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Paediatric Autopsy Profile at Manipal, South India

Shankar M Bakkannavar
S Manjunath
Gururaj Biradar
Pradeep Kumar G.

ABSTRACT

The rate of autopsy is directly proportional to the accurate epidemiological study and quality control of medical care. The health status of a community is reflected by the children present who are going to be caretakers of the nation tomorrow. This study aims to analyze all autopsies performed in a tertiary care teaching hospital in south India during 10 consecutive years. A 10-year retrospective autopsy-based study (2001–2010) was undertaken by the department of forensic medicine and toxicology of Kasturba Medical College, Manipal to ascertain the profile of casualties in the paediatric age group. Out of 1778 autopsies performed during the period, 180 victims belonging to the paediatric age group formed the material for the study. The adolescent age group (12–19 years) was most commonly affected, with a significant male preponderance. More than half of the cases were reported in the first half of the year. A seasonal variation was noticed, with many cases being reported during the summer months. Many of the cases were accidental in nature with road traffic accident being the cause. There was much coexistence of the various parameters typical of both industrialized and developing countries, indicating the epidemiological transition. The need for a paediatric autopsy registry is stressed along with recommendations to reduce paediatric fatalities.

Key words: Paediatric autopsy, seasonal variation, adolescents

INTRODUCTION

It's been aptly said that "child is the father of man" and indeed the health status of a community is reflected by the paediatric age group in a given area. But a child of today is subjected to so much of stress starting from a strained relationship between parents resulting in broken homes, expectation to perform better at the academic arena, comparison between children, etc. In addition to this so many natural and manmade disasters make these innocent minds succumb resulting in so many deaths knocking the doors of the forensic pathologist necessitating an autopsy. Deaths include those due to violence, injury, suicide, poisons, deaths that are unexpected and unattended or otherwise suspicious [1].

With the current emphasis on the cost-effectiveness and quality assurance of health care, autopsy results can help evaluate the medical treatments or interventions that a patient receives, and whether or not those interventions are appropriate [2]. The value of autopsy in clinical audit has been highlighted, and discrepancies between autopsy findings and clinical diagnosis may be used to improve diagnostic accuracy [2].

Autopsy is an invaluable tool for medical teaching, research and quality control. To achieve educational, quality control, and research goals, an autopsy protocol should be adopted and strictly followed [3,4]. Because pediatric autopsies are performed on individuals within a broadage (from the fetal

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to teenage periods), such a protocol is essential [3]. Given the different cultural background and practices that prevail among Asian populations and their attitude towards autopsy, it would be useful for pathologists and clinicians to know the autopsy rate, the pattern of distribution, and the rate and nature of discrepant cases. These figures could be used to provide a basis for comparison between Asian and western autopsy results and to explore the value of including autopsy in quality assurance programmes in Asian medical centres [2].

Many countries have brought out the Paediatric Autopsy Registry (PAR) report that may check the health status of children in a given community. This would provide a detailed description of the causes and conditions associated with deaths in children [1, 5, 6].

There is a paucity of literature in the Indian subcontinent too in relation to this. This is a humble approach to provide a detailed report to the society to take care of the tip of this iceberg in relation to paediatric autopsies and also to show how the paediatric autopsies are helpful in a vertically integrated health care system.

MATERIALS AND METHOD

A 10 years retrospective study was conducted in the department of Forensic Medicine and Toxicology, Kasturba Medical College Manipal, India. All medico-legal paediatric cases autopsied in the mortuary of the department, from January 2001 to December 2010, were considered for the study. In this study the paediatric age group consisted of children from birth to 19yrs of age and thus such deaths have been divided into [7]:

Infant deaths
Death occurring in the live born child before it has completed one year of life

Toddler deaths
Death occurring in children between 1-3 yrs of age

Preschool deaths
Death occurring in children between 3 -6 yrs of age

School deaths
Death occurring in children between 6 - 12 yrs of age

Adolescent deaths
Death occurring in children between 12 - 19 yrs of age Information regarding gender, age, demography, time and month of occurrence, mode and manner of death was collected from the autopsy reports, hospital records, and police's requisition letters. The collected data were analyzed using Statistical Package for Social Sciences (SPSS) version 11.5, results obtained, observations discussed and compared with other available studies.

RESULTS

In this retrospective study, a total of 1778 autopsies were conducted at the aforementioned centre during the study period. Paediatric casualties constituted 10.12% (n=180) of the total autopsied cases. Paediatric casualties have remained static over the study period. The year wise distribution of the paediatric casualties is shown in Table no. 1. Majority of the victims were males (n=100, 55.55%) with the male to female ratio being 1.25:1.

Age wise distribution of the paediatric casualties is given in the Table no. 2. The adolescents were most affected accounting for 63.89% (n=115) of the total paediatric casualties. As depicted in Figure no. 1, 58.9% of paediatric casualties (n=106) occurred during the first half of the year. Season wise distribution of paediatric casualties is shown in Figure no. 2.

Paediatric casualties are predominantly traumatic (98.34%) with most of them being a road traffic accident (27.22%) followed by burns (20.56%) and poisoning (19.44%) as shown in Table no. 3. Males outnumbered females in case of road traffic accidents where as females were more in burns and poisoning casualties. Even incidences of children being victimised by electrocution, lightening, snake bite and explosive blast were noticed in males where as females were spared from these trauma. Manner of these casualties is depicted in Figure no. 3. The incidences of accidental deaths were more with 71.12% (n= 128). Most number of accidental deaths were

Table 1. Year and gender wise distribution of paediatric casualties

Year	Total cases	Paediatric cases		
		Total (n, %)	Male (n, %)	Female (n, %)
2001	197	26 (13.20%)	12 (6.09)	14(7.11)
2002	158	16 (10.13%)	9(5.70)	7(4.43)
2003	113	13 (11.50%)	9(7.96)	4(3.54)
2004	129	09 (6.98%)	7(5.43)	2(1.55)
2005	141	16 (11.35%)	13(9.22)	3(2.13)
2006	155	14 (9.04%)	7(4.52)	7(4.52)
2007	151	17 (11.26%)	10(6.62)	7(4.64)
2008	196	16 (8.16%)	6(3.06)	10(5.10)
2009	236	19 (8.05%)	9(3.81)	10(4.24)
2010	302	34 (11.26%)	18(5.96)	16(5.30)
Total	1778	180 (10.12%)	100(55.55%)	80(44.45%)

Table 2. Age wise distzribution of paediatric casualties

Age group	Male	Female	Total	M:F
Infant (Up to 1 Year)	2	5	7(3.89)	1:02.5
Toddler (1 – 3 Years)	9	7	16(8.89)	1.28:1
Preschool (3 – 6 Years)	8	5	13(7.22)	1.06:1
School (6 – 12 Years)	17	12	29(16.11)	1.42:1
Adolescent (12 – 19 Years)	64	51	115 (63.89%)	1.59:1

Table 3. Mode of death in Paediatric casualties

Mode	Male	Female	Total
RTA	35	14	49 (27.22%)
Poisoning	14	21	35 (19.44%)
Burns	11	26	37 (20.56%)
Drowning	15	4	19 (10.56%)
Fall	14	4	18 (10.00%)
Hanging	4	10	14 (7.77%)
Sudden death	2	1	3 (1.66%)
Electrocution	2	0	2 (1.11%)
Lightning	1	0	1 (0.56%)
Snake bite	1	0	1 (0.56%)
Blast Injury	1	0	1 (0.56%)
	100	80	180

Figure 1. Month wise distribution of Paediatric casualties

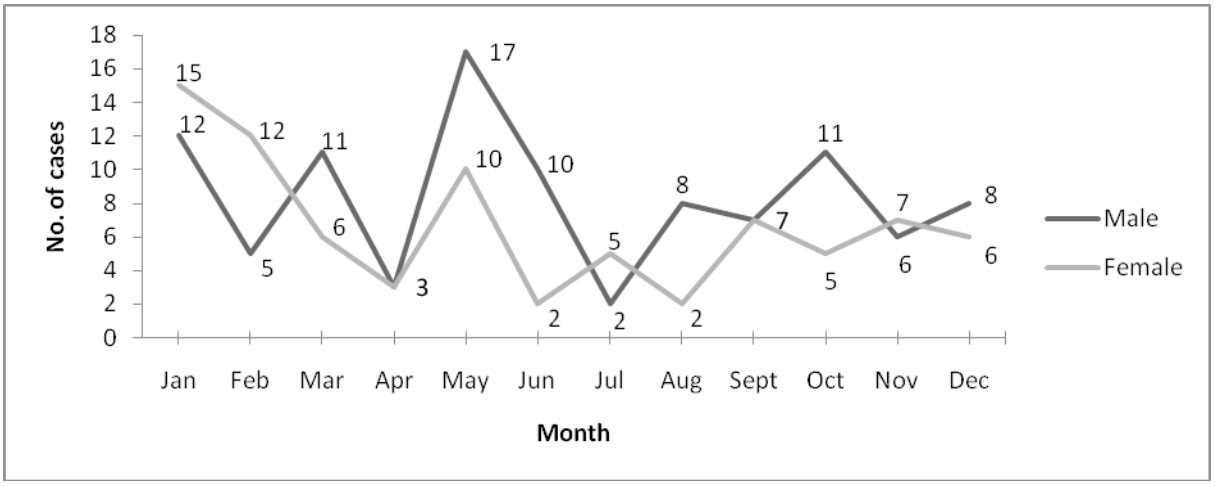


Figure 2. Season wise distribution of Paediatric casualties

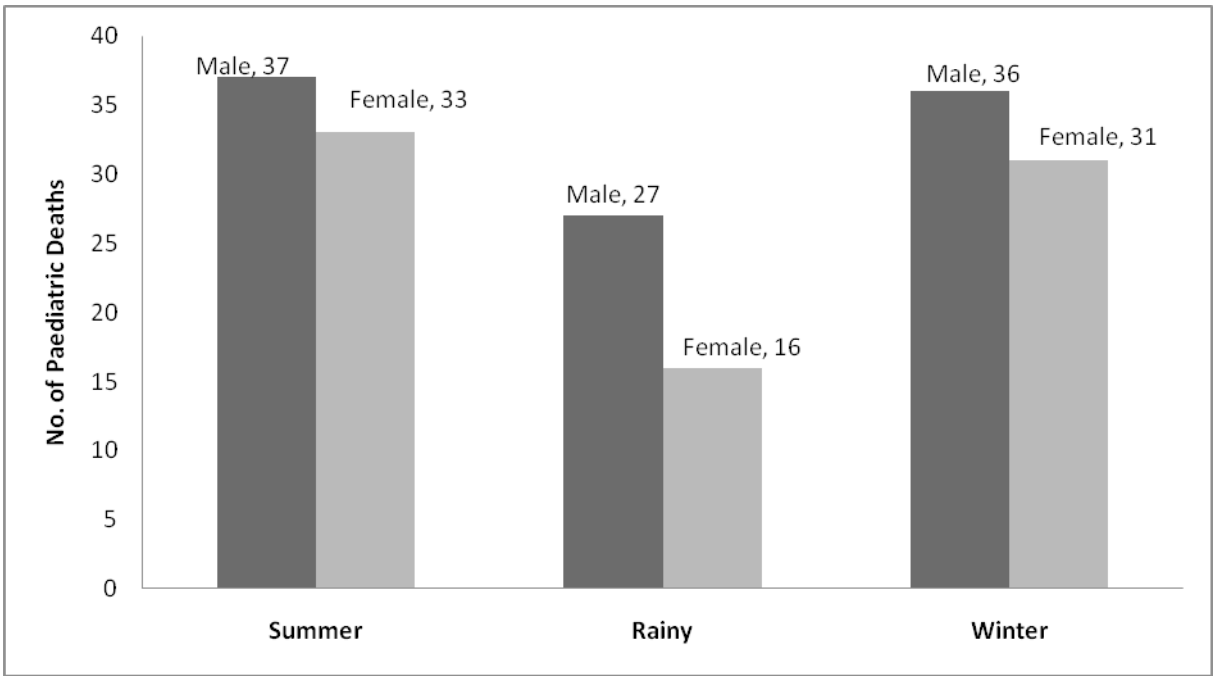
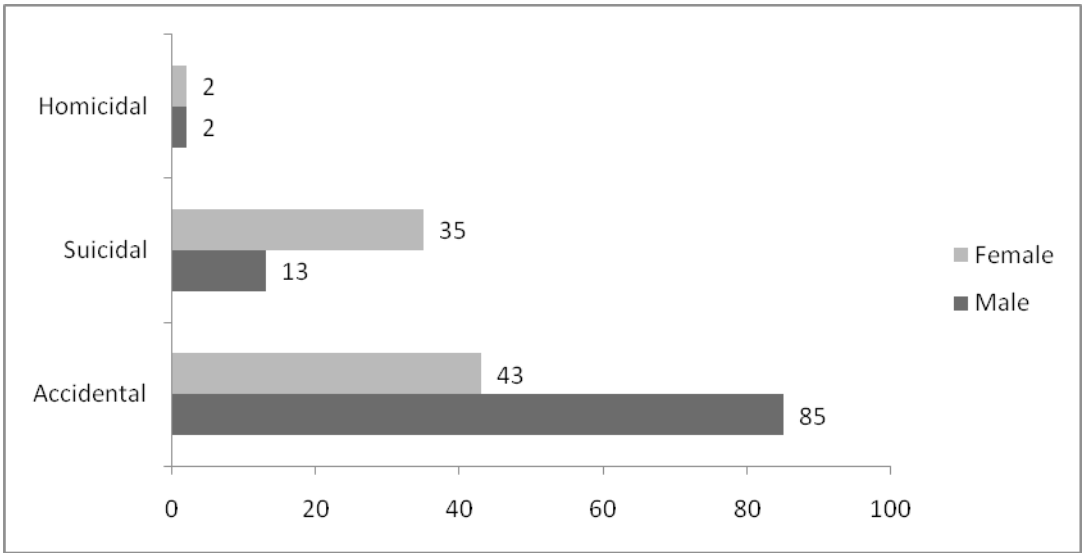


Figure 3. Distribution of the manner of death in Paediatric casualties



due to road traffic accidents (n=48) followed by burns (n=28), drowning (n=19), fall (n=17) and poisoning (n=9). One case of accidental hanging was present during the study period where the mother's saree entangled the neck of the boy while playing. Among the suicidal deaths poisoning amounted to maximum number (n=26) followed by hanging (n=13).

DISCUSSION

Paediatrics is the branch of science dealing with children, their development and care and with the nature and treatment of disease in the children [8].

There are innumerable studies on perinatal autopsies 9 - 13 but fewer studies are reported on infant or childhood autopsies in the literature. Though autopsy material is not totally representative of childhood mortality in this region, it gives an idea about its trends. This prompted the authors to undertake the present composite autopsy study.

In India, children under 15 yrs of age constitute about 35.3% of the population. 0-14yrs age group is considered more important in all societies because the determinants of chronic disease in later life and health behaviour are laid down at this stage. The childhood period is also a vital period because of the so called socialization process, that is, transmission of attitudes, customs and behaviour etc. In addition to this, of course they are vulnerable to disease, death and disability owing to their age, sex, place of living, socio economic class and a host of other variables [14]. These can act as a double edged sword which can make or break a child's future any many may fall victims resulting in unnatural deaths thereby necessitating medico legal investigations.

In our study paediatric autopsies constituted 10.12% of the total autopsies conducted. This was almost in agreement with study done in Jammu (12.25%) [15], South India (8.5%) [16], Transkei region of South Africa [17] and John R Hall study [18] and less when compared to studies done in Brazil (21%) [19]. Similar study done in Kuala Lumpur accounted for only 4.9% of total autopsies [7].

In the present study, majority of the victims were males (55.55%) and females constituted 44.45%. This was in concurrent with the various studies across the world [18, 20 - 24]. The reasons for male preponderance may be the active and adventurous nature associated with the male sex, thereby leading to more fatalities. The orthodox Indian community prevents the female sex from taking part in all those activities like that of the males and this explains the decrease in casualties related to the female gender. Female victims predominated in other reported works from India and abroad [25, 26].

Age wise distribution shows a gradual increase in number of deaths from the toddler age group to finally peak in the adolescent age group thereby signifying the dictim "more the maturity, more the problems". This was in agreement with the other study [16]. The reasons for the increase in deaths in adolescents could be attributed to the presence of rebellious nature at this age where parents are construed as enemies if they advice the budding teenager. The teenagers nowadays are influenced by the present cultures and diet so much so that they try to simulate everything without any forethought. They fall prey to drug addiction, sexually transmitted diseases and innumerable problems thereby losing their studies and work related goals. Pressure to prove everywhere is an additional burden and comparison at every level affects the minds resulting in more impulsive decisions and thereby a lot of fatalities. Among the adolescents the male to female ratio was 1.59:1 thereby indicative of the fact that both males and females are more or less equally susceptible to the ever changing trends of the society. However the data from South Africa suggests 11-15 years to be more commonly affected.

Seasonal variation and time of the year too have shown an impact in the present study. The maximum number of casualities (n = 70, 38.9%) were reported during the summer season. The reasons could be the holidays after exams as most of the educational institutions declare vacations during this season bringing the children out of homes to play. They stay outside throughout the day and tend to try different sports or adventures exposing them to fatal accidents. Rainy season in the coastal area of the country extends from June to September thereby forcing the children to stay indoors and of course study and preparation for exams takes the toll away. This could be responsible for a decrease in number of casualities during the rest of the year. There was an increase in the number of deaths (n=67) noticed in the winter months too. Different studies across the world have different outcomes regarding the seasonal variation of paediatric fatalities. The incidences were more during May – June and in December according to Memphis study.24 A study from Canada27 suggested more involvement in the months from June to October whereas more casualities reported during October – March in a study from Boston.28

When the type of casualty reported was taken into consideration it was noted that road traffic accidents peaked with a toll of 27.22%. The reasons for the increase in deaths due to road traffic accidents could be the fact that children in most parts of India still use roads as the playgrounds. This is evident from the fact that some of the present day cricketers

have always exclaimed that they have come up playing in the roads of India. Moreover crowded localities, ever increasing vehicles in the existing same roads and the ignorant society add up to this burden increasing the number of road traffic accidents. India may have 1% of vehicles in the world but is accountable for 6% of the total cases of unintentional injuries.15 Males (n = 35) outnumbered females (n = 19) in road traffic accidents where as females outnumbered males in deaths due to poisoning (n = 21) and burns (n = 26).

Reasons for the increase in burn fatalities among females could be due to the fact that the typical Indian kitchen still uses the traditional 'Indian choolaah' (Mud Stove where fire wood is used) or a kerosene or pump stove which are risky to work with. Women are more into the kitchen then men as the traditional Indian society expects them to do all the household chores especially cooking food, etc. Deaths due to dowry and child marriages further complicate these issues and it becomes an easy access to immolate a person in the kitchen especially for the mother in law and give an easy reason as death was attributed to a fire accident. A girl child is let into the kitchen at a very early age as many of them are married before their legal age of marriage thereby such deaths are also a part of paediatric deaths. Moreover the impulsive nature of a female may sometimes be blamed to the hormonal changes during their menses and a suicidal tendency thereby [29 - 31].

Deaths due to poisoning (19.44%) were the next highest among the paediatric deaths reported. India being an agricultural country, most of the insecticides sprayed for the fields are very much kept at homes itself. Due to lack of space these may be kept in the living room and kitchen area resulting in accidental ingestion by children for example ratol (rodenticide) paste can be easily mistaken for toothpaste and can be ingested by a child resulting in poisoning. Spraying of the insecticides in the fields also may result in accidental dermal absorption in children who tend to play in the fields thereby resulting in death.

When the manner of death was taken into consideration, accidental deaths topped the list with 71.12% (n = 128) followed by suicide (26.66%) and the least being homicide (2.22%). These findings were in agreement with other studies.16,17 Among accidental deaths, more were due to road traffic accidents (n = 48) followed by burns (n = 28), drowning (n = 19) and falls (n = 17) and finally poisoning (n = 9). This is similar to the conclusions drawn by the paediatric Death review Committee report 2010 of the deaths on the province of Ontario even though the numbers are more than us for a given year [5]. Road traffic accidents predominated in other reported works too [16, 17, 22, 27, 32]. In an Indian study, accidental poisoning was common in children below 5 years of age whereas suicidal poisoning was more after 13 years of age [33]. Accidental poisoning predominated in another study done in Boston [28]. There was equal distribution of accident and suicide in cases of hanging deaths in children in a study from Scotland [22].

The reason for road traffic accidents being more common could be attributed to rash driving methods adopted by the children when they forget to realise the fact that speed thrills, but kills. Reflexes may not act all that well in a child when a fast approaching vehicle is seen coming towards the child and the child may be too shocked to move also. Finally as mentioned before, the road may be a major play ground for the child resulting in death due to a vehicular accident. Paediatric Death Review Committee (PDRC) reports the accidental deaths of children between 5 -10 yrs in the years between 2004 -07 showed the predominance of RTA followed by drowning and fire which is similar in comparison with our study too [5].

This part of the country being a coastal area, drowning deaths are also on the increase as children tend to play in the sea or backwaters thereby resulting in accidental deaths. Swimming without supervision of a parent or a caretaker and lack of use of lifejackets may be the contributing factors.

When suicide was taken into consideration, consuming a poison to end the life was more commonly encountered (n = 26) because of their easy accessibility at most of the Indian agricultural homes. Canadian statistics reveal suicide to be the second leading cause of death between 10 -24 yrs [5]. Hanging also

contributes a small part in suicidal deaths (n=13) as this gives an instantaneous death and children tend to copy this from the elders as portrayed in so many television soaps and films.

Four paediatric fatalities were homicidal in nature. Out of the four cases, three (two female and one male child) were victims of burns and a fourth was a male child who died due to injuries sustained when the father threw the child on the ground.

CONCLUSION

The life of a person from womb to tomb is faced by so many obstacles. Childhood is considered to be a 'Golden age' by many as it is free from responsibilities. It can be a boon or bane if not taken care properly. This is a humble study to outline the severity of paediatric deaths in a small district of an Indian society. We hereby enumerate the following recommendations that would be helpful to reduce the paediatric fatalities in future.

1. Proper parental care and nourishment by parents from infancy till adolescence
2. Counselling adolescents with respect to stress may it be exams, competition etc.
3. Proper handling of poisons and knowledge regarding them to everyone dealing with agriculture
4. Health education regarding first aid treatment before reaching hospital
5. Better fire safety measures at home
6. Better care of a girl child and her associated problems
7. Swimming of children under the supervision of elders and also use of safety gadgets

Finally lack of Indian literature regarding the autopsies in paediatric deaths especially in the manner of death prompted us to take up this study. This stress the need for a Paediatric Autopsy Registry (PAR) which is still a distant mirage and this study is our sincere step towards it.

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Exploring determinants of septic abortion: improving the evidence base in Western Orissa, India

Arun Kumar Singh

ABSTRACT

Background: Septic abortion continues to contribute to the perennial burden of maternal mortality in the developing countries. Literature regarding the characteristics of cases from Orissa, India is virtually non-existent to formulate a preventive hypothesis. **Materials and methods:** Fifty consecutive cases of septic abortion treated in 3 maternity hospitals in rural part of western Orissa, India. Hospital records of these patients are analyzed to explore the epidemiological variables associated with such cases. Study design: Descriptive Epidemiology-Retrospective study of hospital records. **Result:** Septic abortion is common among married and multiparous women, of low socioeconomic status in the age group of 19-30 years. Timely intervention provided good cure rate. Conclusion: Adequate counseling regarding Medical Termination of Pregnancy at the grass-root level may help in curbing this menace to maternal health.

Key words: Septic abortion, criminal abortion, MTP Act.

INTRODUCTION

An abortion that becomes complicated with infection is called septic abortion and this complication is frequently associated with induced abortions. WHO defines unsafe abortion as a procedure for terminating an unintended pregnancy either by individuals without necessary skills or in an environment that does not conforms to minimum medical standard or both.1

Every year, almost 42 million abortions take place throughout the world; out of which 20 millions are terminated illegally often performed by unskilled providers and/or in unhygienic conditions [2]. Almost 98% of these illegal abortions take place in developing countries. According to the WHO, 2–12% of maternal deaths in developing countries are due to complications of abortions.3 Therefore reducing unsafe abortions and the complications resulting from them is directly linked to improved maternal mortality.

There is a wide variation in the age-wise variation of septic abortions in different geographical locations. While in African countries teenage abortions are common, in Asia the proportion is higher in 30-44 age group [4,5,6,7,8]. Accordingly, Induced abortion is common in unmarred women in Africa, and married women in Asia [9]. Similarly, most of the abortion septic abortion patients are multipara in Asian countries compared to the African nations [5,6,7,8,10,11]. Various studies have speculated the close relationship between septic abortion with poverty and illiteracy [8,12]. Therefore, the rate of unsafe abortion is higher in underdeveloped and developing countries compared to the developed nations. Unsafe abortion is closely linked to religion in India. Statistics shows that the abortion rate is highest among Hindus compared to

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Muslims and other religion [2,7,8]. Studies from developing nations reveals that the countries, where abortion laws are restricted, most of the abortions are performed by local unqualified quacks [2,10,11,12,13,14] The quacks try to abort the pregnancies by using orthodox methods like inserting foreign bodies to uterine cavities, oral administration of poisonous substances (abortifacients), and sometimes inserting poisonous substances into the uterus. Therefore the chances of an induced abortion getting septic is very high in these procedures [4,7,10,11,13].

Being concerned over the existing high maternal mortality and morbidity in India, the Government in recent years has started 'Janani Surakshya Yojna, targeting to provide a safe motherhood [15]. Although septic abortion and its complications have been acknowledged as an important public health problem, reliable data regarding the distribution of cases, and the epidemiological variables are lacking from Orissa. Therefore, the present study was undertaken to study the vulnerable population and simultaneously to explore the preventable situations.

MATERIALS AND METHODS

Fifty cases of septic abortions admitted to a tertiary care hospital in Western Orissa over a period of one year, formed the study population for the purpose of the present appraisal. Using the WHO definition, we categorized the unsafe abortions. The causative organisms are isolated from high vaginal swabbing by culture in order to further classify the septic abortions. The hospital records of these patients were analyzed to evaluate the age group distribution, parity, marital status, socio-economic background, the person performing the abortion, complications and the resulting outcome. Study design: Descriptive epidemiology by retrospective analysis of hospital records. Inclusion criteria: all cases admitted with history of unsafe abortions. Exclusion criteria: patient leaving the hospital against medical advice.

RESULT

The mean age of unsafe abortion in our study population was 32.4 years. Maximum patients belonged to 21-30 years (50%) followed by the age group of 31-40 years (32%). Eighty percent of the patients were married; 20% unmarried; none were widowed or divorced. Among the married couples, most were multipara, with more than one living children. Our population mainly consisted of Hindus (92%). In most of the cases 31 (62%), the untrained local quacks performed the procedure. Midwifery, and nurses were involved in 13 (26%) of cases, while the patient herself tried in 6 cases. Among the victims, 84% belonged to lower economic strata and the rest to middle strata. The commonest method employed for inducing abortion was local trauma, i.e. insertion of foreign body into the uterus (70%), followed by ingestion of poisonous substance (14%). Unknown poisonous substances were introduced into the uterine cavity in 12% of cases.

During admission, the most common presenting complications were generalized peritonitis (60%) resulting from perforation of uterus, followed by shock (56%) and renal failure (24%). In spite of these dreaded complication, 80% of the victims fully recovered. Four patients were referred to other specialties for further management. The mortality rate in our study was 12%.

DISCUSSION

We observed that the most vulnerable group for an septic abortion in western Orissa are the poor married women belonging to 21-30 years of age, who have already more than one children. Similar finding were observed by different authors conducting studies in other parts of India as well as in the neighboring countries [6,7,8,9,10,11,12]. Our study population comprised of the women from western rural Orissa, a state laden with illiteracy and poverty, where the age for marriage among girls is considerably low. So, most of these poverty stricken women can not afford to rear more than one or two children. Any pregnancy after that is considered unwanted for the family. Due to illiteracy, the use of contraceptive is also very low in this part of the world. Hence the pregnant women frequently resort to clandestine method of procuring abortion [6,8,10,11,14]. The doctor population ratio in Orissa (particularly western Orissa) is one of the lowest among the Indian states. Most of the doctors' post in government

Table 1.The demographic characteristics of victims of septic abortion

Age	No (n=50)	%
14-20	9	18
21-30	25	50
31-40	16	32
Marital status		
Married	40	80
Unmarried	10	20
Parity		
Nullipara	12	24
Multipara	38	76
Socioeconomic status		
Lower	42	84
Middle	08	16
Religion		
Hindu	46	92
Muslim	4	8
Interference by		
Untrained quacks	31	62
Midwifery/ nurses	13	26
Self	6	12

Table 2. The gynaecologic variables associated with septic abortion

	No. (n=50)	Percentage
Methods employed		
Insertion of foreign body (local trauma)	35	70
Ingestion of a poisonous substance	7	14
Insertion of poisonous substance	6	12
Others	2	4
Complications		
Generalized peritonitis	30	60
Shock	28	56
Renal failure	12	24
Septicaemia	5	10
Faecal fistula	3	6
Outcome		
Completely cured	40	80
Death	6	12
Referred to other specialties	4	8

hospitals lays vacant perennially, which is also a significant reason why most of the abortions are induced by the local unqualified quacks having minimal knowledge of female genital system anatomy [7,10,12,13].

Local trauma inflicted by inserting a foreign body is the commonest method employed. This finding has already been observed by other researchers from various parts of the developing nations [4,7,13]. This may perhaps be the well accepted and well established among the quack communities. However, this method carries an inherent hazard in that, if not employed properly, it may result in perforation of the gravid uterus resulting in peritonitis [7,8,10,11]. This may be the main reason to explain for the majority of the women presenting with the features of generalized peritonitis. The other notable dreaded complications observed in our study are shock and renal failure. However, although we could have successfully treated majority of the patients; we could not save the life of 10% of our patients from this abhorrently stigmatized practice.

CONCLUSION

The victims of septic abortion in western Orissa are mostly the married, multiparous

women belonging to underprivileged society. The abortions are induced mostly by unqualified local quacks using the traditional and hazardous methods resulting in life threatening complications. Although it seems that reduction in the general poverty level and mass education are the genuine and authentic solutions, it appears unfeasible in the present day scenario of the State as well as the Central Government. Therefore, adequate propaganda and encouragement regarding the available family planning procedures and the medical termination of pregnancy remains as a reasonable and practicable alternative.

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Teeth-hidden treasure of blood group

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ABSTRACT

Purpose: To determine the ABO blood group from the dental pulp of extracted teeth at various time intervals by Absorption-Elution technique. **Method:** Extracted teeth (50 permanent and 50 deciduous) were collected and longitudinally sectioned. The pulp was scooped and used for blood grouping by Absorption-Elution technique. The blood grouping was done at intervals of, day one of extraction, day 14, day 30, day 90 & day 180 respectively. Blood from the freshly extracted socket was soaked with gauze which served as the control. **Results:** Overall, ABO blood groups could be identified from 88% of permanent teeth and 44% of deciduous teeth. As the time interval increased the number of positive results obtained decreased. **Conclusion:** The permanent teeth furnished higher percentage of positive results than the deciduous teeth, on the same day of the extraction and on the 14th day after the extraction respectively.

Keywords: Odontology, Human identification, Pulp, ABO blood grouping, Absorption - Elution technique.

INTRODUCTION

Forensic Odontology (dentistry) is an investigative aspect of dentistry that analyzes dental evidence for human identification.1 Identifiable information from oral structure is more than any other part of the body.Forensic dentistry plays a major role in the identification of those individuals who cannot be identified visually or by other means. An important feature of teeth is that they are the most indestructible part of the body and exhibit the least turnover. They not only survive death but also remain relatively unchanged thereafter for many thousands of years. Forensic Dentistry relies on this indestructibility [2].

Blood groups have been the corner stones for identification of biological materials in Forensic science and medicine [3]. The ABO system has been a major focus, since the record of this blood system is a very prevalent one and A, B and O (H) antigens on erythrocytes are also associated with other cells and tissues throughout the body and are known to be considerably stable to the violent conditions as heating or drying [4].

The existence of blood group antigens in the dental tissues (i.e. enamel, dentin, and pulp) have been the subject of debate for a long time.5,6 The presence of ABO blood group antigens in the dental hard and soft tissues makes it possible to assist in identifying highly decomposed bodies where teeth and bone are the only significant tissues remaining [3].

Characterizing body fluid stains by absorption-elution typing for ABO group was one of the most significant advances in forensic biology. Absorption-Elution technique was devised by Siracusa (1923) and refined by Kind, who employed it almost exclusively for blood typing of teeth in Forensic Science laboratory.7 Though adaptation of the more sensitive assays may increase the utilization of these tissues but of particular value would be the development of simpler methods

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for blood group substances in teeth. The absorption-elution technique is a relatively easy and economical method. No sophisticated storage method is required and reexaminations of samples are undemanding.8 Thus we chose this method for our study.

Fresh or recent tooth specimen could be expected to provide a good source for the determination of blood group. However there is the possibility of loss of pulpal antigens due to autolysis and dehydration in long standing tooth remains.9Therefore we thought it was justifiable to study the blood group antigens of the dental pulp at various time intervals i.e. on the day of extraction, 14th, 30th, 90th and 180th day after the extraction of permanent and deciduous teeth.

MATERIALS & METHODS

The study subjects were randomly selected from the department of Pedodontics and oral surgery, after obtaining informed consent.

Inclusion criteria

The permanent teeth indicated for extraction due to periodontal and orthodontic problems. The primary teeth with physiologic mobility or those indicated for serial extractions.

Exclusion criteria

Infected teeth, root canal treated teeth, teeth from individuals above 40 years of age. In correspondence to the time interval (i.e. on the day of extraction, 14th, 30th, 90th and 180th day of extraction.) we divided our samples into five groups (i.e. Group I-V) and planned a sample of 20 teeth (10 permanent and 10 deciduous teeth) in each group. In accordance, bottles were numbered into which the teeth were to be stored. The routine extraction procedure was carried out. The extracted teeth were washed in running water, wiped with gauze and randomly placed in their respective bottles. Blood-stained compresses from the extraction wound served as controls.

ABO grouping (agglutination method) was performed on blood-stained compresses from the extraction wound and the results were noted. Blood groups from the dental pulp were identified by Absorption-Elution technique. This method was carried out at stipulated time intervals and was then compared with that of the control. The teeth were embedded in the modeling wax block. Carborandum disc was used to longitudinally section the teeth embedded in wax blocks. The dental pulp was scooped with sterile spoon excavators, which was then placed in a test tube containing a drop of saline and sterile cotton thread. The test tubes were placed in the incubator at 56°C for 30 minutes so that the blood group antigens of dental pulp were absorbed by the sterile cotton thread.

Blood stained threads of 2 mm length were cut and placed in a drop of anti-A serum in a slide cavity. Similar pieces were placed in anti-B serum. The slides were then kept in moist chamber at 4°C for 2 hours for complete absorption. After absorption, the antiserum was pipetted off from the thread by capillary pipettes and then the thread was thoroughly washed 3 to 4 times in ice cold saline, for the complete removal of unreacted antibodies from it. Slides were again placed in moist chamber and placed in an incubator at 56°C for 30 minutes to break the antigen - antibody bond (Elution).

One drop of a 0.5% suspension of known RBC blood group was added and the samples were again placed in the humidified recipient and were incubated at 56° C for 15 minutes to enhance agglutination. The slides were then removed from the incubator to be kept at room temperature for 45 minutes to 1 hour and were observed under microscope at magnification 100x for agglutination i.e. ABO blood groups. The slides were agitated before reading agglutination.

The results were tabulated. The data was analyzed by comparison (based on percentage).

RESULTS

Cent percent positive results were obtained on the same day and on the 14th day after the extraction of permanent teeth (table1&2). But only 80% success rates were achieved on the same day of extraction of primary teeth and 70% on 14th day of extraction of primary teeth

Table 1. Blood grouping on the day of extraction (Group I)

Blood groups	Permanent teeth				Deciduous teeth			
	Control group		Study group		Control group		Study group	
	Positive	Negative	Positive	Negative	Positive	Negative	Positive	Negative
A	4(40%)	0(0%)	4(40%)	0(0%)	4(40%)	0(0%)	3(30%)	1(10%)
B	3(30%)	0(0%)	3(30%)	0(0%)	1(10%)	0(0%)	1(10%)	0(0%)
AB	1(10%)	0(0%)	1(10%)	0(0%)	1(10%)	0(0%)	1(10%)	0(0%)
O	2(20%)	0(0%)	2(20%)	0(0%)	4(40%)	0(0%)	3(30%)	1(10%)
Total positive	10(100%)	0(0%)	10(100%)	0(0%)	10(100%)	0(0%)	8(80%)	2(20%)
	10(100%)		10(100%)		10(100%)		8(80%)	

Table 2. Blood grouping on the14th day of extraction (Group II)

Blood groups	Permanent teeth				Deciduous teeth			
	Control group		Study group		Control group		Study group	
	Positive	Negative	Positive	Negative	Positive	Negative	Positive	Negative
A	3(30%)	0(0%)	3(30%)	0(0%)	1(10%)	0(0%)	1(10%)	0(0%)
B	2(20%)	0(0%)	2(20%)	0(0%)	3(30%)	0(0%)	3(30%)	2(20%)
AB	1(10%)	0(0%)	1(10%)	0(0%)	2(20%)	0(0%)	2(20%)	1(10%)
O	4(40%)	0(0%)	4(40%)	0(0%)	4(40%)	0(0%)	4(40%)	0(0%)
Total positive	10(100%)	0(0%)	10(100%)	0(0%)	10(100%)	0(0%)	7(70%)	3(30%)
	10(100%)		10(100%)		10(100%)		7(70%)	

Table 3. Blood grouping on 30th day after extraction (Group III)

Blood groups	Permanent teeth				Deciduous teeth			
	Control group		Study group		Control group		Study group	
	Positive	Negative	Positive	Negative	Positive	Negative	Positive	Negative
A	2(20%)	0(0%)	2(20%)	0(0%)	1(10%)	0(0%)	1(10%)	0(0%)
B	4(40%)	0(0%)	3(30%)	1(10%)	4(40%)	0(0%)	2(20%)	2(20%)
AB	0(0%)	0(0%)	0(0%)	0(0%)	1(10%(0	0(0%)	0(0%)	1(10%)
O	4(40%)	0(0%)	3(30%)	1(10%)	4(40%)	0(0%)	1(10%)	3(30%)
Total positive	10(100%)	0(0%)	8(80%)	2(20%)	10(100%)	0(0%)	4(40%)	6(60%)
	10(100%)		8(80%)		10(100%)		4(40%)	

Table 4. Blood grouping on 90th day after extraction (Group IV)

Blood groups	Permanent teeth				Deciduous teeth			
	Control group		Study group		Control group		Study group	
	Positive	Negative	Positive	Negative	Positive	Negative	Positive	Negative
A	2(20%)	0(0%)	1(10%)	1(10%)	1(10%)	0(0%)	0(0%)	1(10%)
B	5(50%)	0(0%)	4(40%)	1(10%)	4(40%)	0(0%)	1(10%)	3(30%)
AB	1(10%)	0(0%)	1(10%)	0(0%)	3(30%)	0(0%)	0(0%)	3(30%)
O	2(20%)	0(0%)	2(20%)	0(0%)	2(20%)	0(0%)	1(10%)	1(10%)
Total positive	10(100%)	0(0%)	8(80%)	2(20%)	10(100%)	0(0%)	2(20%)	8(80%)
	10(100%)		8(80%)		10(100%)		2(20%)	

Table 5. Blood grouping on 180th day after extraction (Group V)

Blood groups	Permanent teeth				Deciduous teeth			
	Control group		Study group		Control group		Study group	
	Positive	Negative	Positive	Negative	Positive	Negative	Positive	Negative
A	2(20%)	0(0%)	2(20%)	0(0%)	0(0%)	0(0%)	0(0%)	0(0%)
B	6(60%)	0(0%)	4(40%)	2(20%)	5(50%)	0(0%)	0(0%)	5(50%)
AB	0(0%)	0(0%)	0(0%)	0(0%)	2(20%)	0(0%)	0(0%)	2(20%)
O	2(20%)	0(0%)	2(20%)	0(0%)	3(30%)	0(0%)	0(0%)	3(30%)
Total positive	10(100%)	0(0%)	8(80%)	2(20%)	10(100%)	0(0%)	0(0%)	10(100%)
	10(100%)		8(80%)		10(100%)		0(0%)	

(Table 1, 2).

An Eighty percent success rate was achieved on the 30th, 90th and 180th day after the extraction of the permanent teeth (table 3, 4 & 5). But we could achieve only 40% on the 30th day, 20% on the 90th day and 0% on the 180th day after the extraction the deciduous teeth respectively (Table 3, 4 & 5).

DISCUSSION

The resilience of the teeth and its supporting tissues to pre- and post-mortem assaults provides a wealth of information for those interested in the identity of the deceased. Chemical attack, burning, burial, submersion, and even severe head and neck trauma are all withstood by the dentition to an extent where identification is possible [10].

The determination of ABH(O) specific

antigens from finger toe nails, hair, teeth, bones and muscles can be used for the identification of victims [11]. Various authors have reported that the dental pulp tissue can be used for ABO blood typing of victims [5,9,12,13,14]. Several techniques like Mixed-Agglutination, two-dimensional Absorption-Inhibition (2-D-AI), Electrophoretic technique, Infusion-sedimentation phenomenon etc including Absorption-Elution technique have been used in Forensic Science for ABO blood group typing [3,9,12,13].

In the present study, the blood grouping of dental pulp from the permanent teeth carried out on the same day, and on the 14th day furnished 100% success rates but the blood grouping of dental pulp carried out on the 30th, 90th and 180th day furnished only 80% success rates.This is in contrast to the study done by Sharma and Chattopadhyaya [5]. Cent percent success rate was achieved up to the 24th month after the extraction, irrespective of the type of dentition. Similar findings have also been reported by Takata [15]. Whereas Smeets6 et al reported 86% success rate up to 21 months after the extraction of the permanent teeth.

In accordance to Heartig et al 9 the overall decrease in the success rate of our study could be due to cell lysis; contamination of the tooth or time lapse for the procedure. The lower success rate of deciduous teeth could be attributed to variation in the pulp volume, loss of the tissue during sectioning and root resorption in the deciduous teeth.

The dental tissue can get contaminated with aerobic gram negative bacteria (e. coli & s. maracesens). These microorganisms' pocess ABO blood group like antigens, simulating a B-type blood group [14]. This could be another reason for higher failure rates. As majority (i.e. 36) of our samples was of the blood group B type. More sensitive methods like multiplex single primer extension reaction, serologically active proteases could be used to control the moisture or heat sensitivity [17,18].

Thus our study emphasizes that the blood typing of tooth pulp by Absorption-Elution method can be used for relative identification of individuals.

CONCLUSION

In our study the permanent teeth exhibited higher percentage of positive results than the deciduous teeth. The blood group identified on the same day of the extraction and on the 14th day after the extraction demonstrated a higher percentage of positive results.

Based on our findings we could probably culminate that the absorption- elution technique is a reliable, economical and easy method for grouping blood samples from the dental pulp.

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Determination of Sex from Ulna by Univariate Analysis

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ABSTRACT

Background: Determination of sex is one of the key questions to be answered in cases of unidentified bodies in medicolegal cases or anthropological studies. A number of studies are available in this regard. The studies being population specific and in general are of not universal help. Present study is an attempt to establish metrical parameters of ulna for the determination of sex.

Materials & Methods: 193 adult human ulnae comprised 133 male and 60 female from the Bone Bank of Govt. Medical College Aurangabad, were used for the present study. Parameters like Length of Ulna (L), width of Proximal Ulnar width (PWD), Distal Ulnar Width (DWD) and Head Circumference (HC), Olecranon Anterioposterior Diameter (OAPD), were recorded and analyzed statistically. Mean, SD, P values and demarking points for male and female are obtained. Cross validation of the ulnae is done using the obtained Demarking points.

Results: All the parameters are found to be statistically significant and Demarking points are found to be valid in sorting the ulnae. Conclusion: The Metrical parameters of long bones including ulnae are of immense help in determination of sex of deceased person specially in cases where skeletal remains available are very less.

Key Words- Sexual Dimorphism, Demarking Points, P Value, Forensic Anthropology, Skeletal Collection

INTRODUCTION

Long before the word 'Anthropology' was introduced, many people tried to determine the sex of the skeletal remains .Various studies have indicated that sexual dimorphism can be found in skull[1], pelvis[2], sternum[3] and other bones of the body. As a general rule definitive sexual traits in the skeleton do not manifest until after the full achievement of the secondary sexual traits that appear during puberty. The dividing line between immaturity and maturity is somewhere around 15-18 years. Prior to this age sexing the bones has been inconclusive. Hence the description of the sex differences is to be limited to the ages above 18 years.

Literature indicates that sex determination from skeletal remains started in 18th century A.D. since then various studies have shown sexual dimorphism in skull [1], pelvis [2], sternum [3] & other bones. Ulna is Latin word meaning elbow. The Ulna is a medial bone of the forearm.

The present study aims at usefulness of Total Length (L), Proximal Ulnar Width (PWD), Distal Ulnar Width (DWD), Head Circumference (HC), and Olecranon Anterioposterior Diameter (OAPD) for sex determination of ulnae and compares the study with other studies carried out on ulnae. The difference between the means in

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males and females were significant (P<0.001). A discriminant analysis was carried out with good results.

Aims and Objectives:

- Aim of present study is to achieve the highest possible accuracy in establishing sex from ulna with the available resources.
- To study the Sexual differences in metrical parameters of Ulnae.
- To study the usefulness of various parameters and indices of ulna for sex determination

MATERIALS & METHODS

One hundred ninety three adult human ulnae of known sex available in the Bone Bank of the Department of Anatomy, Government Medical College, Aurangabad are used for the present study. Out of 193 ulnae, 60 are of females and 133 of males. All the ulnae are dry, free of damage or deformity and are fully ossified. The personal records of all the ulnae for age, sex & race are available with the Bone Bank.

The instruments which are used for the measurements of various parameters of ulna are as follows:-

1. Scale.
2. Osteometer.
3. Sliding Vernier Calipers.
4. Standardized flexible Steel tape.
5. Threads, marker pencils & pens.

Following measurements are taken for each ulna.

1. **Total Length (L)**
   Total length from top of olecranon process to tip of styloid, measured parallel to the shaft, this is achieved by applying top of olecranon to osteometer wall and the sliding pointer is used to mark the tip of styloid and length is recorded in mms.

2. **Proximal Ulnar Width (PWD)**
   The maximum breadth of the upper end of ulna, it is measured by the vernier calliper in mms.

3. **Distal Ulnar Width (DWD)**
   The maximum breadth of the distal articular surface excluding the styloid process.

4. **Head Circumference (HC)**
   The circumference of Head of ulna is measured by marking a fixed point just above the base of styloid process of ulna with a marker pencil and running the non-elastic thread along the circumference of head starting from the fixed point and back to it. The length of thread then recorded on scale in mms.

5. **Olecranon Anterioposterior Diameter (OAPD)**
   The maximum distance perpendicular to the shaft between the anterior surface of the olecranon and the most posterior point distal to the middle of the trochlea. The arms of the callipers are held parallel to the shaft axis. All values are recorded in mms. The values of Range, Mean & Standard Deviation are obtained, Demarking Points are calculated. Subsequently 't' test applied and P values were obtained for male and female ulnae. Cross validation of the data was done using the obtained demarking points.

"Demarking Point": The concept derived by Singh et al (1974) [6] in which minimum and maximum limits of a given dimension were determined by taking three standard deviations around the mean. Thus, if a bone has a value outside these limits, correct identification of sex would be 99.75 percent that the bone is male (greater than the maximum limit) or female (less than the minimum limit).

RESULTS

Ulnae of known sex are studied and various dimensions are measured. All the parameters are tabulated and statistically analyzed. Mean, standard deviations, range, demarking points are obtained for all male and female ulnae and values of these are mentioned in table no 1. The 't' test is applied for evaluating the statistical significance.

S.D. = Standard Deviation, D.P. = Demarking Point,

Table 1. Statistical Analysis of all Parameters

Parameters \ Measurements (in mm)	Mean		S.D.		Mean ± 3 S.D		D.P.		't' test
	M	F	M	F	M	F	M	F	
Total Length Of Ulna (L)	267	242	13.23	15.94	227-306	194-290	>290	<227	P<0.001
Proximal Ulnar Width (PWD)	23.6	20	1.72	1.97	18-28	14-25	>25	<18	P<0.001
Distal Ulnar Width(DWD)	16	14	1.39	1.19	11.9-20	10-17	>17	<11.9	P<0.001
Head Circumference of Ulna(HC)	56	49	3.7	3.6	45-68	39-61	>61	<45	P<0.001
Olecranon Anterioposterior Diameter (OAPD)	25	22	1.86	1.25	19-30	18-25	>25	<19	P<0.001

From the above table it is observed that value greater than Mean ± 3S.D of female is of male and value less than Mean ± 3S.D of male is of female. So by Total length of ulna, the percentage of ulnae sorted is 3.76% & 18.4% in males and females respectively. The percentage of ulnae sorted by proximal width of ulna is 12.8% & 31.7% in males and females respectively. Distal width of ulna, the percentage of ulnae sorted by this parameter is 13.5% & 1.7% in males and females respectively. The percentage of ulnae sorted by Head circumference of ulna is 9.8% & 3.3% in males and females respectively. And Olecranon anterioposterior diameter, the percentage of ulnae sorted by this parameter is 41.4% in males and none in females.

DISCUSSION

In common with other long bones of the extremities, ulna also is not preferred for sexing of the skeleton, as sexual variations are not as obvious as with pelvis[2] or skull[1]. In the present study an attempt has been made to sex the skeleton on the basis of a study of ulnar parameters. We have analyzed the data obtained by the routine statistical method and compared the results with different authors. Comparative values of various authors are mentioned in table no 2.

Total Length of Ulna (L)

The range of mean ± 3 S.D. (see table no 1) shows overlap and hence the percentage of bones identified with 100% accuracy using demarking points of length alone are 3.76% in male and 18.4% in females. Above table-2 showed a comparison of findings of present study with findings of others scientists. The percentage of bones identified by Singh et al [6] using total length is 12% in male and 33% in female. The Population groups for study of Panse (1979) [7] & Rao (1987) [8] and present study are same and it can be observed by comparison that the values are almost identical in the three studies. It is evident that the mean values are more in European races which can be explained on the basis of racial differences whereas the results obtained by Indian Anatomists are identical.

Proximal Ulnar Width (PWD)

Proximal ulnar width is an important

Table 2. Comparison of Study of the Different Authors

Parameters	Name of worker	Male		Female	
		Mean	D.P.	Mean	D.P.
Total Length of Ulna(L)	Krogman[4] (1955)	276	-	236	-
	Singh et.al[6](Rt)(1974) (Lt)	262.9 261.9	>281.5 >278.8	236.8 234.4	<173.5<226.8
	PanseA. A.[7](1979)	266	>278.8	242.8	<224
	Rao S. S.[8](1987)	267.8	-	243.8	-
	Holman[9] (1991)	271	-	245	-
	Leopold [10](1998)	264	-	236	-
	Mall.G[5]](2001)	265	-	238	-
	Present study	267	>290	242	<227
Proximal Ulnar Width (PWD)	Mall G.[5] (2001)	34	-	29	-
	Present Study	23.6	>25	20	<18
Distal Ulnar Width(DWD)	Singh et.al[6](Rt) (1974) (Lt)	19 19	>21.1 >22.1	16.9 16.7	<14.6<13.0
	Mall G[5]. (2001)	22	-	18	-
	Present study	16	>17	14	<11.9
Head Circumference (HC)	Present study	56	>61	49	<45
Olecranon Anterioposterior Diameter(OAPD)	Present study	25	>25	22	<19

parameter for determination of sex of ulna. From table – 2, the mean values of proximal width observed in present study are 23.6 $\pm$ 1.72 (S.D.) mm and 20 $\pm$ 1.97 (S.D.) mm for males and females respectively. Mall G (2001)[5] found mean values of 34 $\pm$ 5.9 (S.D.) mm and 29$\pm$3.6 (S.D.) mm in males and females respectively on German population. The sex determination are correctly determined in male using ulna by demarking points are 12.8% and in female 31.7%. Racial variations may be significant factors in difference in the values.

2. Distal Ulnar Width (DWD): By using demarking point of this parameter 13.5 % of male and 1.7% of female ulnae could be sorted with 100% accuracy in the present study. The percentage of bones identified by Singh et al [6] using DWD is 5% in male and 3% in female. The wide difference in the values of Mall G et al [5] and present study are because of racial variations similarly a difference in values of Singh et al[6] and present study is because of the different study group (regional variation in

India seen in North, Central and South India).

Head Circumference (HC)

Previous work is not available for this parameter, so we cannot have a comparative analysis.

The range in males is 46-66 mm and in females it is 42-57 mm respectively. The percentage of ulna sorted by this parameter alone with 100% accuracy is 9.8% of male and 3.3% of female respectively.

OlecranonAnterioposterior Diameter(OAPD)

For determination of sex the olecranon anterioposerior diameter is also studied for the first time in present study. The range of mean $\pm$ 3 S.D. (see table no 1) in males is 19 – 30 mm and in females it is 18 – 25 mm. The percentage of ulna identified by this parameter alone with 100% accuracy is 41.4 % of male but none of the female ulnae is sexed.

SUMMARY AND CONCLUSION

The present study for determination of sex of ulna is done by univariate analysis. 193 adult human ulnae of known sex are studied, 133 of them being male and 60 female. This study is based on five parameters, all these parameters are analyzed statistically and the percentage of ulnae sexed with 100% accuracy using individual parameters is calculated. It is observed that by Demarking point method 41.4 % of male ulnae are sorted by Olecranon anterioposterior diameter, followed by distal ulnar width 13.5% and accuracy in head circumference 9.8%. proximal ulnar width sorts 31.7% of female ulnae, followed by accuracy in total length is 18.4% , As is obvious from the above, although all parameters are significant statistically, majority of ulnae are in the overlap zone so practically 41.4%% of male ulnae and 31.7% female ulnae sorted using single parameter .It is evident that the values are more in European races which can be explained on the basis of racial differences whereas the results obtained by Indian Anatomists are identical Difference in the values of these studies is because of the racial variations. Sorting of ulnae can be increased by applying multivariate analysis.

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Three-year Retrospective Study of Forensic and Psychosocial Aspects in Alleged Assailants of Sexual Offences

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ABSTRACT

A 3 year retrospective study was carried out with an aim to describe the assailant demographics, allegations made, assault characteristics, explanation quoted for latency in reporting & hence examination. Twenty two such cases had been examined. Majority (50%) belonged to age group of 20-29 years, 77% were illiterates, all were known to victims; few were under the influence of alcohol and forensic examination didn't give any supportive evidence probably due to long latency between the alleged act and examination; and the median time gap was 49 days. It appears to us, that laws of rape are being misused.

Key words: Rape, Illiteracy, Latency, Forensic evidence, Misuse of law.

INTRODUCTION

Sexual assault is defined by law as sexualized contact (sometimes referred to as carnal knowledge) with another person without consent and by force (compulsion) [1]. Victims (both men and women) of sexual assault can be compelled or forced to participate through fear, physical force, deception, other forms of coercion, or the use of intoxicants such as alcohol and drugs. Sexual Assault is the foremost henious assault upon any individual, for this person is traumatized mentally, physically and socially for life. Some forms of sexual assault do not require the use of force but are still considered criminal. Sexual assault has taken place if sexual contact has happened that has not been consented to in a conscious and voluntary way. Cases of rape in India are increasing; perpetrators are usually children or young adults[2]. In 2000, 5852 cases were reported for offences against women in Karnataka[3], but the reasons behind the perpetrator indulging in such activities are not clearly known. Hence this study was undertaken.

MATERIALS AND METHODS

A retrospective 3 year cross-sectional study was conducted to examine males who were brought to our department with an alleged history of having committed sexually assaults.

Data were compiled from the available medico-legal reports of last 3 years including

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certificates, information furnished by the police and the information obtained from the alleged assailants, about socio-demographic variables, detailed facts of the alleged act, acquaintance with the victim, time elapsed after the alleged offence, information of them indulging in clean habits (like bathing, changing of clothes, passed urine and stools, usage of condom) during the said sexual assault. The alleged assailants were examined after obtaining an informed consent from them or their guardians and examination findings were correlated with history given by the police, alleged assailant and laboratory findings.

The study is in adherence to ICMR ethical guidelines on human participants 2006[4] and the information thus gathered was grouped, analyzed and discussed.

OBSERVATIONS

Age of the alleged assailants varied from 12 to 56 years, with a median age of 25 years and was categorized into five groups (Table.1), majority were manual laborers, working on daily wages (54.55%), were illiterates (77.28%), belonging to economic status of below poverty line (90.91%) and more than half were unmarried.

All the alleged assailants were known to the victims, in the form of lover, relative, friend or colleague and the most distant association was in the form of third party acquaintance. Role of alcohol was complained in 2 (9.09%) cases. Latency between the alleged act and examination varied from 1day to 7years with a median of 49 days. Except for one person who was examined the next day of alleged act, all other assailants had indulged in bathing, had passed urine and stools. None used Condoms or any barrier methods. All victims were females, vaginal penetration was the method alleged in all the cases and age of the victims ranged from 4 to 39 yrs, with a median age of 17.5 yrs,

Table 1. Socio-demographic characteristics of the study population

SOCIO-DEMOGRAPHIC VARIABLE	FREQUENCY (n = 22)	PERCENTAGE
Year wise statistics of cases		
2008	5	22.72
2009	5	22.72
2010	12	54.55
Age category in years		
10-19	2	9.09
20-29	11	50
30-39	6	27.27
40-49	2	9.09
> 50	1	4.54
Level of Education		
Primary	-	-
Secondary	3	13.64
Higher Secondary	1	4.54
Graduation and above	1	4.54
Illiterate	17	77.28
Occupation		
Student	2	9.09
Businessmen	3	13.26
Agriculturist	3	13.26
Manual laborers	12	54.55
Others	2	9.09
Unemployed	0	-
Marital status		
Single	13	59.09
Married	8	36.36
Divorced	0	-
Widowed/ Separated	1	4.54
Religion		
Hindu	19	86.36
Christian	0	-
Muslim	3	13.63
Socio-economic status		
Below Poverty Line	20	90.91
Above Poverty Line	2	9.09
Place of Residence		
Rural	12	54.55
Urban	10	45.45

Table 2. Shows victim offender relation, latency and profile of assessment.

VARIABLE	FREQUENCY (n = 22)	PERCENTAGE
Relation of the assailant to victim		
Friend	4	18.18
Lover (As alleged by assailant)	9	40.90
Relative	5	22.72
Employer	0	-
Colleague	1	4.54
Third party Acquaintance	3	13.64
Stranger	0	-
Time gap between the alleged act and time of examination		
< 6hours	0	-
6-24hours	0	-
1-3days	3	13.64
4-7days	0	-
8-15 days	5	22.72
15days – 1month	0	-
> 1month	14	63.63
Physical findings		
Non-genital external injuries	1	4.54
Local genital injuries	Nil	-
Matted pubic hairs	Nil	-
Loose hairs at genitalia	Nil	-
Presence of Smegma	2	9.09
Circumcised	4	18.18
Urethral discharge/ Signs of sexually transmitted diseases	Nil	-

50% had not attained majority and 36.4% had attained majority but were below the age group of 30years. Except in one case number of offenders remained one.

Genital examination of the accused did not reveal clinching evidence of sexual assault. None of the assailants examined had genital injury, and only one (4.54%) of them had physical injuries in the form of multiple bruises and abrasions.

Subjects were detained for offences described under different sections of Indian penal code, and those included Rape (13.6%), Kidnap and Rape (45.5%), Deception (22.7%), Betrayal of promise to marriage (9.1%) and Rape and Murder (9.1%). Around half of the assailants were said to have employed physical force against the victims to fulfill their desire.

DISCUSSION

More than 3/4th of the offenders were adult, illiterates, hailing from lower socioeconomic strata. This higher prevalence among younger adults can be attributed to a higher instance of cases being booked due to an act against their unmarried partners (lovers) and sharp physiological rise of sexual maturation and need for sexual activity in them; added to this illiteracy and inability to communicate to their partners drive them to hurriedly have sexual intercourse which are later labelled as rape due to parental complaints or pressures of parents on victims to do so. Majority of them had intercourse where in the consent was implied by the situation instead of being clearly stated. Similar data of higher incidence in persons belonging to lower socioeconomic class and nonconsensual intercourse are reported by Sagar et.al5 and Fantasia6 respectively.

Age of the victims ranged from 4 to 39years and half of them were below 18years,

annoying parents to book cases under kidnap and rape, similar higher instance in young girls is reported by Grossin et.al7, Riggs8, Santos9, Hassan10, Palmer11 and Daru et.al12. This age group is said to be more prone as they are immature, defenseless and vulnerable.

All the offenders were known to victims in the form of friends, family members or lovers and comparable rate of acquaintance with victims, as a relative/ cohabiting family member in 55-60% of cases7, 13, 14, as friend9 in 24% and as a known third party in 20% and a large majority belonging to victims social or family circle9 (85%) are reported. In contrast Riggs8, Hassan10 and Worm13, report stranger as an offender in 40% of cases. A known victim-offender relationship moderates sexual offence, makes the act nonviolent, and are reported after passage of medically significant time, sufficient enough to lose crucial forensic evidence.

Latency between alleged act and clinical examination proper varied from 1 day to 7 Yrs, most of them were brought after 72hours (95%). This is consistent with the study by Hassan Q10, Daru et.al12 and in contrast Santos9 reports 60% examinations prior to 72 hours. This late presentation for examin ation could be due to embarrassment of being exposed or due to the intimacy between the victim-offender. This again is the important cause for absence of findings suggestive of sexual act11.

Alcohol is known to interact with personality and aspects of the situation, might produce a dead end to rational thinking, and is considered as an important determinant when some men commit sexual aggression, rather than who becomes sexually aggressive[14,15,16&17]. Non usage of contraception at the time of assault as in Worm AM13 study, (65%) might be hypothesized to commission of offence without preparation/ intention or may be attributed to lack of awareness about safe sexual practices

SUMMARY AND CONCLUSIONS

The cases were brought to examination by Police authorities after a considerable time in majority of the cases. Eight of the cases were brought with history of elopement after love; it appears that the victim's guardians are filing cases on the alleged accused with a revenge attitude, as the victim and alleged accused were living happily. The Supreme Court opined that the courts should, at the same time, bear in mind that false charges of rape are not uncommon. There have been some, though rare instances where a parent has persuaded a gulliable or obedient daughter to make a false charge of rape either to take revenge or extort money or to get rid of financial liability. Whether there was rape or not would depend ultimately on the facts and circumstances of each case18.

All of the cases were those of attempted/ completed vaginal intercourse only. Alcohol as a factor in assault was recorded in 9% of cases and is a factor which could prevent these intra-familial sexual assaults. The data collected favours the importance of physical examination within 24 Hrs after the alleged assault. Allegations of penetration, physical evidence of trauma was neither predictive nor essential for consideration of sexual assault. Medical examiners need to circumspect when they record non-medical variables.

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Happy are those who are concerned for the poor; the Lord will help them when they are in trouble. PS. 41:1

IMMANUEL ASSEMBLY FOUNDATION CHARITABLE TRUST (Regd.4891)

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Review Article

Snake bite and its treatment: The essential awareness

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Tanuj Kanchan**

Shrinidhi***

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ABSTRACT

Snake bites when viewed globally form a major chunk of neglected health problem in the tropics which comprise mostly of the developing and underdeveloped countries. Lack of awareness, delay in presentation to hospital, difficulty in identification of snake, clinical manifestation and treatment protocol, along with Anti Snake Venom (ASV) and its complications remain the vital issues regarding snake bite and its treatment that needs to be highlighted.

Key words: Snake bite; Awareness; Dry bites; Treatment; ASV; First Aid

INTRODUCTION

Snake bites when viewed globally form a major chunk of neglected health problem in the tropics which comprise mostly of the developing and underdeveloped countries. Snake bites and its management is a fundamental national health concern in rural India [1]. The reason for this is multiple; spectrum varies right from blind beliefs, fear of the folk to identification and management problems by trained doctors. The vital issues regarding snake bite and its treatment that needs to be highlighted include; lack of awareness, delay in presentation to hospital, difficulty in identification of snake, clinical manifestation and treatment protocol, along with Anti Snake Venom (ASV) and its complications.

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Dry bites

An important fact that needs to be highlighted is that more than 20-30% of snake bite is caused by potentially non venomous snakes (or venomous with less significant effects) [2] and many deaths are caused by the factor of "fear" (vagal shock). Besides, snake bites can be a dry bite or defense bite [2, 3] in which no venom is injected. Monteiro et al have reported dry bite in a study conducted on viper bites in a tertiary care center in Southern India and attributed the lower incidence of dry bites to the referral bias [4].

First Aid measures in snake bite

A large number of snake bite cases receive first aid measures prior to hospitalization [5]. With regards to first aid, some basic precautions need to be exercised. General public should be educated to make sure that the tourniquet is not tied too tightly above the affected part which itself occludes the arterial supply leading to gangrene of the part distal to the tourniquet. The tourniquet should be tied lightly as to occlude the venous and lymphatic drainage only. In a study in simulated snakebite scenario, Norris et al [6] reported that physicians and lay people

are unable to apply pressure immobilization properly.

Identification of snakes, clinical manifestations and toxins

Even though every snake has a distinct identification feature identification of snake still remains an area of concern. Previous research suggests that the identity of the snake in snake bite cases remain obscure to an extent of 66% [1]. Globally viperidae family is responsible for majority of snake bites. They are easily identified by a triangular head and other local variations. In India cobras and kraits are next common. A cobra is easily identified by a hood which often bears a spectacle shaped mark. Krait is identified by a central row of hexagonal scales running along the dorsum of the body along with circular rings or bands [2, 3]. Clinical manifestations vary depending upon the nature of venom [3]. Snake venom are vasculotoxic (haemotoxic) or neurotoxic in most of the cases of land dwelling snakes, whereas it is more commonly myotoxic in case of sea snakes (hydrophidae). Vipers are predominantly vasculotoxic while cobras, kraits, and coral snakes are predominantly neurotoxic. Death can ensue as early as 20 min or may be delayed upto 2 days depending upon the snake bite and other factors such as the depth of bite, amount of venom injected, and site of bite [3]. Neurotoxic venom is known to cause death in less than 30 minutes so it is of utmost importance to identify the bite caused by a neurotoxic snake by the treating doctor based on history, signs and symptoms. Whereas, in a case of suspected viper (haemotoxic) bite time may permit essential investigations that include a complete blood profile, bleeding time, and clotting time [3]. The issue is hence, vital as the management of a case of snake bite, varies depending upon the species of the snake. Basic information regarding the common snakes present in the locality to the people in general can thus be helpful in the management of snake bite to a great extent.

Specific treatment in snake bites

Snake bite is a medical emergency, hence, immediate management should be started and the patient should be shifted to a centre well equipped with emergency care (with life support system). A fatal case of Krait bite is reported by Monteiro et al [7] where the diagnosis of snake bite was delayed and the victim was managed symptomatically by the family physician for an insect bite. The case emphasizes on the fact that the possibility of snake bite should be considered in an otherwise healthy person who presents with sudden onset of neuroparalytic features. Anti Snake Venom (ASV) is the treatment of choice in management of cases of snake bite and should be started promptly. However, owing to their significant side effects medical practitioners should be cautious before administering it. Identification of the snake species if possible is once more emphasized as monovalent ASV for a particular species are now available that should be preferred over polyvalent ASV whenever available. Moreover owing to a wide variation in the composition of the venom form region to region [3], indigenously developed ASV particular to that region should be administered otherwise chances of treatment failure remain. For instance ASV developed for Indian vipers was not a success when used for viper bites in Sri Lanka [8]. Besides, adverse effects of ASV have to be managed aggressively as they can lead to life threatening immune reactions [8]. These reactions have to be managed with steroids, adrenaline and anti-histaminics [9]. These adverse affects are very common almost to an extent of 50% of the cases where ASV was administered [1]. More than 20% cases of viper bites developed allergic reactions to the test dose polyvalent ASV administration in a study from South India [4].

CONCLUSIONS

Snake bite if managed efficiently yields good results and if neglected is sure to cause mortality. In order to address the possible variations a protocol has to be formulated that should cover all aspects like- identification of the snake, signs and symptoms, and management of the case. Some such effective protocols have been proposed in literature [10]. Further a consensus has to be arrived at so that a uniform protocol can be followed at the national and international level. Studies about snakes, snakebite and its treatment are numerous but ironically the views have been confined to text books and journals; that too predominantly the western literature. The present paper attempts to widen the awareness on this subject matter

among the medical scientific community to improve on the existing state of affairs in India. It proposes and stresses on the need to disseminate information on similar issues of importance among practicing physicians of the commonly affected regions through widely circulated and well read journals.

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Case Report

Death due to uterine rupture: An evidence of negligence

Chormunge Vijay*
Patil Mrunal**
Avhale Rupesh***

ABSTRACT

A young female with history of previous lower segment cesarean section was admitted in a hospital at Nashik with full term fetus for induction of delivery. The patient was having Labor pains but the doctor on duty admitted the patient & assured her relatives that she is under false labor pains. After 7 hrs of admission in hospital patient died due to shock. The relatives of patient banged the doctor on duty & filled a complaint of medical negligence against the doctor. On post mortem examination, body was well built & pale. On opening the abdominal wall peritoneal cavity contained 1500 cc of dark red blood clots. The uterus was ruptured on anterior aspect with placental parts extruding but the fetus in situ. The Police have registered a case of gross negligence against the doctor.

Key words: Snake bite; Awareness; Dry bites; Treatment; ASV; First Aid

INTRODUCTION

Uterine rupture refers to separation of the old uterine incision throughout the most its length, with rupture of fetal membranes so that uterine cavity and the peritoneal Cavity communicate. In these cases all or parts of the fetus usually is extruded in the peritoneal cavity1. Uterine rupture is a major obstetric hazard in India & it still accounts for 5-10% of all maternal deaths2. The most common cause of uterine rupture in the developed world is previous cesarean section. Other less common causes are myomectomy, breech version, operative delivery, trauma, high parity, use of oxytocin & obstructed labor1. Uterine rupture is potentially preventable complication if a case of previous LSCS is attended in time for induction of Labor.

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Case history

A 30 yrs old female, resident of Cidco, Nashik was admitted to Civil Hospital Nashik on 7/9/08 at 9.10 pm with full term fetus for induction of delivery. Patient was having Labor pains & gave history of previous Cesarean section. The doctor on duty attended the patient and assured the relatives that they are false labor pains though the patient was shouting with pains & was restless. The patient was admitted in maternity ward and oxytocin drip was started for contraction of uterus. After few hours patient's condition started deteriorating & doctor on duty gave a call to obstetrician. Till the obstetrician arrived in hospital patient was in shock. On 8/9/2008 at 4.00 a.m. after near about 7 hrs the patient was declared dead by the duty Doctor. The relatives of patient were violent & banged the doctors on duty asking why cesarean section was not done when it was needed. The relatives demanded a postmortem to be conducted to do the justice with the patient and its relative and the civil surgeon allowed to file a case and to conduct the post mortem

with the help of a forensic expert & a team of doctors. Civil surgeon frame a committee of experts including a forensic expert, one C.M.O, one Surgeon & one Gynecologist to conduct the postmortem and give expert opinion to the case. We proceeded for postmortem examination on the request of Sarkarwada Police Station an 8/9/2008 at 11.00 p.m.

External examination

A young female body without any external injury on body except injection marks on the forearm was seen. The body was well built & pale with a scar mark of previous LSCS on the abdomen on infra umbilical region was seen. Rigor mortis was present & postmortem lividity was seen on back portions of the body. The eyes were closed, tongue inside the closed mouth & blood tinged fluid coming out. No any injuries were seen on external genitalia.

Internal examination

The skull vault was intact. Brain with meninges was pale. On opening the abdomen, the peritoneal cavity contained about 1.5 Litre of red blood clots as like a mass. The clots when removed from abdomen it was traced to uterus. The uterus was enlarged with placental parts extruding out. On dissection of uterine cavity a female fetus of 47 cms & weight 3 kg was seen in situ with placenta. All other internal organs were pale. Opinion as to cause of death was given as "Shock due to ruptured Uterus".

DISCUSSION

Uterine rupture in pregnancy is rare & often a catastrophic complication with a high incidence of fetal & maternal mortality3. Rachagan & colleagues4 reported an incidence of uterine rupture of about 1 in 3000 deliveries over a period 21 years. Currently the most common cause of uterine rupture is separation of a previous cesarean section scar & this probably is increasing with developing trend of allowing a trial of labor following, prior transverse section. The studies showed that incidence of uterine rupture after previous cesarean section was 0.2 to 0.8 %. Some of the most recent studies state that induction of oxytocin, prostaglandins have added the tragedies of Uterine rupture death. In the present case the trial of labor was given in-patient of previous LSCS. The oxytocin was started, though the patient was in high-risk group pregnancy. Doctor could not assess the condition of patient. The patient was in full term with typical labor pains but duty doctors could not able to differentiate true labor pains with false labor pain.

The doctor on duty should have given a call to on obstetrician. In case if a call was given then why obstetrician didn't reach in time. It was the duty of the consultant to reach within 30 min to one hour to attend the serious patient. Here in this case, the patient was unattended for more than 6 hours which may result in developing the condition of shock. The treating doctor & nurse could not able to diagnose the signs of shock & uterine rupture. While for diagnosis of shock does not need any specialization and can be easily assessed by a general MBBS physician. The signs of uterine rupture need some keen observation such as follow-up - sharp shooting pain in the abdomen, cessation of uterine contraction, palpations of fetal parts & stoppage of fetal heart sounds. If in this case timely treatment of shock i.e. giving IV fluids or blood transfusion and operative management i.e. Laparatomy & or hysterectomy would have been done, the patient's life could have been saved. The doctor has failed to diagnose uterine rupture and take proper care in management of the case. The relatives were left with mental agony due to this untimely shock given by the doctor. The Police have registered the case of negligence under section 304 (A) against the doctors for there gross negligence in handling the patient.

The Uterine rupture is a potentially preventable complication & great caution should be taken when managing a trial of labor with a previous Cesarean section. The doctor should identify the cases of high-risk pregnancy of previous LSCS & take proper care in management of these cases to avoid the charges of negligence.

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