. Thereafter, she awoke her husband and other members. The husband entered the room and found the accused present there. The accused was handed over to the police.

A lady doctor sent her pubic hairs, clothes and swabs to the Forensic Science Laboratory (FSL), medically examined her. The accused also medically examined by a doctor. The FSL report confirmed the presence of stains of semen and sperms on the underwear of the accused. The accused was put on trial under section 376 IPC and he was convicted by the trial court and sentenced to seven years imprisonment.

The High Court in appeal by accused set aside the conviction recorded by the trial court and acquitted the accused, solely on the ground that the victim was medically examined, but the doctor who examined her, did not come in the witness box to prove the report, and the prosecution did not take care to examine the lady doctor. Even serologist report was on the record but the same was not proved. The High Court was of the opinion that non-examination of the doctor and non-providing of an opportunity to the accused person to cross-examine the lady doctor is a fatal one and is a great lacuna in the prosecution case. On the basis of this view the High Court acquitted the accused on benefit of doubt.

Being aggrieved, the appeal was preferred by the State to Supreme Court against the order of acquittal by the High Court. The Supreme Court observed that the view taken by the High Court is perverse, erred in law as well as on fact and contrary to the established law laid down by the Supreme Court in various decisions. Reverting back to the facts of the case, the testimony of the victim that she had been ravished by the accused at night remains unimpeached. She was subjected to cross-examination but nothing could be elicited to demolish the statement in chief. The Trial Court as well as the High Court had accepted her statement.

The Supreme Court held that the High Court was totally erred in law in recording the acquittal of the accused by giving him benefit of doubt for non-examination of doctor, thereby committed grave miscarriage of justice. The order of acquittal passed by the High Court was set aside and the order of conviction and the Hon'ble Supreme Court restored the sentence recorded by the Trial Court.

Cases Quoted:

In a case [2] it had been held that a conviction can be founded on the testimony of the victim alone unless there are compelling reasons for seeking corroboration. The evidence of the victim of sexual assault stands almost on a par with the evidence of an injured witness and to an extent is even more reliable. Just as a witness who has sustained some injury in the occurrence, which is not found, to be self-inflicted, is considered to be a good witness in

the sense that he is least likely to shield the real culprit. The evidence of the victim of a sexual offence is entitled to great weight.

In a case [3] it was held that the non-production of the medical report would not be of much consequence if the other evidence on record in believable.

In a case [4] the opinion of the doctor that no rape appeared to be committed was based only on the absence of the rupture of the hymen and injuries on the private parts of the victim. This opinion cannot throw out an otherwise convincing and trustworthy evidence of the victim. Besides the opinion of the doctor appears to be based on 'no reasons'.

In a case [5] the Supreme Court observed that the refusal to act on the testimony of a victim of sexual assault is in the absence of corroboration, as a rule, is adding insult to injury. The court criticized viewing evidence of such victims with the aid of spectacles fitted with lenses tinted with doubts, disbelief or suspicion.

In a case [6] the Supreme Court held that the courts should not lean in favour of acquittal by giving weight to irrelevant or insignificant circumstances or by resorting to technicalities or by assuming doubts and given benefits of where none exists.

In a rape case [7] o on child, the failure of the investigating officer to get the accused medically examined is not of significance when the accused found to be a married man and having two children. There was no need to get him medically examined to ascertain his potency.

Conclusion:

The courts have to do justice to the society and to the victim on one hand and to the offenders on the other. The proper balanced view must be taken. The legislative wisdom reflected by the statutes has to be respected by the courts and the permitted departure there from made only for compelling and convincing reasons.

But that is not to say that medical evidence is unnecessary or irrelevant. Even where medical evidence is absent the court has to arrive at a conclusion on an appreciation of all the relevant circumstances.

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Changes in Thymus Gland in Suicide Victims

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Abstract

In an autopsy study conducted in Bankura Sammilani Medical College, Bankura, West Bengal, India from 1st Jan'2005 to 31st Dec'2005; we compared the size & weight of the thymus gland, and prevalence of thymic lymphoid follicles in victims of suicide in 10 – 20 years' age group who survived for less than 24 hours after the suicidal act; with those of the deceased persons belonging to the same age group whose mode of death was anything other than suicidal (i.e., accidental, natural or homicidal). The latter group mostly comprised of deaths from road traffic accident, snake bite, electrocution, disease process etc.; while the former included deaths from hanging, poisoning, burns etc. This age-group was specifically selected as thymus involutes naturally after this age, which makes studying the stress-related involution difficult. Total no. of victims in this age group was 147 (72 male and 75 female), out of which 77 committed suicide and 70 died from some other cause. Atrophy of the thymus gland alongwith lymphocyte depletion was found in 66 of the suicide victims. From this, we conclude that there is significant association between psychological stress and thymic involution.

Introduction:

Thymus, once buried in obscurity within the mediastinum, rose to a star role in cell-mediated immunity in last two decades. This bi-lobed organ, weighing 10 – 35 gms. at birth, continues to grow until puberty, reaching its maximum weight of 20 – 50 gms. Then it atrophies gradually to 5 – 15 gms. in the elderly. This age-related involution is accompanied by replacement of thymic parenchyma by fibrofatty tissue. Microscopically, the normal thymus comprises of branching lobules made up of a dark-staining cortex, densely populated by lymphocytes and a medulla which takes up a lighter stain. In addition to the meshwork of thymic epithelial cells, characteristic Hassall's corpuscles with concentric keratinization are present.[1, 2]

In psychological stress, involution of thymus may be acute and even premature. Stressful conditions give rise to increased level of circulating glucocorticoids. Glucocorticoids inhibit the activation of a transcription factor, Nuclear Factor-$_{\kappa}$B [NF-$_{\kappa}$B] by increasing the production of $I_{\kappa}B_{\alpha}$. This, in turn, decrease the size of thymus and lymph nodes by inhibiting lymphocyte mitotic activity, the ultimate result being marked lymphocyte depletion with preservation of lobular architecture and Hassall's corpuscles.[3] This involution process is so rapid in acute stress that it can lead to almost complete lymphocytic depletion of the cortex within one week.[1]

Materials and Methods:

This prospective study had been conducted in the Department of Forensic and State Medicine, and Department of Pathology, Bankura Sammilani Medical College, Bankura, West Bengal from 1st January to 31st December, 2005. We collected thymus glands from the deceased persons of **peri-pubertal age (10 – 20 years)** on whom medicolegal autopsy was done as their deaths were sudden, suspicious or unnatural. **This age-group was specifically selected as thymus involutes naturally after this age, which makes studying the stress-related involution difficult.** After noting the size, weight and macroscopical appearance, the thymus glands were collected in 10% Formalin for fixation. After the usual processing, they were stained by Haematoxylin-Eosin stain and studied under light microscope. The findings were corroborated with the cause and manner of death, and analysed as per standard statistical procedures.

Observation and Results:

The total number of medicolegal autopsies done in Bankura Sammilani Medical College Police Morgue attached to the Department of Forensic and State Medicine of the same institution in the year 2005 was 988. Among those, 147 victims were found to belong to the age group of 10 – 20 years. The sex-distribution of all the cases and that of our study group is shown in Table-I. **Then, we looked for the cause of death of the victims, as proved by medicolegal autopsy. The cause of death along with the sex predilection is given in Table-II.** Manner of death of the victims were determined henceforth by carefully corroborating the Police Inquest reports and findings of the Postmortem

examination. These findings are depicted in Table III. The ratio of the suicide cases in male and female was found more or less to be 1:2 from the above table. The thymus glands were collected from all the 147 victims and examined. The distribution of weight in gms.is represented in Table-IV. Most of the thymus glands were congested with areas of haemorrhage. All of them were preserved in 10% Formalin. Sections were taken and processed by routine histopathological methods. Findings were recorded after examination under the light microscope (Table-V). Out of the 147 thymus glands examined, 65 showed normal histology. 6 cases showed reactive or hyperplastic changes (follicular hyperplasia). Lymphocytic depletion or atrophy was noted in 76 cases, out of which 66 were suicidal deaths. Based on the findings of the last three tables, a **cause-to-effect shown in Table VI.** From the above findings, it is evident that there is a clear relation between suicide and lymphocytic depletion/ atrophy of the thymus gland.

Discussion:

In the present study, it was seen that though the total number of the male victims (502) on which medicolegal autopsy had been performed in the year 2005 was higher than the number of female victims (486); females (75) marginally outnumbered males (72) in the age group of 10 – 20 years.

Poisoning was the commonest method adopted for committing suicide (21 males, 34 females), which could be attributed to easy availability of vegetable and organophosphorus poisons, as the occupation of the majority in these rural areas is agriculture. Total number of subjects in whom poisoning was found to be the cause of death in the 10 – 20 years' age-group was 60 (23 males, 37 females), which includes 1 case of homicidal poisoning, 1 case of accidental Datura poisoning in an 11-year old boy, and 3 cases whose manner of death could not be determined. Road traffic accident (RTA) or injury was second in incidence (21 males, 8 females). Causes like poisoning, hanging or burns were more prevalent in females, whereas RTA, snake-bite, electrocution/ lightning stroke etc. showed male preponderance. In 2 male victims, the cause of death was identified to be due to some disease. One of them died of Meningitis and the other from ruptured Berry Aneurysm. One 12 year-old girl died of severe Gastroenteritis.

Out of the 60 poisoning cases, 55 (21 males, 34 females) could clearly be stamped as suicidal. Absence of signs of struggle, presence of suicidal notes, or opinion of the witnesses or Police (as per Inquest reports) as to the manner of death helped us to reach this conclusion.

In our study, hanging was the cause of death in 17 cases (7 males, 10 females). Two children accidentally hanged themselves while enacting judicial execution of a criminal, which was the centre of media attention for quite sometime. One female subject was tortured, rendered unconscious and hanged to death by her in-laws. There were 14 cases (5 males, 9 females) of suicidal hanging, this being the second commonest method adopted for committing suicide.

Thymus is largest relative to body weight at birth when its weight is 10 – 35 gms.[2] Mean weight is constant at about 20 gms. upto the 6th decade when reduction in weight occurs.[8] Although the weight of the thymus may be fairly constant, it becomes increasingly infiltrated by adipose tissue and so, the total amount of lymphoid tissue becomes progressively smaller. At birth, individual adipose tissue may be seen in connective tissue septa and increased numbers are found within the cortex in 2nd and 3rd decades. Fatty infiltration is usually complete by the 4th decade, when only the medulla and small patches of cortex are spared.[7, 8]

Thymus is not only one of the two primary lymphoid organs, but also a part of the neuro-endocrine axis of the body. It both influences and is influenced by products of this axis. This activity, therefore, varies throughout the life under the influence of different physiological states like stress, pregnancy and clinical insults such as drug pollutants.[1, 2, 8]

In stressful conditions, involution of thymus may be acute and premature, even in childhood due to increased level of circulating glucocorticoids which inhibit the activation of a transcription factor, Nuclear Factor-$_{\kappa}$B [NF-$_{\kappa}$B] by increasing the production of $I_{\kappa}B_{\alpha}$[3]. This, in turn, decreases the size of the thymus and lymph nodes by inhibiting lymphocytic mitotic activity, the ultimate result being marked lymphocytic depletion with preservation of lobular architecture and Hassall's corpuscles.[1,3].

In our study, we found that there is remarkable change in thymus following suicide, which in most instances, is a consequence of stress. Thymus glands of 66 cases of suicide out of 77 weighed 10 – 25 gms. More than one-third thymus glands obtained from suicide victims were very small (10.1 – 15 gms.) Histologically, all these showed lymphocyte depletion, but lobular architecture alongwith Hassall's corpuscles and epithelial cells were preserved[1]. There was increased fatty infiltration in the thymus.[8] Thymus of another group of suicide victims showed marked atrophy histologically, while their sizes and weights were not reduced considerably, because these glands were infiltrated by fatty tissues with gross depletion of lymphocytes.[8] Thymus glands of 11 suicide victims

showed normal histological features. There was no hyperplastic thymus in the suicide group.

Hyperplasia of the thymus gland is often found in some diseased conditions like Myasthenia Gravis and other autoimmune disorders.[2] In our study we found 6 cases of thymic hyperplasia in death due to causes other than suicide.

In 10 cases, we found atrophy of thymus where death was not suicidal

Summary and Conclusion:

From this study, we can come to the following conclusions:

1. Suicide is more common in females in the peri-pubertal age-group.
2. Consumption of some poisonous substance is the most common method adopted for committing suicide, followed by hanging and burns.
3. Most common manner of death in the peri-pubertal age-group is accidental, followed by suicidal.
4. There is reduction in size and weight of the thymus gland in suicide victims in most of the cases.
5. There is a strong association between chronic stress and atrophy of the thymus gland ($P<0.05$).

Table-I : Sex Distribution

Sex of the Victims	Total No. of Autopsies performed in 2005	No. of Victims in 10–20 yrs age-group
Male	502	72
Female	486	75
TOTAL	988	147

Table-II : Cause of Death

Cause of Death	Male	Female
Poisoning	23	37
Hanging	7	10
Burn injury	3	12
Road Traffic Accident / Other injury	21	8
Snake-bite	8	4
Electrocution / Lightning Stroke	3	0
Drowning	2	1
Homicide other than poisoning & hanging	3	2
Disease process	2 [One Meningitis, other Ruptured Berry Aneurysm]	1 [Diarrhoea]
TOTAL	**72**	**75**

Table-IV : Weight of Thymus according to Age and Sex

Weight of Thymus gland (gms)	No. of cases				
	Age 10 – 15 yrs.		Age 16 – 20 yrs.		TOTAL
	Male	Female	Male	Female	
5 – 10	0	0	0	0	0
10.1 – 15	10	5	7	6	28
15.1 – 20	3	3	2	8	16
20.1 – 25	6	9	5	10	30
25.1 – 30	11	5	4	9	29
30.1 – 35	7	4	4	5	20
35.1 – 40	1	1	4	5	11
40.1 – 45	1	1	5	3	10
45.1 – 50	1	0	1	1	3
50.1 – 55	0	0	0	0	0
TOTAL	**40**	**28**	**32**	**47**	**147**

Table-V: Microscopic Findings according to Manner of Death

Manner of Death	Histopathological Findings		
	Normal	Hyperplastic	Lymphocyte depleted / Atrophied
Suicide (77)	11	0	66
Homicide (8)	6	1	1
Accident (53)	45	1	7
Undetermined / Natural (9)	3	4	2
TOTAL (147)	**65**	**6**	**76**

Table-VI : Relation Between Morphological Change of Thymus and Mode of Death

Mode of Death	Lymphocyte depletion / Atrophy	No atrophy / No lymphocytic depletion	Total
Suicide	66	11	77
Other than suicide	10	60	70
TOTAL	**76**	**71**	**147**

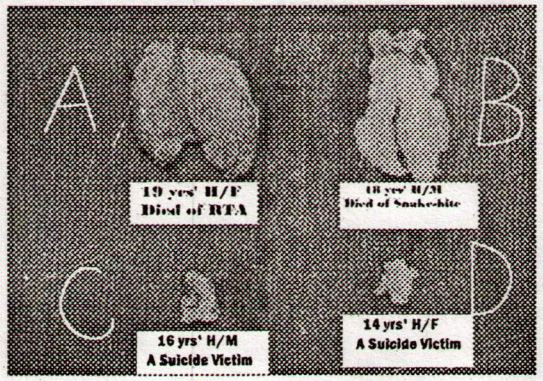

Fig.1: Macroscopic appearance of Thymus gland:
A. 19yrs' old female subject who died of RTA;
B. 18 yrs' old male subject who died of snake-bite;
C. & D. 16 and 14 yrs' old male and female suicide victims respectively.
Note the reduction in size in suicide victims.

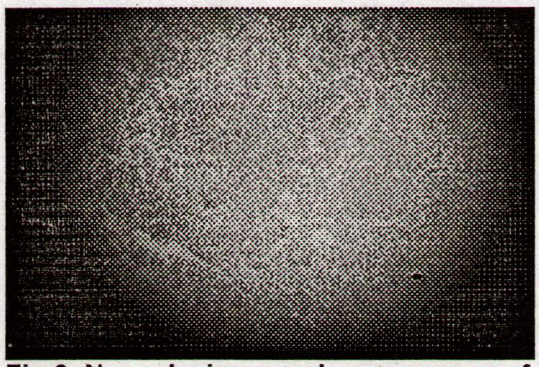

Fig 2: Normal microscopic appearance of Thymus gland
Note the abundance of lymphocytes [H & E, X 40]

Fig.3: Microscopic appearance of Thymus gland
in a suicide victim
Note the depletion of lymphocytes [H & E, X40]

Table-III : Manner of Death

Cause of death	Suicidal		Homicidal		Accidental		Undetermined / Natural		TOTAL
	M	F	M	F	M	F	M	F	
Poisoning	21	34	-	1	1	-	1	2	60
Hanging	5	9	-	1	2	-	-	-	17
Burn injury	-	7	-	1	2	3	1	1	15
Road Traffic Accident / Other injury	-	-	-	-	21	8	-	-	29
Snake-bite	-	-	-	-	8	4	-	-	12
Electrocution / Lightning Stroke	-	-	-	-	2	-	1	-	3
Drowning	-	1	-	-	2	-	-	-	3
Homicide other than poisoning & hanging	-	-	3	2	-	-	-	-	5
Disease process	-	-	-	-	-	-	2	1	3
TOTAL	**26**	**51**	**3**	**5**	**38**	**15**	**5**	**4**	**147**

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Fatal Deliberate Self Harm in Geriatrics

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Abstract

A retrospective research analysis held at the department of Forensic Medicine, Kasturba Medical College, Manipal, India over a span of twelve years (1993-2004) to study fatal deliberate self harm (FDSH) in elderly. Thirty-one victims (7.6%) were more than 60 years of age. Men outnumbered (90.3%) women. Hindus predominated (77.4%). Daytime (6 AM – 6 PM) had more fatalities (70.9%). Winter season witnessed maximum fatalities (45.2%). Majority of the victims were in the age group 61-65 years. Death due to poisoning predominated. Organophosphorous compound was the most common compound consumed. Financial problem was the most common motive. Eighteen victims could survive for less than a day after the incident.

Key Words: Fatal, Deliberate, Self Harm,, geriatrics, poisoning, Organophosphorous

Introduction:

A great deal of research has been focused on the suicide in young, but the suicide in elderly is under researched and under reported. Particular problems occur in older individuals, which may predispose to self-destructive acts. Social isolation with significant mental and physical illnesses tend to be more common in the elderly who may prefer to terminate their lives than to endure it.

As the elderly population continues to grow, suicides in this age group will continue and possibly will increase in number. Data regarding the suicide in elderly is lacking in this part of the world. Present study was under taken to overcome this lacuna. The data thus generated may assist in getting an overview of mechanisms, demographics and recent trends involved in elderly suicide thereby helping the professionals involved in combating this menace.

Materials and Methods:

This was a retrospective research analysis held at the department of Forensic Medicine, Kasturba Medical College, Manipal, India over a span of twelve years (1993-2004). The department of Forensic Medicine, Kasturba Medical College, Manipal undertakes medicolegal autopsies of unnatural deaths occurring in the jurisdiction of Manipal Police Station and the cases referred from the adjoining districts and states of Southern India.

Relevant data were gathered from the autopsy files, police inquest reports and hospital case records. The manner of death was construed as suicide based on inquest reports of the investigating officer. Victims more than 'sixty years' of age were included in the study.

Results:

Out of 1917 medicolegal autopsies conducted during the study period, 407 (21.2%) were fatalities due to deliberate self-harm. Thirty-one victims (7.6%) were more than 60 years of age. Men outnumbered (90.3%) women. Hindus predominated (77.4%). Daytime (6 AM – 6 PM) had more fatalities (70.9%). Winter season witnessed maximum fatalities (45.2%) (Fig.1). Majority of the victims were in the age group 61-65 years (Table 1). Death due to poisoning predominated (Fig.2). Organophosphorous compound was the most common compound consumed (Fig.3). Financial problem was the most common motive (Table 2). Eighteen victims could survive for less than a day after the incident (Table 3).

Discussion:

Suicide in general, across various civilizations and religions has always been condemned. Although it is widely encountered, the various complexities involved are unfortunately ill understood. A proper understanding of these aspects is imperative for any suicide investigation.

Present study sample consisted of thirty-one cases of elderly suicide. This represented 7.6% of all suicides (31/407) and 1.6% of all cases autopsied

(31/1917) at the department of Forensic Medicine, Kasturba Medical College, Manipal during the study period (1993-2004). It was 2.4% in Adelaide[1] and 11.5% in South Carolina[2] respectively.

Male victims predominated and this finding is consistent with findings observed elsewhere[1,3,4] It is observed that the rates of suicides for males increase with age and reach their highest levels in the oldest age groupings, whereas rates for females increase with age, peak in middle adulthood and decline slightly with advancing age[2].

Most of the victims belonged to Hindu religion. In this part of the world, majority of the population follow Hinduism as their religion. The incident occurred more during the day time. During the day, the stress could be in its peak and so is the tendency to end one's own life.

Majority of the elderly victims were in the age group 61-65 years. Frustration due to imbalance between ambitions and available avenues at the onset of ripe age when one's physical, psychological and financial abilities are gradually 'weaned-off' may be the reason for high mortality observed in 7th decade[5]. Getting acclimatized to the limitations may cause significant decline in the mortality in the forthcoming years, as it would be inferred from our observations. Our findings could not be compared with other works, as there are no similar studies conducted in this part of the world.

The incident occurred more commonly during the winter months. Studies have shown that there is no seasonal correlation between suicide and time of year[2].

Poisoning was the preferred method in overwhelming majority of the cases. All the female victims terminated their lives by poisoning whereas 17.9% of males used hanging apart from poisoning to end their lives. Other methods like drowning, fall from height, burns and gunshot were not encountered in the present study. Our findings are in contrast with other reported works. Hanging and fall from height were the common methods in one of the study[6]. Fall from height was the most preferred method in New York[7].

Gunshot predominated in South Carolina[2]. Suicide by firearm is rare in this part due to the strict legislation and lack of easy access to firearms. It can be concluded from our observations that females generally prefer less painful methods like poisoning to end their lives as compared to males who are more adventurous.

Among the poisons, organophosphorous compounds were commonly implicated in the present series. People in this region have easy accessibility to these insecticides since these are commonly used for agricultural purpose. So whenever there is a tendency to end their lives, they are readily available in hand.

Financial problem was the commonest motive for committing suicide in the present study. Our findings are in contrast from other studies. Physical illness was the commonest motive in South Carolina[2]. Mental illness and lack of social support were commonly responsible in the studies from North Italy[6] and Japan[8] respectively.

More than half of the victims survived for less than a day after the incident, which is perhaps the crucial period determining the prognosis. Early death could be attributed to their compromised immune status, advanced age, debility, no care taker in the house hold and more over they are the 'determined death seekers' and have taken every care to see that no force on the earth would save them. It also emphasizes the need for early and energetic management of the cases.

Nearly one-fifth of the victims survived for more than a week and died due to ensuing secondary complications.

Extending psychiatric services to the suicide prone elderly individuals in the community may reduce the incidence of suicide. Setting up of rehabilitation centers for the elderly individuals suffering from chronic debilitating diseases, counseling of the geriatric patients and their care takers may be helpful in the long run in reducing the mortality.

Implementation of specific laws and regulations governing dispensing, disposal, storage and handling of various insecticides is the need of the hour. Enhancement of a sense of belonging among elderly individuals by the family members may be beneficial.

Table 1: Age of the victims

Age(years)	Number of cases	Percentage
61-65	15	48.4
66-70	08	25.8
71-75	06	19.3
>75	02	6.5

Table 2: Motive for committing suicide

Motive	Number of cases	Percentage
Financial problem	12	38.6
Physical illness	06	19.4
Mental illness	07	22.6
Disgust in life	06	19.4

Fatal 'Bhang' Poisoning

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ABSTRACT

A young adult male of about 25 years of age consumed a glass (about 300ml) of Bhang on the holy occasion of ShivRatri. The deceased died within 24 hours of consuming the Bhang. The deceased had suffered from rheumatic heart disease with multiple valvular involvements. He had also undergone open-heart surgery in the past. Fatality due to Bhang is extremely rare and therefore the case is presented. An attempt is made to review the literature.

Bhang is one of the Indian preparations of Indian hemp (*Cannabis sativa*). It is prepared by the wet grinding of the leaves of the plant. The bolus is then consumed in various ways. Water is used as a vehicle. In the present case a bolus of about 1 to 2 gm was mixed in a glass of water.

ShivRatri is a Hindu festival. On this day prayers are offered to Lord Shiva, who is the god of all evils and poisons. Bhang is a special article, which is offered to Lord Shiva on this auspicious day. Then, the devotees consume it as *the God*.

Gujrat is a dry state (possession, consumption, sale, etc. of alcohol, Bhang, opium and other psychotropic substance, etc. is governed by particular laws), but on the holy occasion of ShivRati, for a day, the law is relaxed for the use of Bhang. In most other parts of the country, particularly, in northern India, it is a common practice to consume various preparations of Indian hemp like Bhang, Charas, Ganja, sweetmeat, etc. The bolus mentioned above is probably the minimum single dose.

CASE PRESENTATION

The deceased, a young man of 25 years of age, was a resident of Jam Jodhpur, a taluka (local area) of Jamnagar district. On the holy occasion of ShivRatri he consumed a glassful of Bhang. Within an hour he developed behavioural symptoms, which became severe within the next hour. He was rushed to the local government hospital. He was then referred to Shri Guru Gobind Singh Hospital (GGH), Jamnagar.

On examination it was noted that the patient was conscious, but showing behavioural symptoms in the form of disorientation of time and place, irrelevant and loud speech and irrelevant and unwanted hyperactivity of the limbs. His eyes were congested; the pupils were of normal size and were reacting to light. He had peripheral cyanosis. He had tachycardia, pulse 98/mit; his blood pressure was 140/90 mm Hg. He also had laboured breathing, dyspnoea and bilateral crepitations in the lungs. There was an oozing of reddish fluid from his mouth and nostrils.

His heartbeat was irregular. On inquiry, it was learnt that he had rheumatic heart disease affecting some of the valves of his heart. He had undergone open-heart surgery. In fact, he was suffering from mitral stenosis, mitral regurgitation and pulmonary hypertension. He died within two hours of his admission to the GGH, Jamnagar. The total duration since his consumption of Bhang and death was about seven hours.

On post-mortem examination the following relevant findings were noted. There was an oblique scar of about 20cm in length on the left side of the chest, confirming a history of previous open-heart surgery. The pupils were in mid position and conjunctivae congested. There were dried marks of bloodstains at the

mouth and nostrils. The nails were cyanosed. There were no injuries. The brain and coverings were congested. The right lung was enlarged, oedematous and congested. On dissection, blood-mixed fluid came out from the cut surface. The left lung was adherent to the chest wall and was shrunken.

The heart was enlarged, weighing 550gm (in an Indian context it was almost double the norm for his age and sex). The pericardium was adherent all over. The left atrium appeared as a huge sac. It measured about 8cm × 5cm. The cusps of the mitral valve were not identifiable separately, but were fused in the form of a diaphragm between left atrium and left ventricle with typical but small fish mouth opening. There was thickening, shortening and fusion of chordae tendinae. Papillary muscles were hypertrophied. The thickness of the right ventricular wall was about 1cm and that of the left ventricular wall was 2cm.

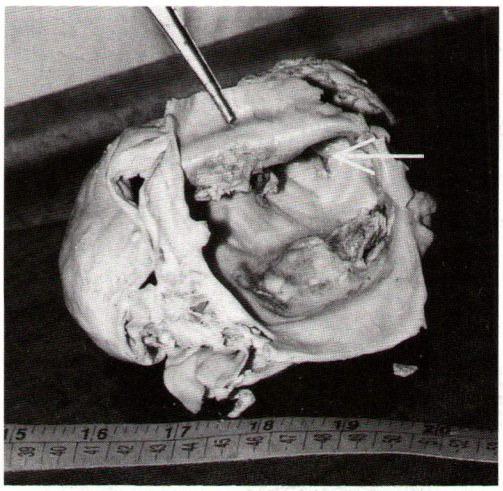
The stomach showed 150cc greenish fluid with plaques of leafy material. Other findings were non-specific.

The following viscera were preserved:

(a) stomach and its contents, one foot of upper part of small intestine and its contents;
(b) part of liver and half of each kidney;
(c) 100cc of blood.

The viscera were preserved in saturated sol of common salt.

In India it is also common to mix dhatura (*Datura fastuosa*) seeds with Bhang to increase its 'kicking' effect. Dhatura is far more toxic than Bhang. Therefore, we requested the chemical analyser to test for dhatura also. Cannabis was detected in all three above-mentioned samples, while they were negative for dhatura.



Figures 1 and 2. Left atrium is opened up. The photograph is taken from above. Arrow points out the fish mouth opening of the stenosed mitral valve. See also interior of the atrium, which is affected by the rheumatic heart disease.

DISCUSSION

Fatality due to Bhang poisoning, though reported (Subrahmaniam, 1999), is very rare. As the fatal dose of Bhang is so high, it is practically impossible for anybody to consume and retain such an amount. The fatal dose of delta 9 tetra hydro cannabinols (THC), active ingredient of cannabis resin is about 1,000 to 2,000mg by the intravenous route (Subrahmaniam, 1999). The fatal dose of Bhang when taken orally is 10,000mg/kg body weight (Parikh, 1988). Therefore, for a 70kg man it should be 700gm.The quantity in itself should produce vomiting in all probability, thereby reducing the retained dose. Though Subrahmaniam, (1999) has mentioned a case of fatal

Figure 3. The interior of the left ventricle. Arrow points out fish mouth opening of stenosed mitral valve. Apex of the heart is cut transversely to expose the diseased mitral valve from 'below'. Heart was dissected in a particular manner, as the history of valvular disease was known at the time of post-mortem examination, for the preservation of the diseased valve and to mount the specimen in the museum.

Bhang poisoning, quoting the report of chemical analyser Madras, no reference is made as regards the quantity consumed and route of administration. Therefore, we thought that it was very unusual for a young man of 30 to die just after consuming one glassful of Bhang.

Goldfrank et al. (1986) have suggested the contamination of marijuana with the herbicide paraquat. But at the same time they have also mentioned that there have been no documented case reports of any toxicity associated with paraquat-contaminated marijuana preparations in spite of several years of paraquat use.

As regards the physical manifestations of cannabis administration, very little is written in the available textbooks of forensic medicine and toxicology. Does this mean that only a few symptoms and signs of any significance are produced by cannabis? Probably yes. Most important among the physical manifestations, involving systems other than CNS are tachycardia and occasional palpitation (Polson et al., 1983). In an inexperienced user, the effect of marijuana intoxication may be mistaken for a heart attack (Goldfrank et al., 1986). Mendelson et al. (1983) mention that tolerance for marijuana-induced tachycardia develops rapidly among regular users; marijuana smoking in persons with a history of coronary insufficiency may precipitate angina. They also say that exercise induced angina may be increased following marijuana use. Therefore, they have cautioned that patients with cardiac disease should be strongly advised not to smoke marijuana or use cannabis compounds.

In the present case, we know that the deceased had multiple valvular lesions in his heart. He also underwent open-heart surgery for one of them. It was obvious, therefore, that his cardiac functions were compromised. However, we do not know how much exertion or exercise he had after the consumption of Bhang. But it is known that physical activity increases after consumption of Bhang. We are of the opinion that the dose of Bhang proved fatal in this case because of his failing heart.

Consumption of Bhang and other preparations of cannabis is quite common in India. *Sadhus* and temple *poojaris* use it to get into a religious mood. In the present case also it was consumed on the holy occasion of *ShivRatri*. Road poisoners (thieves who befriend travellers before drugging them and stealing from them) also use cannabis preparations to stupefy their victims and facilitate robbery (Parikh, 1988).

Though fatality due to Bhang consumption is not common, precautions must be taken when a person is suffering from a heart ailment. Due precautions should also be taken when physicians and toxicologists are dealing with cases of cannabis poisoning to check that their patients are not suffering from heart disease. It is also important to educate those who consume Bhang regularly that exercise or physical exertion may prove serious in their case. There should be general awareness about the serious link between heart disease and consumption of any of the cannabis preparations. This becomes more important in regions like India where use of various cannabis preparations is socially very common; on

occasions like *ShivRatri* this consumption takes on religious colour and feelings as well.

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Table 3: Survival period of the victims

Duration of Survival (days)	Number of cases	Percentage
< 1	18	58.0
2 – 7	07	22.6
> 8	06	19.4

Fig 1. Seasonal variation

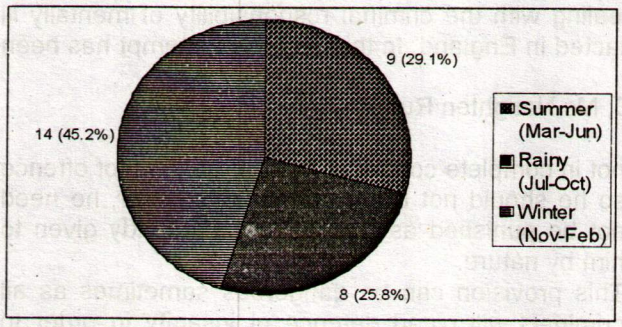


Fig.2. Method used to commit suicide

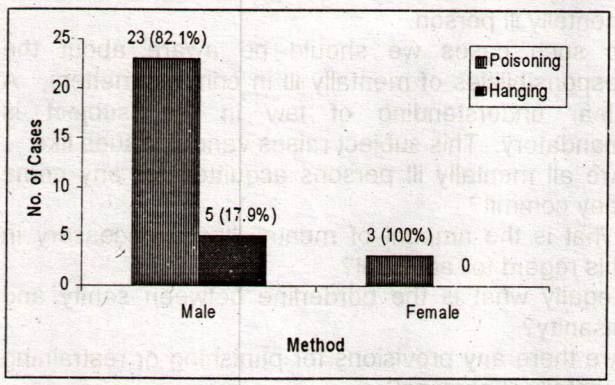
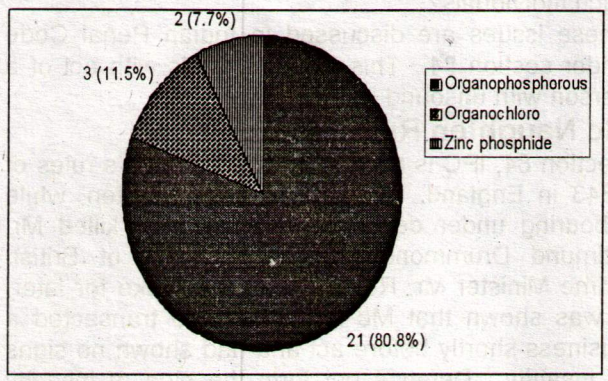


Fig.3. Type of poison consumed.



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Section 84, IPC: An Analysis

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Abstract

Section 84 of Indian Penal code is the primary legislation dealing with the criminal responsibility of mentally ill persons in india. This law is based on Mc Naughten Rules enacted in England. In this paper an attempt has been made to discuss this section in detail.

Key words: Mentally ill; criminal responsibility; section 84 IPC; Mc Naughten Rules.

Introduction:

In law responsibility means liability to punishment.[1] This concept of responsibility is fundamental to our view of man as a free, intentional being and is said to form the basis of criminal codes and punishment systems.[2] A person can be held liable for any act he commits, only if he does it with his wish and free will. It is considered that motive is a must for a criminal act. A mere commission of act does not prove a person guilty.

Law recognize the concept "*actus non facit reum, nisi mens sit rea*",and "*amens ne sine mente*" i.e. the physical act alone does not make a person guilty; the mental component in the form of evil intent (guilty mind) is equally important.[3]

Plea of mental illness or unsoundness of mind is usually brought forward by defence in order to save his client from capital punishment. The law presumes every individual at the age of discretion, to be sane and to possess a sufficient degree of reason to be responsible for his criminal acts, unless the contrary is proved to the satisfaction of the court .[4]

A mentally ill person is not punished for his crime, as he is devoid of free will, intelligence and knowledge of the act.[5] Burden of proving this unsoundness of mind lies entirely on defence.[1,6] It does not mean that prosecution is free from all responsibilities. Case is to be proved by prosecution beyond reasonable doubt and then only plea of unsoundness of mind is entertained. If case cannot be proved then accused is outrightly acquitted. If defence can prove that accused was of unsound mind at the time of committing the offence then his responsibility diminishes. Depending upon the condition and nature of offence, the accused can be sent to prison, psychiatric hospital, any other place of safe custody or he may be acquitted. Concept behind this provision is that as such this person was not in complete control of mind at the time of offence so he should not be punished. Moreover, he need not be punished as punishment is already given to him by nature.[7]

This provision can be dangerous sometimes as all criminals will plead defence of insanity in order to escape capital punishment. So, there should be a check guard for feigned insanity. On the other hand, society must be protected against the attacks of a mentally ill person.

In such cases we should be aware about the responsibilities of mentally ill in criminal matters. A clear understanding of law in this subject is mandatory. This subject raises various issues like:

Are all mentally ill persons acquitted for any crime they commit?

What is the amount of mental illness necessary in this regard for acquittal?

Legally what is the borderline between sanity and insanity?

Are there any provisions for punishing or restraining mentally ill persons?

Are there any provisions to safeguard society from such individuals?

These issues are discussed in Indian Penal Code under section 84. This sections deals with act of a person with unsound mind.

Mc Naughten Rule:

Section 84, IPC is based on Mc Naughten's rules of 1843 in England. Mr. Daniel Mc Naughten, while labouring under delusion of persecution killed Mr. Edmund Drummond, private secretary of British Prime Minister Mr. Robert Peel in mistake for later. It was shown that Mc Naughten had transected a business shortly before act and had shown no signs of insanity. Defence put forth the plea of insanity and accused was acquitted. Due to adverse public reaction, the House of Lords decided to probe into subject. Accordingly, some questions were put

before a bench of 14 judges in House of Lords. From the answers given some rules were framed towards determination of criminal responsibility of insane and were called Mc Naughten rules.[4,6]

It states that "in order to establish a defence on the grounds of insanity, it must be clearly proved that at the time of committing the act (or making the omission), the accused was labouring under such a defect of reason from disease of the mind as not to know the nature and quality of the act he was doing, or if he knew what he was doing, that he did not know it was wrong." [8]

Section 84 of Indian Penal Code:

Based on this law was drafted section 84 of Indian Penal Code, which says "nothing is an offence which is done by a person who, at the time of doing it, by reason of unsoundness of mind, is incapable of knowing the nature of the act, or that he is doing what is either wrong or contrary to law". [9]

Let us examine this section in detail. To be exempted under this section only proof of insanity is not enough. It should be clearly proved that:

Unsoundness of mind existed at the time of offence.

This unsoundness was of such a degree

Which rendered him incapable of knowing the nature of the act.

Even if he knew the nature of the act he did not know that it was wrong or against the law.[9]

Explanation:

A. Unsoundness of mind:

For want in this section, unsoundness of mind is used to describe only those conditions that affect the cognitive capacity of an individual. So, every person who is mentally ill is not relieved from his responsibilities. Here the law makes distinction between medical and legal insanity.

Medically a person is termed insane if he is suffering from any disease or disorder of mind. Medical insanity means the person's consciousness of the bearing of his acts on those affected by it and by legal insanity is meant the person's consciousness in relation to himself.[9]Conditions like emotions, fear, hatred, jealousy, revenge, anger, perversions, and lack of self control may be termed as features of insanity in medical term. In some of these situations person might become a fit subject to be admitted in a mental hospital.[4] In the eyes of law these aspects are not considered. Law recognizes only those conditions as insanity which impairs the cognitive faculties of the mind.

There can be no legal insanity unless cognitive faculties of the mind are, as a result of unsoundness of mind are so affected as to render the offender incapable of knowing the nature of the act or knowing that what he is doing is wrong or contrary to law. For the purpose of criminal law emphasis is therefore, on degree of unsoundness of mind.[4]

If a person is acting under effect of delusions and delusions are such that they impair his cognition then he is not liable. When Karma Urang killed his father under the delusion that he was ordered by Goddess Kali to do so. He even proceeded to court with cut head in his hands. It was held that he was under delusion and so was acquitted.[5] If a person under delusion of persecution kills another in order to save his own life then he is exempted but if he kills another just to avenge some wrong then he is punished.

When an accused suffering from fever paroxysms killed his children because their crying disturbed him he was convicted although medically he can be termed insane.[9] On the other hand, where an accused killed his son thinking him to be a devil dangerous to his life, he was acquitted.[9]

Absence of a motive or forethought is considered criteria for determining unsoundness of mind. When the accused pushed a four-year old child into fire, there was no premeditation for the act. Neither the accused ran nor tried to hide the act. This showed he was not conscious of his guilt. He was benefited under this Section.[9] On the other hand, accused killed his son by drowning, he was convicted as there was no evidence to prove insanity.[9] This shows that although absence of motive shows unsoundness of mind yet it is not so in all circumstances.

When an accused killed a young boy by stabbing in the stomach, there was no motive, secrecy or accomplice. The doctor certified him to be sane but witnesses told him to be of unsound mind. He was acquitted.[5] When an accused suffering from fits of epilepsy killed his father in an attack of vertigo. It was held that although his illness has rendered his intellect weak and has affected his emotions and will, but it was not sufficient so as to invoke S.84 as his cognitive functions were not impaired. He was convicted.[5]

These cases clearly show that law only considers disturbance of cognition as unsoundness of mind in legal terms.

B. Unsoundness should exist at the time of the act:

Another requirement under law is that this unsoundness of mind should exist at the time of commission of the act. It is only the presence of insanity at the time of the act which matters and not before or after that.[10] If insanity exists at the time of trial it can only lead to postponement of trial but not to acquittal of the accused.

An accused a young boy was brought up by his grand father and studied abroad. His parents did

not care about him; even his grand father's death was not communicated to him. On coming to India he committed brutal offences at random. During pendency of trial he completed studies and started his own business. His behavior was normal before and after the offence. But was held insane while committing the offence and was acquitted.[9]

C. Nature of the act:

If accused did not know the nature of the act he was committing then he is not responsible for it. Similarly, if he knew the nature of the act but did not know whether it was wrong or contrary to the law he is not liable. On the other hand if the person did not know the nature of the act but knew that it is wrong as contrary to law he is held responsible.

If the evidence shows that the accused was conscious of the nature of the act, he must be presumed to have been conscious of its criminality.[11]

According to Stephan if a person cuts off the head of a sleeping man because "it would be great fun to see him looking for it when he woke up" he is incapable of knowing the nature of the act and is therefore not liable.[9]

When an accused sacrificed his son in a mosque on being commanded in dream to do so, it was held that though he knew the nature of the act but did not know that it was wrong so was given benefit.[5] On the other hand where a father and relatives sacrificed his four-year old son to please the deity. They were held liable as the court said that such barbaric actions don't prove insanity.[9]

When an accused attempted to kill his wife and mother-in-law, and did killed his brother in law and subsequently set fire to the house. Although he was of unsound mind but as he was conscious about nature of the act he was convicted.[7] If a person thinks another man to be a wild boar and kills him he is exempted from criminal responsibility, as he does not knew the nature of the act. If he kills a child under an insane delusion that by doing, he is saving him from sin and sending him to heaven, he knows the nature of the act but he is incapable of understanding that what he is doing is morally wrong.[7]

A person killed his four relatives and started running away. Later he volunteered this information, there was no motive, no accomplice and no attempts to secrecy but then also he was convicted, as legally he was sane.[5] He knew the nature of his act as well as consequences.

In such cases, burden of proof lies on the accused to prove his insanity. But in some cases things speak for themselves. When an accused killed his son and then danced around, moving towards his house and threatening others, here facts themselves proved the care and accused was ordered to be detained in mental hospital.[9]

Criticism of Section 84:

This Section is still based on outdated Mc Naughten rules of 1843. Even the country, which had formulated then had brought some changes in them.

Firstly, this Section considers unsoundness of mind to be equivalent to disorders of cognition. The other forms of mental illness does not hold good for plea. Various disorders of mind, which certifies him to be mentally ill, might affect his working to such an extent that he might loose control over his actions. Lots of crimes are committed in a fit of anger or emotion. Just after committing the act person may realize what he has done. But at that particular moment emotions have controlled his actions. His cognitive functions might be absolutely normal.

Secondly, it considers such unsoundness to exist at the time of act. Here again no consideration is given to condition prior to the act. Proper assessment of his pre act status or conditions leading to cause of act may help to figure out reasons for his act. Pregnancy and childbirth can lead to psychosis in women due to excessive stress and strain. In this situation she can commit offence of infanticide.[12] Here although her consciousness is clear and there is no impairment of cognition yet her emotional imbalance have led her to commit the offence. If she is tried under Section 84 she will be convicted. This is an injustice to such females.

Another example can be of a drug addict. His craving for drugs may compel him to commit on offence. Although this is not to justify his actions but it can be argued that drugs have lead to emotional imbalance in him. He might have no disorder of cognition but offence may be committed in state of emotional instability.

In short it can be said that this law does not consider the emotional aspects of crime, which are in fact the major causes. Law insists on regarding insanity as a disease of intellect, whereas it is usually a disease of the affective or emotional spheres of the mind.[6]

Thirdly, it is mandatory for a person to be acquitted under this action that he is unaware of nature of act and or, its legality. Sometimes a person knows the illegality of his act but then also in fit of anger, emotions as delusions he might commit some crime. In such situations, conditions like irresistible impulse, obsessive-compulsive disorder, delusion, emotions, fits of anger can offer a ground for medical insanity but will not constitute a legal ground for acquittal.

A depressed person may be driven by his mental illness to commit suicide. But he may kill his dependent relatives (e.g. mother) before the act of suicide. If he is caught before killing himself he will be punished. As according to Section 84 he is

liable, as he knows the nature as well as legal status of his act.[4] Thus, it can be said that medical proof of insanity is not legal proof for acquittal.

Although it may be hazardous to consider emotional aspects of crime as basis for acquittal. As every criminal will plead them as defence and people will be left with no logically secure place short of total abandonment of criminal responsibility.[2] But we should not look only at these small number of cases. Though some criminals might be acquitted wrongly but no non-guilty should be punished. The question of person's capacity to resist temptation and of a person's responsibility is beyond easy understanding; they lie buried in his consciousness into which no human being can enter.[2]

Suggestions:

Although section 84 tries to deal fairly with mentally ill offender but sometimes there may be false acquittals or convictions. So, there is need for incorporating wider concepts like emotions, pre act situations etc. Scope of legal insanity is to be widened to incorporate some more aspects of medical insanity. Stress should be on removing the crime and not the criminal.

Most of such criminals are emotionally unstable and are usually undeterred by punishments so care should be taken to improve and support them and not to punish them. Other than this the family of such persons suffers from guilt and social stigma. They should be supported and care should be taken to not to let entire family suffer because of one individual.[13]

On the other hand, these criminals should not be let free in larger interests of society but may be detained in psychiatric hospitals and proper assessment of their mental status is to be made to avoid any false acquittals or convictions. Provision should be made for examination by a psychiatrist in all such cases and fate of individual should not depend only on discretion of one judge. Judge may be bound by law to give a particular judgment. Opinion of doctor should be mandatory.

Proper analysis of this act has to be made and attempts should be made to modify it. In foreign countries lot of cases have been decided on such issues and consideration have been given to pleas of irresistible impulse. Doctrine of diminished responsibility has become a latest issue in giving decisions. We should also keep us update of these advancements and should incorporate newer provisions for a free and fair trial.

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Violence against Women: Evidence from Rural Andhra Pradesh (Eluru, W.G. Dist.), India

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Abstract

In recent years violence against women has emerged as an important social problem in India. It has attracted the attention of a wide spectrum of agencies, from healthcare providers to law enforcement authorities. This study is attempted to determine the characteristics and the magnitude of physical and psychological violence against women in rural Andhra Pradesh. The actual study was conducted by interviewers in five selected villages of rural Andhra Pradesh (Villages under Rural Health Centre of ASRAM). The study included 200 women, (eligible if they had at least one child less than 18 years of age). The results revealed that of the women interviewed, the most common age group suffered from violence is in between 25 to 30 Years (43%), almost one-third (30.4%) had no formal education and the women's husbands were better educated. More than half the women lived in one-room dwellings, their husband verbally insulted 42% of the women. Almost half the women said they had been slapped, hit, kicked or beaten by their husbands at some time. 24% of the women reported having been kicked by their husbands at some point during their married life, and 44% were reportedly kicked during pregnancy. 8% were specifically threatened by their husbands with having kerosene oil poured on them to set them on fire. 30% of the physically assaulted victims required medical care.

Key Words: Domestic Violence, Verbal Insult, Physical Assault.

Introduction:

Violence is a widespread and growing problem in practically all societies. It takes many forms, and occurs in all settings: at work, in the home, in the streets and the community at large. In recent years, domestic violence against women has emerged as an important social problem in rural India. It has attracted the attention of a wide spectrum of agencies, from healthcare providers to law enforcement authorities. Violence against women is a significant health and social problem affecting virtually all societies, but often it goes unrecognized and unreported and in many countries it is still accepted as part of normal behavior. Most significant is the fact that women and girls experience violence primarily at the hands of men they know and within the so-called 'safe haven' of the home and family. The manifestations and forms of violence vary in different settings, but most of the violence against women takes place within families and the perpetrators are almost exclusively men who are or have been in a close relationship with the woman.

The extent of the health consequences of this problem is unknown. Such violence may consist of physical and/or psychological elements. Physical violence is defined as the use of physical force against another person that results in physical, sexual or psychological harm and includes beating, kicking, slapping, stabbing, shooting, pushing, biting, pinching, strangling, among others. The nature of domestic violence, its causes, and its prevalence must be fully understood in order to plan effective prevention and intervention strategies. The present study generated population-based data to determine the magnitude of family violence as well as its characteristics and consequences, in the West Godavari district of Andhra Pradesh, South India.

Materials and Methods:

The study was conducted in five villages in West Godavari district of Andhra Pradesh, South India. Eligible women (a married woman with at least one child under 18 years were considered eligible) from 200 households were interviewed. Demographic characteristics and other characteristics of social ecology related to violence against women (E.g. the husband's alcohol abuse, residential instability, poor neighborhood support, gender biases, child disobedience, child health problems, and maternal depression) were also included. Questionnaires were administered by trained interviewers. The survey covered household socioeconomic and demographic status, health expenditures, and health behavior, including a series of questions on husbands' exposure to, and perpetration of, physical violence and sexual violence.

Results:

The characteristics of the 200 women interviewed are described, as are those of their husbands, and the household characteristics (Tables 1, 2, 3). The women's ages ranged from 18-40 years and most

common age affected by violence is in between 25-30 years (43%). Almost one-third (30.4%) had no formal education (i.e., up to or below class III). The women's husbands were better educated, with 37.5% having attended school for more than 10 years. Almost 90% of the families were Hindu and more than half (58%) lived in one-room dwellings. Likewise, almost half (49.4%) had three or more children.

Almost half the women (50%) reported having been physically abused (slap, blows, kicks or beaten by sticks or rods) during their marriage, and almost one-quarter reported being beaten in the past 6 months. 42% reported having been verbally insulted by their husband. (Table 4)

There was a high frequency alleged of physical assault by husbands while the woman was pregnant. (Table 5) Almost half of the women (44%) reported having been kicked during pregnancy. Physically assaulted women reported that they required medical care for their injuries in 30% of the cases as shown in Table 6.

Discussion:

Women who are abused are often reluctant to admit to the violence, in part because of shame, fear and a belief that people will not understand or be able to help. In the present study, the ability to access the level of violence against women was due to the intense, standardized training of the interviewers and the skilled interview that was conducted in total privacy. Not only is the frequency of violence reported in the present study surprising, but also the evidence of the repetitive nature of this violence.

Two-thirds of the women interviewed reported some form of psychological or physical abuse. Of the total sample, half reported physical abuse.42% described abusive language, belittlement, and threats. This large proportion resonates with high levels of violence recorded in other parts of India. [2, 3, 4]

Almost half of the women in the present study admitted to physical abuse during pregnancy. Such violence during pregnancy could also be one of the factors contributing to the high prevalence of fetal loss[6]. However, further studies are needed to shed more light on this association.

In the USA the cost of family violence is thought to be US$12.6 billion annually. [7] Because 30% of the physically assaulted women in the present study required medical care, these data suggest that violence against women may cause significant costs to the Indian healthcare system.

This study raises the issue of whether rural health professional should incorporate screening for violence in their routing care of women. A recently published review of studies from the USA, Australia and New Zealand found insufficient evidence to justify such screening. [8] However the relevance of such a review to this setting can be questioned when all the studies included were from the USA, Australia or New Zealand and there was no mention of any rural context in the review.

Conclusion:

The present study indicates that the magnitude of violence against women in rural villages in Andhra Pradesh is similar to that found by other Indian and Western authors. This domestic violence is a significant public health problem. The results of this study should be used to develop informed interventions aimed at reducing family violence. This research suggests that, in the present Indian rural setting, solutions to domestic violence must be found within the social structure of the family and within the community setting. So research within this field needs to go on, continuing to improve knowledge on violence against women, gender roles and their interplay, but also on the role of the state, where for instance the degree of protection offered by the law seems to have preventive implications. The mindset of the society has to be changed and the first step is to identify the extent of the problem and make the females realize that it is wrong not to oppose this abuse. In the end, regardless of which remedy is applied, respecting and empowering the individuals who are the victims can only enact real change.

Table No. 1
Age of the Women affected by the violence

Age	No. of Cases	Percentage
15 to 20 Years	42	21%
20 to 25 Years	36	18%
25 to 30 Years	86	43%
30 to 35 Years	20	10%
35 to 40 Years	16	8%
Total	**200**	**100%**

Table No. 2
Educational Status of Women and their Husband

Education status	*No.	%	**No.	%
Class - III	61	30.4%	20	10%
Class- V	57	28.6%	25	12.5%
Class- VII	51	25.2%	80	40%
Class – X & above	31	15.8%	75	37.5%
Total	**200**		**200**	

***Women; ****Husband**

Table No. 3 : Family Living Condition

No. of Rooms & Type of Family	No. of Cases	%
Combined Family & Single Room dwelling	116	58%
Nuclear Family & More than one room dwelling	84	42%
Total	**200**	

Table No. 4 : Type of Violence

Type	No. of Cases	%
Verbal abuse	84	42%
Physical (Slapping, blows, Kick & beaten by sticks or rod).	100	50%
Threatening	16	8%
Total	**200**	

Table No. 5
Time of infliction of physical violence

Time Period	No. of Cases	%
Just after marriage (With in 1 Year)	15	15%
During Pregnancy	44	44%
After giving birth to child	17	17%
At any period during married life	24	24%
Total	**100**	

Table No. 6
Violence and Treatment history

Type of Violence	No.	%
Minor injury without any treatment	58	58%
Minor injury with house hold treatment (small bleedings with or without swelling)	12	12%
Injuries with hospital treatment (Bleeding from mouth, nose, and head or involving other parts of the body).	30	30%
Total	**100**	

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Autopsy finding of pattern of skull fractures and intra-cranial hemorrhages in cases of head trauma: A Prospective Study

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Abstract

The injuries and death due to head trauma are inescapable in the modern way of life and their correct interpretation is vital to the reconstruction of the events of Forensic Medicine and their proper management for treatment of the injured. The present study was conducted in Department of Forensic Medicine, SMS Medical College, Jaipur in year 2003-2004 to find out the patterns of intracranial injuries during autopsy examinations. Total 120 cases of autopsy were studied irrespective to the age, gender, religion, cast etc., who have died due to head injuries by any means. All the data related to time, manner and manifestation of head injury were recorded with detailed autopsy examination and subsequently analyzed statistically. We reached at a conclusion that majority of the victims were male of 20-40 years age involving in road traffic accidents, when they were going on two wheelers with out wearing helmets, while fall from height was the second most common cause.
Key Words: - Head injury, Road Traffic Accident (RTA), Fracture, Haemorrhage.

Introduction:

Among all the regional injuries, the injuries to head and neck are the most common and important in Forensic practice. Deaths from head injury comprise 1-2% of all deaths from all causes and one third to one half of all deaths due to trauma are due to head injury. Of the survivors, those with a head injury were substantially more impaired than those without the former, therefore also being an important cause of morbidity. Head injury not only affects the primary victims but it has got innumerable secondary victims also, who suffer financially, psychologically and socially, whether the injury is produced by a vehicular crash, fall from height, an assault or by some other means. As head injury provides the major contribution to death, a sound practical understanding of the neuropathology of trauma with intracranial injuries is more essential to the Forensic Pathologist than any other aspect of his subject. Road traffic accidents cover almost two third of the total deaths due to head injuries, hence being the major devastating factor adding to total head traumas.

Materials and Methods:

A total of 120 cases of autopsy examination, which are brought to mortuary directly or from accidental emergency or from neurosurgery department, were studied. All cases who have associated hypertensive, cardiac, endocrinal and metabolic disorders were excluded by history and previous clinical records, with cases who are having only external evidence of injury over head and cause of death is other than the head injury. The pathological features of these cases as scalp injury, pattern of skull fractures and intracranial hemorrhages and their distribution were noted at the actual autopsy examination of victim with detailed history related to time, manner and hospitalization. All the data were reduced to tables, graphs and subsequently subjected to computer aided statistically analysis. The gross features of the injuries to skull and its contents were photographed (by SONY digital camera) and recorded.

Observations:

The age group between 20-40 year covers the maximum number of incidences of head injury (Table-1). The most interesting causative factor which was came across during the case study was the handful contribution of 66.84% (79 out of 120 cases) of the Road Traffic Accidents followed by cases of fall from height covering 23.33% (28 out of 120 cases) and rest 10.83% include cases of assault and other traumas (Table-2).Around 56% of the cases were fatal on the very first day and half of the cases among them could not reach to the hospital and died either on the spot, on the way or immediately after they getting admitted in emergency (Table-3). The skull fractures (91.67%), intracranial haemorrhages (92.5%) and brain injuries (92.5%) were common features of almost all fatal

head injuries in combination, which suggests that these are the common lesions and causes of high percentage of mortality (Table-4).The dominant type of skull fracture found was the linear (fissured) fracture in 40% cases followed by basilar fracture counting 29.17% and being the 2nd common type. The depressed, comminuted and crush fracture shared a percentage of [9], [17], [5], [4], [16] among all showing their lesser and un common existence. In rest 10 cases no skull fracture was found (Table-5).Linear fracture is comparatively more common in the thin areas of temporal and parietal bones (Table-6), while on basal region basilar fracture is more commonly involving the anterior and middle cranial fossa (Table-7). Comparative study shows that linear fractures are more common in cases of RTAs while basilar fractures are comparatively more common in cases of fall from height (Table-8).The incidences of intracranial haemorrhages shown in Table-9 revels that the dominant type of intracranial haemorrhage is sub-dural haemorrhage (SDH) involving 83.33% cases followed by sub-arachnoids haemorrhage (SAH) in 28.33% and intra-ventricular haemorrhage (IVH) in 16.67% while the extra-dural haemorrhage (EDH) is the least common type involving only 6.67% cases. We observed that all cases of EDH are associated with SDH while 75% cases of SAH and IVH are associated with SDH.

On comparative study we found that SDH is more commonly seen in cases of RTAs while SAH and EDH are comparatively more common in cases of fall from height (Table-10).

Discussion:

Head injury is a major health problem all over the world. According to WHO estimate the injury is going to third leading contributor of the global burden of the disease after ischemic heart disease and unipolar depression by 2020. Motor vehicle accident is the leading cause of serious injuries with associated head trauma especially in youth and middle age. These accidents occur more frequently in certain age groups, at certain times of day and at certain localities. Some people are more prone to accidents than other and susceptibility is increased by the alcohol, unawareness of traffic discipline and carelessness.

RTA is on the increase globally and India is not an exception. In our capital Delhi, there is an average of about 6 deaths everyday and records the highest number of accidents every year in India – one of the highest in the world. In the year 2004 the slogan on the eve of World Health Day was **"ROAD SAFETY IS NO ACCIDENT".**

The rate of incidence is higher in India because of its traffic patterns and possibly the lack of preventive measures such as helmets in motor cyclists and seatbelts in automobiles and poorly controlled traffic conditions and poor road conditions. Age group 20-40 which covers the maximum youth and the middle age populations, involving males formed the major sufferer group of head trauma with more prone to RTA, compatible to other studies. [4], [5], [8], [11], [12] The rest of the age groups i.e. the females, old aged and children are comparatively involved with a history of fall and other trauma. This can be explained by the fact that at the age of 20-40 people especially male are more mobile, go out for work and take risks, while elderly people, females and children usually stay at home, which coincides with the study of other workers. [4], [5], [11]

The ratio of male:female head injury cases in our study is 5:1 which is very well supported by the other studies. [4], [6] It also gives an almost similar distribution of the external causes of RTAs covering 66% and falls 24% as in our study.

As study shows, the linear (fissured) fracture is the most common type of skull fracture. The more vulnerable thin areas of skull lie in the temporo-parietal, lateral part of frontal and occipital zones. The similar type of finding was presented by other authors (4). A heavy impact on the side or over top of the head often leads to the linear fracture of skull vault in these thin areas, extending up to the base of skull, causing basilar fracture also. Other author also implicates the above-mentioned facts. [1]

The linear fractures extending upto the base of skull are comparatively more common in cases of road traffic accidents than fall from height and assault because this type of pattern is more common in those head injury cases which are caused by forcible contact with a broad resisting surface like ground, especially in a moving condition.

In fatal head injuries subdural haemorrhage (SDH) and subarachnoid haemorrhage (SAH) are the two common type of haemorrhages in which SDH is mainly traumatic in origin with broad etiology while the EDH and SAH both are comparatively more common in fall from height cases than road traffic accident and assault. The extradural haemorrhage was observed in the least and almost all cases were found in age group of more than 20 years, which shows that the EDH is less common in children and adolescent due to the greater adherence of dura to skull and absence of a bony canal for the artery.

Contusions and lacerations of the brain are particularly prominent in regions where the brain is in contact with projectile buttresses and ridges on the inner surface of the skull i.e. the inferior surfaces of temporal poles and orbital surfaces of the frontal lobes, which were also reported by others. [4], [10].

Conclusion:

Distribution and causes of intracranial injuries in present study are more or less similar to the pattern found in most of the other studies. This similarity is there in almost all parameters used in this study. Most of the fatal head injuries are due to road traffic accidents especially in male of 20-40 years of age followed by fall from height cases mostly seen in children and older one. Most of the other workers did not include the types and patterns of intracranial lesions as we did it.

Recommendations:

So far as the studies suggest the basic cause of the concern is the lack of awareness and carelessness of the common masses regarding the traffic and safety discipline and on the other hand a kind of leniency shown by the legal authorities towards such fallacies. The increasing number of vehicle in India indicates the progress and improvement of a developing nation, but it should be kept in mind that the "mobility should not get priority over human lives".

- Proper safety guidelines to be taught right from school children to the youth and especially drivers regarding safe driving.
- Promotions of safety measure like use of seat belts and helmets should be made compulsory and forget the use of mobiles during driving.
- Alcohol and other drug users should be punished legally and also fined heavily so as to create a lesson for others to not to follow alcohol and drug intake while driving.
- There should be a proper segregation of bullock-carts, pedestrians and animals on the roads while traffic is moving.
- The proper layout of roads and speed breakers is an excellent investment and cost effective measure rather than the expenditure on the treatment and the rehabilitation of the traffic injured persons.
- Last but not the least I would like to suggest that at least one fully equipped specialized trauma care center should be established in each major city where medical, social and occupational rehabilitation can be planned for the victims left handicapped after such incidences.

Table 1
Age wise Distribution of cases of Head Injury

Age in Years	No. of Cases	Percentage
0-9	17	14.17
10-19	14	11.67
20-29	26	21.67
30-39	21	17.50
40-49	14	11.67
50-59	11	9.15
>60	17	14.17
Total	**120**	**100**

Table 2
Distribution of cases of Head Injuries by External Cause

External causes	No. of Cases	Percentage of Cases
RTA	79	65.84
Fall	28	23.33
Assault	2	1.67
Others	11	9.16
Total	**120**	**100.00**

Table 3
Distribution of Head Injuries as per Time of Survival

Time of Survival	No. of Cases	Percentage of Cases
0-12 Hrs	40	33.34
12-24 Hrs	27	22.50
24-48 Hrs	13	10.83
3-7 Days	25	20.83
>7 Days	15	12.50
Total	**120**	**100.00**

Table 4
Distribution of cases as per Principle Types of Head Injuries

Types of Head Injuries	No. of Cases	Percentage of Cases
Fracture of Skull	110	91.67
Intra cranial Hemorrhage	111	92.50
Brain Contusions & Lacerations	111	92.50

Table 5
Types of Skull Fracture Observed during Head Injuries

Types of Fractures	No. of Cases	Percentage
Linear	48	40
Basilar	35	29.17
Depressed	11	9.17
Comminuted	6	5
Crush	5	4.16
Ring	1	0.83
Suture Diastatic	1	0.83
Countercoup	3	2.5
No	10	8.34
Total	**120**	**100**

Table 6
Distribution of cases according to Site of Linear Fracture

Site of Fracture	No. of Cases	Percentage Of Cases
Frontal Bone	10	20.83
Temporal Bone	15	31.25
Parietal Bone	12	25.00
Occipital Bone	11	22.92
Total cases	48	100.00

Table 7
Distribution of cases according to Site of Basilar Fracture

Site of Fracture	No. of Cases	Percentage Of Cases
Anterior Cranial Fossa	14	40.00
Middle Cranial Fossa	13	37.14
Posterior Cranial Fossa	8	22.86
Total cases	35	100.00

Table 8
Comparative distribution of Percentage of basilar& linear fracture

No. of Cases	Percentage Of Basilar Fracture	Percentage Of Linear Fracture
Road Traffic Accident (79 cases)	45.57	29.37
Fall from height (28 cases)	21.43	32.14
Total cases (120 cases)	40.00	29.16

Table 9
Types of Intra cranial Hemorrhage seen in Head Injuries

Intracranial Hemorrhage	No. of Cases	Percentage of Cases
EDH	8	6.67
SDH	100	83.33
SAH	34	28.33
IVH	20	16.67

Table 10
Comparative Distribution of Percentage of Intracranial Haemorrhages

Types of Intracranial Hemorrhage	Road Traffic Accident (79)	Fall from Height (28)	Total Cases (120)
Extra-dural Hemorrhage	7.59%	10.71%	6.67%
Sub-dural Hemorrhage	86.76%	75.00%	83.33%
Sub-arachnoid Hemorrage	25.30%	32.14%	28.33%
Intra-Ventricular Hemorrhage	18.90	17.85%	16.67%

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