Original Article

AGE DETERMINATION OF FEMALE SPORT PERSONS OF AGE 9-18 YEARS BY RADIOLOGICAL EXAMINATION OF ELBOW AND WRIST JOINT

Dr. RC. Dere, Dr. HG. Kukde, A. Maiyyar, Dr. SV. Dhoble

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Abstract

Scientific estimation of age of an individual whether living, recently dead person, disintegrated and decomposed dead bodies, skeletal remains or incomplete skeleton or fragmentary remains is vexing problem for medical jurist, in both civil and criminal cases and is an important part of examination in medicolegal practice. Cheating often occurs in sports that are defined by age when older participants compete by falsifying their true age by measuring the skeletal age of competitors.

Present study was carried out to determine age in female sports person of age 9 to 18 years by radiological examination of elbow and wrist joints.

Thirty eight female sports persons were examined and X ray examination of elbow joint and wrist joint was carried out.

In females, fusion of ossification centres of elbow joint occurs by 14 – 15 years, ossification centres of lower end of radius and ulna fused by 17 – 18 years and ossification centres of pisiform appeared by the 10 – 11 years.

Key Words: Epiphyseal union, sports, ossification centres, elbow joint, wrist joint, radiological examination.

Introduction:

Determination of age of an individual from the appearance and the fusion of the ossification centres is a well accepted fact in the field of medical and legal profession. Epiphysis of bones unite during age periods which are remarkably constant for a particularly constant for a particularly epiphysis. This is possible due to complex but dependable system by which the osseous framework of the body develops, grows and matures. Epiphysis of the bones unites at particular age and this is helpful in age determination (1).

Age is one of the significant primary characteristics in identification of an individual and has considerable medicolegal importance in administration of justice. The incidence of age cheating in sports has increased and has caused a problem comparable to athletes taking illegal substances. Identity documents pr birth certificates cannot be used with confidence to identify age, particularly in developing countries (2, 3).

Objective:

To determine age in female sports person of age 9 to 18 years by radiological examination of elbow and wrist joints.

Method:

Study was conducted in 38 female subjects. These subjects were female sports person coming for medical age determination sent by various State Sports Association approved by Sports Authority of India in State of Maharashtra belonging to Schools, Colleges of different cities, predominantly of western Maharashtra. The selection of the subjects was based on the following criteria:

Inclusion criteria:

a) All the subjects should have exact documented record for date of birth.
b) Informed written consent with full disclosure, of each subject to be taken before proceeding for radiological examination.
c) No evidence of malnutrition or other diseases that would affect the skeletal growth and general development of person.
d) All the subjects should have good hygiene and normal physique.

Exclusion criteria:

a) Subjects having congenital and acquired anomalies.
b) Subjects with nutritional and endocrinal deficiencies.
c) Subjects those who come for age determination, other than sports persons.
d) Pregnant female.
e) Subjects whose date of birth is not known.

Methodology:

- Permission of institutional ethical committee is obtained by submitting the study project.
- Subjects are selected according to criteria mentioned above.
- Informed consent of subject obtained prior to examination
- Radiological assessment for fusion or no fusion of ossification centre of wrist joint and Elbow joint.
- General and physical examination was done in Department of Forensic Medicine And Toxicology, Lokmanya Tilak Municipal Medical College & General Hospital, Sion, Mumbai.

Each of these subjects was radiographed for the elbow joint, wrist joint pelvic with iliac crest and mandible in the Department of Radiology, LTMMC & LTMGH, Sion, Mumbai by digital method. This includes following radiographs.

1. Elbow joint PA and lateral view: Showing Medial Epicondyle, Lateral Epicondyle, Capetulum, Trochlea, Conjoint Epiphysis, Upper End of Radius and Ulna.
2. Wrist joint PA lateral view: Showing Lower End of Radius and Ulna, Carpal Bones and Base of 1st Metacarpal.

Observations:

Out of 38 female subjects, 70 % belong to age group of 12 to 15 years followed by age group 10 to 11 years. 33 out of 38 subjects belong to middle economic class and 5 belong to high socio-economic status. For determination of appearance and fusion of ossification centres in elbow and wrist joints, subjects are grouped on the basis of age groups as from 9 years to 18 years:

X ray elbow joint:

Present study observed that Capitulum and Medial Epicondyle appeared in all cases. Trochlea and lateral Epicondyle appeared in most of the cases, 30 (78.9%) at the age of 11 to 14. Ossification centres of lower end of elbow found to be fused in 12 (31.5%) by conjoint epiphysis at the age of 14 to 15 years. (Table 1)

X ray elbow joint Lower end of humerus:

The ossification centres of Lower end of humerus with shaft found to be fused at the age of 14 years in 9 (23.68%) case and 13 to 15 years in 20 (52.6%) cases. (Table 2)

Ossification Centre	Appeared		Fusion by conjoint epiphysis
Age	Trochlea	Lateral Epicondyle	Fused
9	0 (0.0%)	0 (0.0%)	0 (0.0%)
10	1 (2.6%)	1 (2.6%)	0 (0.0%)
11	8 (21.05%)	8 (21.05%)	2 (5.2%)
12	6 (15.7%)	6 (15.7%)	1 (2.6%)
13	7 (18.4%)	7 (18.4%)	7 (18.7%)
14	9 (23.68%)	9 (23.68%)	8 (21.05%)
15	4 (10.5%)	4 (10.5%)	4 (10.5%)
16	0 (0.0%)	0 (0.0%)	0 (0.0%)
17	3 (7.8%)	3 (7.8%)	3 (7.8%)
18	0 (0.0%)	0 (0.0%)	0 (0.0%)

Table 1

Age in years	Fused
9	0 (0.0%)
10	0 (0.0%)
11	4 (10.5%)
12	3 (7.8%)
13	7 (18.4%)
14	9 (23.6%)
15	4 (10.5%)
16	0 (0.0%)
17	3 (7.8%)
18	0 (0.0%)

Table 2

X ray wrist joint Lower End of Radius And Ulna:

In female the lower end of radius and ulna of wrist joint found to be appeared appeared in all 38 (100%). Lower end of radius found to be fused in 21 (55.2%) at the age of 18 years followed by 14 (36.8%) at the age of 17 years. At the age of 17 to 18 years, total 25 (65.78%) show union at lower end of radius. Lower end of ulna show fusion at the age of 18 years in 24 (63.1%) and 10 (26.3%) cases. most of the cases, 24 (63.15%) is in between 17 to 18 years of age. (Table 3)

Age in years	Radius		Ulna	
	Appeared	Fused	Appeared	Fused
9	38 (100%)	0 (0.0%)	38 (100%)	0 (0.0%)
10	38 (100%)	0 (0.0%)	38 (100%)	0 (0.0%)
11	38 (100%)	0 (0.0%)	38 (100%)	0 (0.0%)
12	38 (100%)	0 (0.0%)	38 (100%)	0 (0.0%)
13	38 (100%)	0 (0.0%)	38 (100%)	0 (0.0%)
14	38 (100%)	0 (0.0%)	38 (100%)	0 (0.0%)
15	38 (100%)	0 (0.0%)	38 (100%)	0 (0.0%)
16	38 (100%)	3 (7.8%))	38 (100%)	4 (10.5%)
17	38 (100%)	14 (36.8%)	38 (100%)	10 (26.3%)
18	38 (100%)	21 (55.2%)	38 (100%)	24 (63.1%)

Table No 3.

X ray wrist joint Base of First Metacarpal and Pisiform:

In female wrist joint base of first metacarpal most frequently found to be appeared at the age of 14 and 15 years in 17 (44.7%) and 12 (31.5%) cases respectively while pisiform was found to appear most commonly at the age of 11 and 12 years in 10 (26.3%) and 15 (39.4%) cases respetively. (Table 4)

Age in years	Base of First Metacarpal		Pisiform
	Appeared	Fused	Appeared
9	38	0 (0.0%)	0 (0.0%)
10	38	0 (0.0%)	1 (2.6%)
11	38	1 (2.6%)	10 (26.3%)
12	38	2 (5.2%)	15 (39.4%)
13	38	4 (10.4%)	8 (21%)
14	38	17 (44.7%)	4 (10.5%)
15	38	12 (31.5%)	0 (0.0%)
16	38	2 (5.2%)	0 (0.0%)
17	38	0 (0.0%)	0 (0.0%)
18	38	0 (0.0%)	0 (0.0%)

Table No 4.

Discussion:

Age determination by epiphyseal fusion is one of the most important scientific tools in Forensic Medicine. In this study, main emphasis is given on time of fusion of epiphysis with diaphysis.

William B, Sangma Ch, Marak FK, Singh SM[1], in their study in northern India, concluded that by the age of 16 years, epiphysis around elbow joint fused completely. Binoy Singh TH[4], in his similar study in 2007 had found that, at the age 18 years, there is complete fusion of epiphysis with diaphysis at elbow joints. Bhise SS, Nandkar SD[8], in their study found, fusion of elbow at 14 to 15 years. Memchoubi PH[10], in his similar study of radiological examination of elbow joint found that all the cases showed degree 3 fusion at the elbow joint at the age of 16 years. Memon N, Muhammad UM, Memon K, Junejo H, Memon J[11] in their similar study, found that fusion of epiphysis in females is completed by the age of 14-15 years. In this study it was observed that epiphysis of lateral epicondyle and trochlea appeared by 11 to 14 years. However, fusion of the elbow occured by 13 to 14 years for majority of the cases. Comparing the bove studies, it was observed that fusion around elbow by and large are similar with studies done by Bhise SS, Nandkar SD, Memchoubi Ph, Memon N, Muhammad UM, Memon K, Junejo H, Memon J. This similarity of fusion of elbow joint in female can be attributed to the same study sample group i. e. the urban population in all above similar studies.

William B, Sangma Ch, Marak FK, Singh SM[1], in their study in northern India found that in wrist joint complete union occurs at 18 years. Davies and Parsons (1927)[5] in their study in England found that distal end of radius fuses at 19-20 years. Distal end of ulna fuses at 20 years. Dharmesh S. Patel, Harish Agarwal, Jigesh V. Shah[6], in their study in 2011 found that starting up of epiphyseal appearance in lower end of ulna of both hand for female is 16-17 years. And completion of epiphyseal fusion in lower end of ulna of both hands in female is 18-19 years. Hepworth SM (1929)[7] in his study in Punjab found that distal end of radius fuses at 16-17 years in both sexes. Distal end of ulna fuses at 16-17 years. Memchoubi PH[10] in his study observed that elbow fused by the age of 17 years. In this study lower end of radius and ulna are found to be fused by 17 to 18 years. The present study corroborated with the observations made by William B, Sangma Ch, Marak FK, Singh SM[1] and Memchoubi PH[10].

Davies and Parsons (1927)[5] in their study in England found pisiform appears at 12 years. Shrivastav A, Saraswat PK, Agarwal SK and Gupta P[9] in their study found that

pisiform appears at the age of 11-12 years. In this study, it is found that pisiform appears at 10 to 11 years. Base of 1st metacarpal fuses by 14 to 15 years in females.

Summery And Conclusion:

Study was conducted in 38 subjects. These subjects were Sports person coming for age estimation sent by various recognized state associations by Sports authority of India in State of Maharashtra. These sports persons belong to schools, Colleges of different cities of State of Maharashtra. Subjects between the age group of 9 to 18 years were taken into consideration, as this age group is significant with regards to medicolegal aspect.

From observation and discussion in study following specific scientific conclusions are drawn:

- In this study, it was found that epiphysis of lateral epicondyle and trochlea appeared at 11 to 14 years in females. However fusion of the same occurs at 14 to 15 years for females.
- In this study, lower end of radius and ulna are fused by 17 to 18 years in female. Pisiform bone appears at 10 to 11 years, base of 1st metacarpal fuses by 14 to 15 years.
- There is no significant correlation between socioeconomic status and skeletal maturation or epiphyseal fusion.

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Original article

IMPORTANCE OF MAXILLARY AND MANDIBULAR INTERCANINE DISTANCE IN SEX DETERMINATION IN MAHARASHTRA POPULATION

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Original article

IMPORTANCE OF MAXILLARY AND MANDIBULAR INTERCANINE DISTANCE IN SEX DETERMINATION IN MAHARASHTRA POPULATION

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Abstract

Gender determination of skeletal remains is a part of many medico-legal as well as anthropological examinations. Many anatomical structures have been studied, but the teeth and their measurements seem to be the most reliable method since teeth represent the most durable and resilient part of the skeleton. The present study was aimed at investigating the accuracy of a method with which gender can be differentiated by the intercanine distance of maxillary and mandibular arch in a sample of adult Indian population. The study was carried out at department of Orthodontics and Dentofacial Orthopedics, Rural Dental College, Loni, India on students and patients reporting at OPD. The study was conducted on 70 subjects (35 males, 35 females) of 17 to 25 years age group. Impressions of the upper arch were made using alginate and casts poured in dental stone. Maxillary and Mandibular inter-canine width were measured with vernier calipers. From these measurements the percentage of sexual dimorphism was calculated. The data were subjected to statistical analysis using students unpaired't' test and results were analyzed. It was observed that there was sexual dimorphism in the intercanine distance of maxillary (3.82%) and mandibular (3.10%) arch. It is inferred that the technique employing intercanine distance of maxillary and mandibular arch can provide predictive equations useful for gender determination in a sample of Maharashtrian adult individuals.

Keywords: Sexual dimorphism, intercanine distance, canine

Introduction

The methods of gender determination of skeletal remains vary and depend on the available bones and their condition. The only method that can give a totally accurate result is the DNA technique, which is not feasible in many cases and cannot be readily used.[1] This might be due to the expensive, time consuming, laborious technique of DNA isolation. Also the need for qualified experts in DNA identification highlights the need for alternative simple, rapid and reliable methods for gender determination.[2] DNA concentration of teeth extract was found to decrease after storage of teeth in soil, this decrease exceeded 90% after being kept for 6 weeks in soil.[3] Teeth are known to be unique organs made of the most enduring mineralized tissues in the human body

As such, teeth are extraordinarily resistance to putrefaction and the effect of external agents (physical, thermal, mechanical, chemical or biological) which makes them invaluable elements for anthropological, genetic, odontologic, evolutionary and forensic investigations [3,4]. Sexual dimorphism refers to the systemic difference in form (either in shape or size) between individuals of different gender in the same species. Teeth of various species are known to exhibit sexual dimorphism.[5] Teeth measurements seem to be the most reliable method in forensic investigations due to its advantages of being quick, less time consuming, non-invasive and easy to perform.

The maxillary and mandibular canines are not only exposed to less plaque, calculus, abrasion from brushing or heavy occlusal loading than other teeth, they are also less severely affected by periodontal disease and so, usually are the last teeth to be extracted with respect to age.[3] These findings indicate that maxillary and mandibular canines can be considered as

the 'key teeth' for personal identification.[4] In the field of forensic odontology, permanent canine teeth and their arch width (distance between the canine tips) have been reported to show sexual dimorphism.

Bosset and Marks[6] and Krogh[7] stated that the study of the permanent mandibular and maxillary canine teeth offers certain advantages. These advantages emanate from the fact that they are the least frequently extracted teeth and being less affected by periodontal disease. Canine teeth have also been reported to survive in air and hurricane disasters.[8]

The present study establishes the impact of the 'sex factor' on the intercanine distance of the maxillary and mandibular arch in Maharashtrian Indian population. The results indicate that the maxillary and mandibular intercanine distance can be of immense medico-legal use in identification.

Materials and Methods

The sample composed of 70 dental casts that belonged to 35 males and 35 females students selected from Rural Dental College Loni, Maharashtra, India. Subjects were selected after careful oral examination and were chosen to fulfill the following criteria:

Fig 1: Electronic Digital Vernier calliper

1. Age 17-25 years
2. Free from malocclusion
3. Have no missing anterior teeth
4. Having canine teeth free from:
   a. Proximal restorations
   b. Excessive incisal attrition.
   c. Dental erosion or abrasion
   d. Dental trauma.
   e. Previous orthodontic treatment.

Materials:

1. Alginate impression material.
2. Type IV Dental Stone
3. Electronic Digital Vernier Callipers giving readings upto two decimal points. (with resolution of 0.02mm). (Figure1)

Fig 2: Measurement of Intercanine distance of Maxillary arch

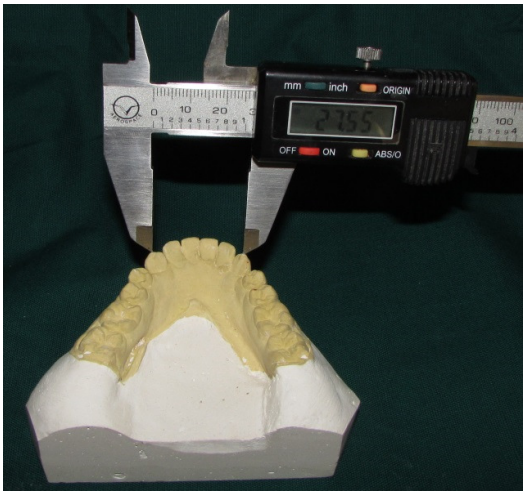

Fig 3: Measurement of Intercanine distance of Mandibular arch

Methods:

1. Making of study casts: Impressions of maxillary and mandibular arches were taken in alginate impression
2. Measurement of Canine Arch Width [Intercanine Distance]:

Vernier caliper is used to measure maxillary and mandibular canine arch width. To measure distance, tip of one end of caliper is kept over the center of the tip of one side canine tooth and another end of caliper is kept over the center of tip of opposite side canine tooth. Figure (2, 3)

All the measurements were done by a single examiner to eliminate inter-observer error. Each measurement was taken three times and the average distance of Maxillary arch of three values was obtained to minimize the intra-observer error. The descriptive statistics were calculated (mean, range and standard deviation), for maxillary and mandibular intercanine distance.From these measurements the percentage of sexual dimorphism was calculated.

The observed maxillary and mandibular intercanine width were subjected to statistical analysis to assess sex difference using unpaired t-test. The level of statistical significance was set up at $p<0.001$.

Statstical Analysis

The intercanine measurements of maxillary and mandibular arch were entered in a Microsoft Excel spread sheet with the corresponding gender. The mean and standard deviation were calculated for both sexes and used for description of quantitative variables. Student (t) test was applied for comparison between two groups. In all tests the Probability, i.e., $P< 0.001$ was considered highly significant.

Sexual dimorphism: Sexual Dimorphism in maxillary and mandibular intercanine distance was calculated using formula given by Garn & Lens (1967). [9]

Sexual dimorphism was calculated using the formula:

Sexual dimorphism = $(Xm \div Xf)-1 \times 100$ ----------

Where: Xm - Mean mesiodistal width in males and Xf - Mean mesiodistal width in females

Sex	Maxillary intercanine (n=35)	Mandibular intercanine (n=35)	Student's Unpaired 't' test value	'p' valve and Result
	Mean ± SD	Mean ± SD		
Male	36.11±1.41	27.20±1.38	38.24	p<0.001, Highly significant
Female	34.78±1.78	26.38±1.58	20.89	p<0.001, Highly significant
Student's Unpaired 't' test value	3.47	3.07		
'p' valve and Result	p<0.01, Highly significant	p<0.01, Highly significant		

Table 1: Sex wise comparison of mean values of maxillary and mandibular intercanine

Results:

The study results are presented in table form (Table 1). There was a statistically significant difference between males and females in the intercanine distance of maxillary and mandibular arch. The mean intercanine distance for maxillary and mandibular arch was found

to be 36.11±1.41, 27.20±1.38mm in males and 34.78±1.78mm, 26.38±1.58 mm in females respectively.(Table 1).

Sex Measurement	Sexual Dimorphism
Maxillary Intercanine	3.82
Mandibular Intercanine	3.10

Table 2: shows sexual dimorphism of maxillary and mandibular intercanine distance of both male and female.

Discussion:

The study was conducted to determine the sexual dimorphism that exists in the maxillary and mandibular permanent canines. This was done by measuring the intercanine distance. The study was conducted on 70 subjects, out of which 35 were males and 35 were females. The study established the existence of a definite statistically significant sexual dimorphism. Comparison of intercanine distance between the different populations was done as variation in tooth size is influenced by genetic and environmental factors such as race, sex, heredity, environment, secular changes and bilateral asymmetry. (Table No. 3, 4)

Population	Author	Inter Canine Distance (mm)	
		Male	Female
Egyptian	Aliaa Omar	36.823	34.653
Indian(Gujarat)	Dhara Parekh	34.477	32.789
Nigeria	Zirahei	37.80	35.34
Saudi Arabian	Al-Rifaiy	34.76	26.46
Indian(Punjab)	Sharma	34.70	33.09
Indian(Gujarat)	N. Parekh	30.62	28.62
Indian(Uttar Pradesh)	Gupta	41.00	36.05
Present study		36.11	34.78

Table No. 3: Comparison of maxillary intercanine distance in different populations

The canine teeth were chosen for this study because they were found to have greater resistance to periodontal diseases and severe trauma. This is attributed to their long roots which are firmly anchored in alveolar bone and the labio-lingual thickness of the crown and root which enables them to sustain stress and trauma. These characteristics of canine teeth tend to preserve them throughout life; therefore, the canines are usually the last teeth to be lost.[10]

Population	Author	Inter Canine Distance (mm)	
		Male	Female
Canadian	Anderson & Thompson	26.08	25.33
French	Muller	26.28	25.03
Indian(North India)	Kaushal	25.83	25.07
Norwegian	Olav	19.06	18.24
Saudi Arabian	Abdullah	27.01	26.46
Saudi Arabian	Sherfudin	26.36	26.11
Nigeria	Ibeachu	34.20	32.64
Indian(Uttar Pradesh)	Reddy	26.86	26.28
Indian(South Indian)	Grover	30.78	29.41
Present study		27.20	26.38

Table No. 4: Comparison of mandibular intercanine distance in different populations

Similar observations were made by, Kumar et al (1989), who demonstrated that inter canine distance and mandibular canine index are useful parameters in differentiating the sexes. Aliaa Omar et al (2009) studied that maxillary Inter-canine distance showed statistically significant differences between both sexes.[11]Neelampari Parikh(2013) showed that the most sensitive predictors for gender determination were the maxillary and mandibular inter-canine distance & canine index.[12] M. Abdulla et al (1998) showed that inter-canine distance of the maxillary and mandibular dental arches were significantly greater in males than in females in his Saudi population group study.[13] Olav studied casts of 64 females and 80 males of Norwegian decent and found that the mean mandibular inter canine width were 19.06 mm in males and 18.24 mm in females.[14] Muller studied 424 students of University of Nice Sophia Antipolis split between 214 men and 210 women. The lower canine arch was 26.280 mm in males and 25.030 mm in females.[15] Contrary to results of current study, Kaddah (1998) stated that no statistically significant differences were obtained between males & females while measuring the inter canine distance.

In all the populations mentioned above, the intercanine distance of the maxillary and mandibular canines was found to be more in the males than the females and the difference was statistically significant. It can thus be concluded that the sexual dimorphism in maxillary and mandibular canines is evident in its intercanine distance.

Conclusion:

The present study revealed that males show larger mean dimensions of intercanine distance than females in the study group and the difference was statistically significant ($P<0.001$). This study indicates that Inter canine distance show significant and consistent results for sexual dimorphism and can be used in forensic investigations as an adjunct along with other accepted procedures for sex determination.

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Original Article

A STUDY TO CORRELATE THE HAND LENGTH & HAND BREADTH TO FOOT LENGTH OF CENTRAL INDIAN POPULATION

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Original Article

A STUDY TO CORRELATE THE HAND LENGTH & HAND BREADTH TO FOOT LENGTH OF CENTRAL INDIAN POPULATION

Dr. PM Mohite, Dr. AS Keche, Dr. DP Mohite, Dr.HA Keche, Dr. S Patond

Abstract:

Identification of decomposed or dismembered human bodies forms an important aspect of study for anthropologists and forensic experts. Morphometric relationships between different parts of the body have been used for estimating gender or stature to reveal the identity of an individual.[1] Hand & Foot dimensions are used by many researchers to find out the sex & stature. This prospective study was carried out to find the correlation between 2 parameters, the Dimensions of hand, i.e., length & breadth to that of Foot length of an individual. The study was carried out on 230 Students (120 Male & 110 Female) between the age group of 17-25 years studying in Medical & Dental College in Sawangi (Meghe) Wardha. To avoid diurnal variations all the measurements were taken in the afternoon hours (2 - 4 pm). The students born & brought up in Central India only were included in the study. The dimensions of hand which was dominant was taken and length of the left foot was measured which was as per requirements of Geneva agreement (1912). After statistical analysis, we found that there was a definite correlation between the dimensions of Hand and Foot. Hand length was more accurate than Hand breadth to find the Foot length as is derived from a regression formula which may help the forensic experts for identification of either of the dimension if one is known in dismembered or mutilated bodies.

Key Words: Identification, Hand length, Hand breadth, Foot length, Forensic Anthropology, Fragmented remains, Mutilated body.

Introduction:

Estimation of identity forms an integral part of investigation in cases where bodies are fragmented, disintegrated, mutilated or amputated as in the events of murders, accidents, mass disasters like bomb blasts, plane crash, stampede or natural calamities like earthquake or floods etc. [1] Various methods are in use for personal identification. There have been many studies to emphasise the importance of measuring the hand length as well as foot length to determine one of the important parameters of identification i.e. stature. Anthropometric parameters show variations by genetics of a person, geographical location, environment and climatic conditions.[1,2] Studies have shown that the dimensions of Hands & Feet vary in different races and also with the dominance of the hand. Rate of growth in males and females varies during the course of development with ossification being complete and skeletal maturity attained by the age 25 years.[3] Females tend to show higher growth rate during first half of second decade where as in males it is during the second half of second decade which has been attributed to hormonal control.[3] Present study was designed to correlate the Dimensions of Hand i.e. Hand length & Hand breadth of an individual with Foot length in adult population of 17-25 years of age group of Central India in both the genders. In Forensic investigations, the dimensions of Hand & Foot have been used to determine the Age, Sex & Stature of an individual.[4] Although the Relationships of hand length and foot length with various body part measurements have been studied, there is little information in the available literature regarding the correlation between hand length and foot length.[5] With this objective the present study was designed to find the correlation between Hand length and Hand breadth to that of Foot length of an individual and determine the linear regression formula &

multiplication factor for estimation of either dimension for people in Central India, Also to find the standard deviation in the estimation of correlation from regression formula.

Materials & Methods:

Study was carried out in the Department of Forensic medicine, JNMC, Sawangi (Meghe) Wardha over a period of 2 years. It included 230 normal healthy adults (120 Male & 110 Female) admitted to Medical & Dental College, Wardha between the age group of 17-25 years and those who were born & brought up in Central India. Students from different region, NRI's, those with poorly defined wrist creases, Physical deformities acquired or congenital were excluded from the study. After taking informed written consent, physical parameters were recorded.

Photo 1
Measurement of Hand Length (L1)

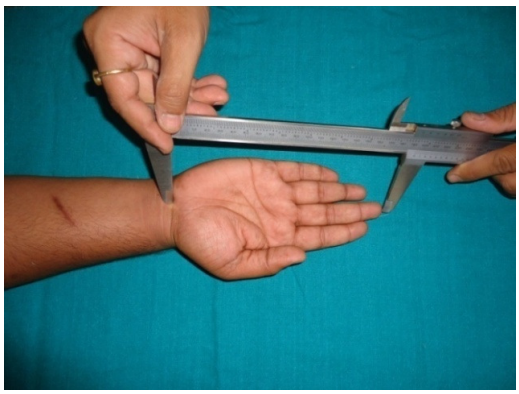


Photo 2
Measurement of Hand Length (L2)

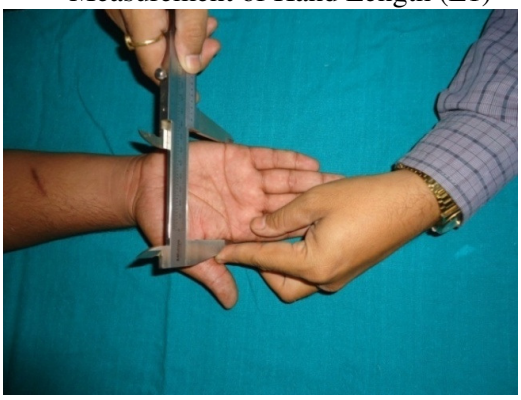


Photo3
Measurement of Hand Breadth (B1)

Photo 4
Measurement of Hand Breadth (B2)

Photo 5: Measurement of Foot Length

All the measurements were taken at a fixed period of time between 2-4 pm to avoid any diurnal variations. Hand length is measured as L1 & L2 from Proximal crease of Wrist to tip of Middle finger & Midpoint of interstyloid line to tip of Middle finger (in mm) as shown in photo (1 & 2) respectively. Hand breadth is measured as B1 & B2 from Radial side 2nd metacarpopharyngeal joint to Ulnar side 5th metacarpopharyngeal joint and from 1st metacarpopharyngeal joint to base of 5th metacarpal in mm respectively by using sliding Vernier Calliper (0-300 mm) as shown in photo (3 & 4)respectively. Foot length is measured as distance between anterior & posterior point of foot as shown in photo 5.Correlation between hand length & Hand breadth with the Foot length of an individual is evaluated by obtaining linear regression equations & multiplication factors by SPSS 17.0 and accordingly results were assessed statistically.

Observations and Results:

Table 1: Correlation between hand length and foot length

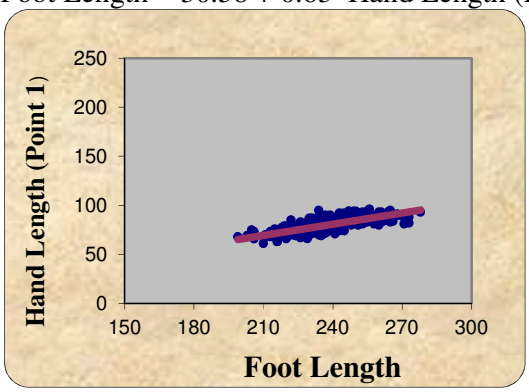
	Mean	Std. Deviation	N	Correlation 'r'	p-value
Foot Length	237.63	16.66	230	-	-
Hand Length – Point 1	171.13	11.816	230	0.85	0.000 S,p<0.05
Hand Length – Point 2	182.17	12.37	230	0.85	0.000 S,p<0.05

A positive significant correlation was found between Foot length and Hand length at both the levels as can be seen in Table No.1.

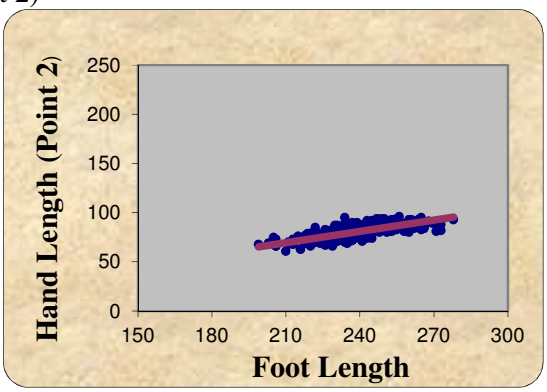
Line of Regression

Foot Length = 27.05 + 0.60*Hand Length (Point 1)

Foot Length = 30.58 + 0.63*Hand Length (Point 2)



Graph 1.1: Correlation between hand length at point 1 and foot length



Graph 1.2: Correlation between hand length at point 2 and foot length

Table 2: Correlation between hand breadth and foot length

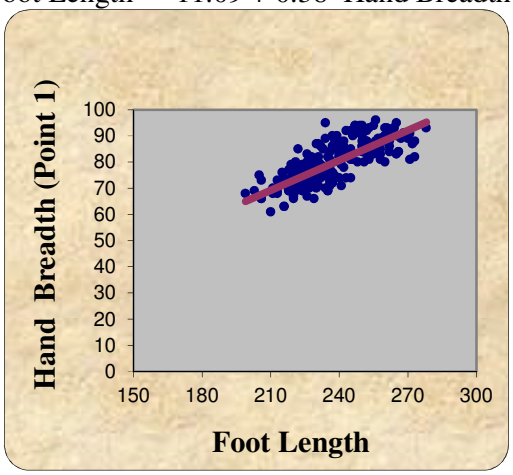
	Mean	Std. Deviation	N	Correlation 'r'	p-value
Foot Length	237.63	16.66	230	-	-
Hand Breadth – Point 1	68.04	6.47	230	0.74	0.000 S,p<0.05
Hand Breadth – Point 2	79.82	8.19	230	0.77	0.000 S,p<0.05

A positive significant correlation was found between Foot length and Hand breadth at both the levels as can be seen in Table No.2.

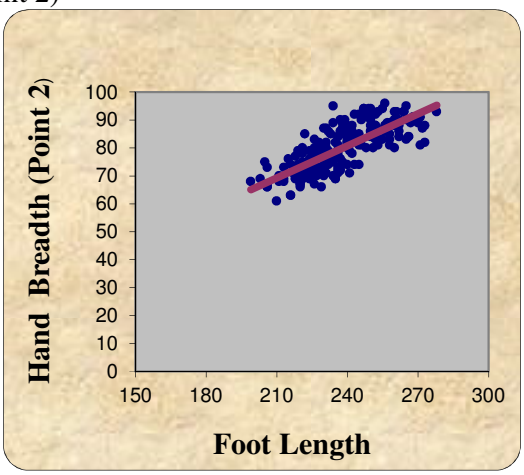
Line of Regression

Foot Length = -0.74 + 0.28*Hand Breadth (Point 1)

Foot Length = -11.09 + 0.38*Hand Breadth (Point 2)



Graph 2.1: Correlation between hand breadth at point 1 and foot length

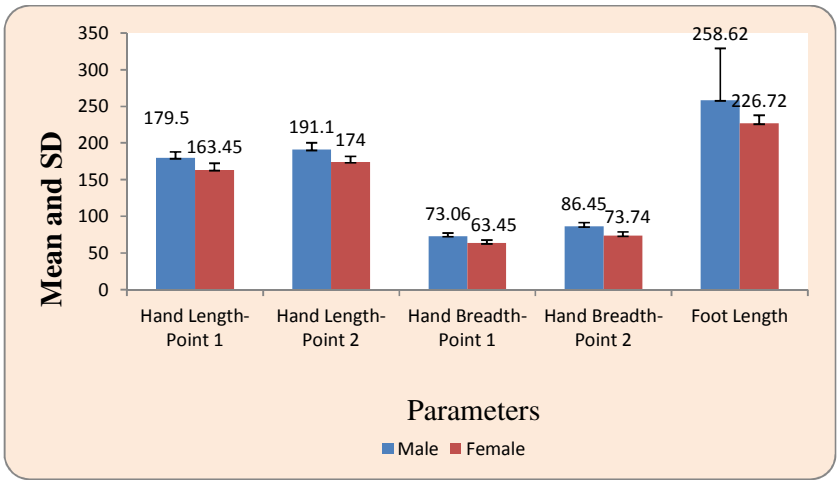


Graph 2.2: Correlation between hand breadth at point 2 and foot length

Table 3: Gender wise comparison of parameters

	Male	Female	z-value	p-value
Hand Length- Point 1	179.50±8.55	163.45±8.80	14.00	0.000,S,p<0.05
Hand Length-Point 2	191.10±9.21	174±8.70	14.43	0.000,S,p<0.05
Hand Breadth-Point 1	73.06±4.28	63.45±4.39	16.78	0.000,S,p<0.05
Hand Breadth-Point 2	86.45±5.09	73.74±5.24	18.64	0.000,S,p<0.05
Foot Length	258.62±70.30	226.72±11.14	4.70	0.000,S,p<0.05

The correlation between dimensions of Hand i.e. Length & Breadth to that of Foot length of an individual was studied. There is strong correlation between the Hand length & Hand breadth to foot length at both the points as seen in table no. 1 & 2. Hand length shows more significant correlation than hand breadth. Comparison of parameters between males & females shows a positive significance and dimensions of all parameters are higher in Males as compared to Females as shown in table no.3



Graph 3: Gender wise comparison of parameters

Discussion:

Although the physical parameters of an individual are influenced by many factors like Nutrition, genetics, geographical environment, gender, age, physical activity; there is definite correlation between the various parameters in the same individual. The present study shows significant correlation between the dimensions of Hand i.e. Hand length & Hand breadth to Foot length of an Individual, with hand length being more predictive (with r=0,85) followed by Hand breadth at point 2 (r=0.77) and at point 1 (r=0.74) respectively which is similar to the study observed by other researchers (1, 4, 5). The relationship between Hand Length & Hand breadth is also found to be significant ($P<0.05$) as shown in Table no.1 &2 respectively. When comparison is made between the dimensions of hand i.e. Length & Breadth to that of Foot length of an individual, the Hand length is more significantly correlated to the foot length showing more r- Value (as seen in Graph 1.1). The dimensions of Hand & Foot tend to have higher values in Males than that in Females as seen in table no.3. The results of this study have a medico legal importance in identification of dimensions of parameter if one of the other is known. The formula arrived at in the study can be definitely used for Central Indian population. The data can be of help in reconstructive or plastic surgery. If one dimension i.e. Hand breadth or length is known the foot length can be determined or vice versa. With the help of linear regression formulae even from a single dimension the other can be predicted. We tried to determine the normal range when one parameter is known. The study can be further explored by increasing the sample size and broadening the geographic area.

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Original Article

ANALYSIS OF VARIOUS ASPECTS OF ASSAULT CASES ATTENDED IN EMERGENCY DEPARTMENT OF GOVERNMENT HOSPITAL MUMBAI

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Original Article

ANALYSIS OF VARIOUS ASPECTS OF ASSAULT CASES ATTENDED IN EMERGENCY DEPARTMENT OF GOVERNMENT HOSPITAL MUMBAI

Dr. Thube HR, Dr. Chikhalkar BG, Dr. Nanandkar SD

Abstract

The ability to appropriately assess, document, and interpret injuries that have been sustained in assault is a key part of the work of any medical officer or forensic expert. Present study was conducted in casualty department of tertiary government hospital Mumbai over the period of two years from October 2011 to September 2013. Total 1288 cases were observed, interviewed and studied in respect to injury profile. Out of which males were large in number, n=1100 (85.4%) and (51.48%) were in the age group of 21 -30 years. The 505 (45.9%) assaulted male victims and 80 (42.6%) female victims were from upper lower socioeconomic class. Also majority of male 762 (69.3%) victims approached the casualty and reported the case by themselves. The assault took place in majority victims n=525 (40.76%) in evening time i.e. 4 pm to 11:59 pm. In 795 (61.7%) cases assailant were known to victim. Females were mainly assaulted at their homes 137 (72.9%) and males 525 (47.7%) were at public place. Out of total 1288 victims, 153 (11.9%) were found to have consumed alcohol.

So analysis of assault cases is essential to know more about the interpersonal relationship and their effects on new growing society of metro city.

Key words: Assault, Casualty, Assailant, injury

Introduction

The ability to appropriately assess, document, and interpret injuries that have been sustained is a key part of the work of any medical officer or forensic expert. Crimes of violence are increasing throughout the world. So assault cases have also become more widely recognized. It has been suggested that the definition of physical injury in the forensic medical context should be 'damage to any part of the body due to the deliberate or accidental application of mechanical or other traumatic agent'. The purpose of assessment and documentation is to assist in establishing how a wound or injury is caused, which may often be an issue in courts of law. These two skills should be within the remit of any doctor, although they are rarely done fully and appropriately. Based on the queries generally faced by casualty medical officer, the present work is aimed at studying the medico-legal and other various aspects of assault cases in casualty.

Material and Methods:

Present study was conducted in casualty department of tertiary government hospital Mumbai which is working round the clock. The assault cases which were brought to casualty for treatment purpose or for medicolegal reason and which were registered as cases of EPR (Emergency Police Register) were attended in casualty. The detailed examination of assault cases was done after taking consent. The documentation in register done by casualty medical officer was reviewed.

Total 1288 cases included in study. The history was obtained from patient, accompanying people and relatives and or from accompanying police by taking proper informed consent. Specific leading questions were asked to both victim and accompanying persons. Some information also gathered by taking detail history from victim's relatives and

accompanying persons and or police by asking question in open and closed frame manner. The injuries were examined and documented in detail.

Observations and Results:

Male preponderance [n=1100 (85.4%)] was observed in victims of assault. Majority of male [509 (46.3%)] and female [154 (81.9%)] victims were from same age group i.e. between 21- 30 years. The majority of cases fall in 21 -30 years age i.e. 663 (51.48%) cases followed by 31-40 years group showing 457 (35.48%). 117 (9.08%) victims were between 41-50 years age group, while only 17 (1.32%) victims were over 50 years of age. 34 (2.64%) victims were between age group of 11-20 years. Majority victims [694 (53.9%)] were Muslims. 560 (43.5%) were Hindus and 34 (2.6%) were Christians by religion. Total 505 (45.9%) male victims of assault and 80 (42.6%) female victims were from upper lower class. Victims from lower middle class were 231 (21%) males and 46 (24.5%) females. 28 (14.9%) females and 179 (16.3%) males were from lower class. 13 (6.9%) females and 112 (10.2%) males were from upper middle class. 21 (11.2%) females and 73 (6.6%) males were from upper socioeconomic class. 525 (40.76%) victims were assaulted in evening time i.e. 4:00 pm to 11:59 pm. Between 8:00 am to 3:59 pm, 508 (39.44%) victims were assaulted. And few [255 (19.8%)] were assaulted in night from 12:00 midnight to 8 am. In casualty 865 (67.2%) victims approached the casualty by themselves. 254 victims were brought by relatives and police brought 169 (15.4%) victims. Out of total victims that came to casualty by themselves 762 were males. Police brought 169 (15.4%) male victims in casualty. Relatives brought 169 (15.4%) male victims to casualty. In females victims 103 came by themselves in casualty. While 85 (45.2%) females were brought by their relatives and no female was accompanied by police.

795 (61.7%) assailants were known to victims, and in 493 (38.3%) cases assailants were unknown. The majority of assaults took place at public place 542 (42.1%). 424 (32.9%) incident took place exclusively over street. Domestic or indoor violence took place in 290 (22.5%) cases. In 32 (2.5%) cases assaults occurred at miscellaneous locations. 137 (72.9%) females were mainly assaulted at their homes and 525 (47.7%) males were assaulted at public places. 390 (35.4%) males and 34 (18.1%) females were assaulted over street. 17 (9%) females were assaulted at public places. 153 (13.9%) males were assaulted at and in vicinity of their homes. Total 923 (71.1%) assault cases were treated on outpatient department (OPD) basis and then discharged. And remaining 365 (28.3%) cases were admitted in different inpatient department for observations and treatment. 365 (33.2%) males were admitted in different wards because of gravity of sustained injuries and remaining 735 (66.8%) received treatment on OPD basis. Surprisingly all females (188) were treated on OPD basis. Out of 1288 assault cases in 502 (38.92%) cases injury certificates were issued by casualty medical officer immediately or after follow up. Alcohol was consumed by 153 (11.9%) victims out of 1288 victims brought to casualty before assault incidence. In 170 (13.2%) incidences of assault assailants had consumed alcohol and were under influence of alcohol. In 1187 (92.2%) cases history correlated with assault injury, whereas in 101 (7.8%) cases it did not correlate.

Discussion:

During the study period of two years from october-2011 to September- 2013, total 6870 EPR (Emergency Police Record) cases attended in casualty which were registered as medicolegal cases.

Frequency of male and female victims of assault in the present study coincide with the studies of Wright et al (male-80%), Zargar et al (male-88.5%), Farooqui et al (male-80%),

Subba et al (male-78%), Hocking et al (male-77%), Fothergill et al (male-72%) and Howe et al (male-71%). The male preponderance is also similar in the studies of Hofnera et al and Ranney et al. The reason for predominance was due to more aggressive behaviour and more exposure to environment and assault.

Common Age group of victims of assault in the present study coincides with the studies of Honaken et al (15-45), Farooqui et al (17-45) and Bhullar (16-30). Some variations were seen when compared with studies like Albrektsen et al (35-49), Hocking et al (16-26) and Subba et al (16-25). Both male 509 (46.3%) and female 154 (81.9%) affected victims of the assault were of young and productive age group between 21- 30 years.

Religion wise Distribution of Assault Victims

In total assault cases Muslim victim were 694 (53.9%) and Hindu victims were 560 (43.5%). Only 34 (2.6%) of victims were of Christian and other religions. In similar study Mohanty et al found 82% victims were of Hindu religion. This majority of Muslim victims undergone assault incidence may be because of dense Muslim population around hospital area.

Accompanying person

In present study majority of the victims sustained only minor injuries so they came to casualty by themselves in 865 (67.2%) cases. Out of 1288 victims 254 (19.7%) were brought by their relatives to casualty department for treatment and medicolegal examination purpose. Police brought 169 (13.1%) victims for examination and treatment purpose in casualty and all these were males 169 (15.4%) victims. In females victims majority 103 (54.8%) came themselves in casualty. While 85 (45.2%) females were brought by their relatives and no female was accompanied by police.

Assailant

In 795 (61.7%) cases assailant were known to victim and in 493 (38.3%) cases they were unknown to victims. This finding was consistent with similar previous studies by Fothergill et al and Makower et al. In both these studies, 70% victims knew their assailants. In Subba et al 56% assailant were known to victims.

Treatment

Assault victims after undergoing primary documentation process were treated in casualty and then either admitted or discharged. In present study 923 (71.7%) assault victims received treatment on OPD basis and then discharged. 365 (28.3%) victims required admission in different wards in hospital. Out of 1100 males, 365 (33.2%) required admissions in ward and 735 (66.8%) were treated on OPD basis. Surprisingly all females (188) could be treated on OPD basis. Few of the victims refused hospitalization in spite of the medical advice for the same. This could be because of less severe injury on body of females, and majority of the females were brought by accompanying persons only for medicolegal examination purpose. In the studies carried out by Wright et al (27%) and Makower et al (24%), the hospital admission findings were consistent with present work. However, Hocking et al observed 12% and Shepherd et al observed 17% of hospitalizations in their studies.

Place of assault

The majority 542 (42.1%) of assault incident took place in vicinity of public place like hotels, pubs, beer bars, railway stations etc. In 424 (32.9%) cases the assaults occurred over street. In 290 (22.5%) cases of violence, assaults occurred in homes along with assault surrounding of home. Females were mainly assaulted at their homes 137 (72.9%) and 525 (47.7%) males were mainly assaulted at public place like hotels, pubs etc. 390 (35.4%) males and 34 (18.1%) females were assaulted over streets. 17 (9%) females were assaulted at public places. 153 (13.9%) males were assaulted at and in vicinity of their homes.

The difference between locations of violence in major cases i.e. domestic violence in females and public place assault in males was highly significant.

In similar studies like Shepherd et al the majority of assaults took place in public place (32%) and in Makower et al 37% cases occurred in public place. This is consistent with the observations in present study. In studies of Butchart et al majority cases occurred in street and in Fothergill 64% cases occurred at home. Both these studies were inconsistent with present study. This may be due to difference in gender wise distribution of victims. In studies where females contributes majority of victims the incidence of domestic violence was more.

Time of assault

Majority of assaults [525 (40.76%)] occurred in evening period i.e. from 4 pm to 11:59 pm. Out of 1288 assault cases, 508 incidence happened in morning from 8 am to 4 pm. After 12 midnight the incidences of assault drastically fallen to 255 (19.8%) cases. The probable reason for majority 525 (40.76%) of assault occurring between 4 pm to 12 midnight may be because of more exhaustible and irritable nature in evening along with more man to man interaction after the work periods. And the fall in assault cases after midnight may be because of very less activity of persons after midnight. These observations were consistent with other similar studies like Farooqui et al in which majority of assault occurred in evening and with Subba et al, where maximum number of physical assault injuries occurred between evening and midnight (59.59%).

Association of alcohol and assault

In present study the data on alcohol ingestion by Assailant was gathered from the victim, their relatives, friends, and other accompanying person and from police if he or she was brought by police. Specific questions related with incidence of assault and regarding assailant were asked to gather information on the role of alcohol in the quarrel.

In 170 (13.2%) cases there was history of assailant having consumed alcohol and having assaulted the victims under influence of alcohol. During examination the victims were examined for alcohol consumption, also attempts were made to obtain specific history of alcohol consumption, and in suspected cases detail examination for alcohol consumption was carried out. In present work, out of 1288 victims brought to casualty, 153 (11.9%) victims had consumed alcohol before incidence of assault. In similar studies like Fothergill & Hashemi et al 72% victims consumed alcohol prior to assault, as per Albrektsen et al 41% of the patients were intoxicated, Shepherd J & Scully C et al reported 73% of victims with alcohol intake immediately preceding injury, and Sivarajasingam V, Morgan P et al concluded that the risk of injury in assault for men and women is same when no alcohol is consumed. Alcohol consumption may lead to different risks taking behaviour in men and women. Thus, all these studies show strong correlation of alcohol with assault and quarrel incidences. In present work only 13.2% assailant had history of alcohol consumption and it can be commented that alcohol is also contributing factor for quarrel and assault incidences. However higher percentage of correlation of alcohol with assault was observed in above mentioned foreign studies, where alcohol is consider as a social drink. This difference of correlation of alcohol with assault could be because of geographic location of hospital and difference in study population.

Correlation of history with examination findings of assault victims

The history obtained from victim, relative and accompanying person was noted and it is correlated with examination finding of injury with respect to nature of injury, its severity, site of injury and probable weapon. Out of 1288 cases in 1187 (92.2%) cases the history about injury was found correlating with examination findings. While in 101 (7.8%) cases the examination findings of injuries were not supporting the history obtained from victims. Hence it was found non correlating observations may be as a result of improper, incomplete

history, fraudulent history, and incomplete history about type of weapon and due to the fact that the victims were under influence of alcohol.

Conclusions

From the present study it can be concluded that:

1. Out of 6870 medicolegal cases observed in casualty during the study period, maximum 37.5% were of assault cases.
2. There was male preponderance in assault cases with male and female ratio of 5.85:1.
3. The age group which was maximally affected in males was 21-30 years i.e. 509 (46.3%) cases and same age group in case of female with 154 (81.9%) cases. Mean age of assault victims was 31.4 years.
4. Assault victims are found in all the religion with order of frequency-muslim-53.9%, hindu-43.5%, Christian- 2.6% cases.
5. Maximum assault cases were noted in lower class i.e. upper Lower 585 (45.4%) and lower class 201 (16.1%).
6. Most of the male assault victim 69.3% and female assault victims 54.8% visited casualty and registered a case as medicolegal by themselves.
7. The 40.76% assaults took place in evening i.e. between 4 pm to 12 am.
8. In 61.7% cases of assault, assailants were known to victims, and 13.2% assailants were under influence of alcohol.
9. Majority of males 66.8% and all females were treated on OPD basis.
10. Most of the females 72.9% were assaulted at their home and 47.7% males had incident of assault at public place.
11. The history given by victim and their accompanying person correlated with the examination findings and injuries over the body of victim in 92.2% cases.

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Original Article

PATTERNS OF INJURIES IN FATAL VEHICULAR ACCIDENTS IN AND AROUND AKOLA CITY

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Original Article

PATTERNS OF INJURIES IN FATAL VEHICULAR ACCIDENTS IN AND AROUND AKOLA CITY

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Abstract:

In developing countries injuries and deaths due to vehicular accidents are major problems and it requires concrete efforts for prevention of morbidity and mortality. The objective of present study was to analyze the pattern of injuries in vehicular accidents and to find out the measures for its prevention. The study was conducted on 270 victims who died of vehicular accidents and were autopsied at government Medical College Akola, during the period from 1st January 2012 to 31st December 2013.

Study showed that males were the worst sufferers (84.81%) than females (15.18%). Most of the victims were from age group of 21-40 years (53.69%). Head injury was the commonest (61.11%) followed by thoracic injuries (53.70%), abdominal injuries(44.81%)and injuries to lower limbs were observed among(35.92%) of the victims.

Key Words: Vehicular accident, Head injury, Thoracic injury, Abdominal injury.

Introduction:

An accident is occurrence in sequence of events which usually produces unintended injuries, death, or property damage. Today accidents represent a major epidemic of the noncommunicable disease in present century.[1]

According to World Health Organization, in its first global status report on road safety, more people die in road accidents in India than anywhere else in the world.[1]

Due to rapid urbanization, unprecedented motorization, industrialization, dense population etc. number of road traffic accidents is increasing day by day in developing countries like ours.Although number of motorvehicles per population is much lower as compared to developed countries but mortality is far higher than developed countries due to poor maintenance of transportation management.[2,3]

In present study an attempt is made to analyze the patterns of injuries in fatal road accidents with regards to age, sex and to identify resulting injuries in road traffic accidents in order to implement preventive strategies to reduce the morbidity and mortality.

Material and Methods:

The present study was conducted in the department of Forensic Medicine, Government Medical College, Akola during the period 1st January 12 to 31st December 13.

The material for present study included the victims who died of road traffic accidents during study period and whose bodies were autopsied at Government Medical College, Akola.The basic information about the deceased like age, gender, season and type of injuries were obtained from individual, postmortem reports, inquest and clinical papers of deceased. Data obtained is tabulated and represented in pie chart forms.

Results:

A total of 270 cases of road traffic fatalities were studied during the study periodwhich accounts for 10.37% of the total autopsies.

Diagram shows that majority of victims were male (84.81%) as compared to females (15.18%).

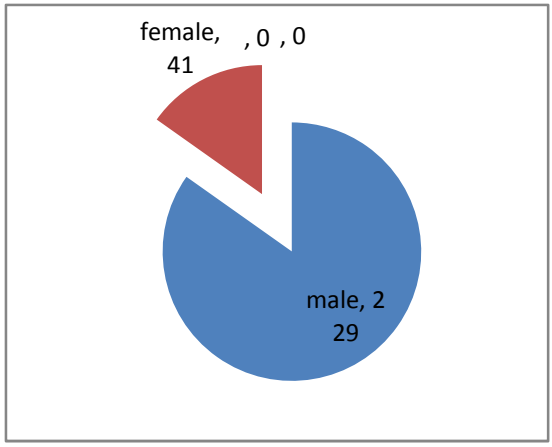

Figure No.1: Gender wise distribution of cases

Age group	No. of cases	%
0-10	4	1.48%
11-20	12	4.44%
21-30	76	28.14%
31-40	69	25.55%
41-50	47	17.40%
51-60	33	12.22%
60& above	29	10.74%

Table No. 2: Age group wise distribution of cases

Table No. 2reveals that maximum number of road traffic fatalities areamong the age group 21-30 years (28.14%)followed by age group 31-40 years (25.55%) and least among age group 0-10 years (1.48%).

Region	No. of cases	%
Head	165	61.11%
Thorax	145	53.70%
Abdomen	121	44.81%
Upper limb	51	18.88%
Lower limb	97	35.92%
Spine	28	10.37%

Table No.3 Body region wise cases.

Type of injury	No. of cases	%
Fracture of skull	105	63.63%
ICH	110	66.66%
Fracture skull + ICH	81	49.09%
Brain	62	37.57%

Table No.4 Distribution of head injury cases.

All the victims had multiple injuries externally in the form of abrasion, lacerations, and contusions or either of them in almost all the cases. Present study revealed that head was most commonly affected region of the body(61.11%) followed by thorax(53.70%) and abdomen (44.81%).

Among head injury; intracranial hemorrhage was commonest injury observed (66.66%) followed by fracture of skull (63.63%) and injuries to brain was observed in (37.57%) of cases.

Type of injury	No. of cases	%
Fracture of ribs	111	76.55%
Lungs	75	51.72%
Heart	12	8.27%
Fracture of sternum	10	6.89%

Table No. 5: Distribution of thoracic injuries

Organ involved	No. of cases	%
Liver	72	59.50%
Spleen	35	28.92%
Kidney	28	23.14%
Stomach	11	9.09%
Intestine	9	7.43%
Urinary bladder	9	7.43%
Others	8	6.61%

Table No. 6: Distribution of abdominal injuries

Among the thoracic injuries, fracture of ribs was commonest (76.55%) followed by injuries to lungs (51.72%) and heart (`8.27%).

Type of injury	**No. of cases**	**%**
Lower limbs	97	55.11%
Upper limbs	51	28.97%
Spine	28	15.90%

Table No. 7: Distribution of limbs and spinal injuries.

Among the solid abdominal organs liver was more commonly affected organ (59.50%) followed by spleen (28.92%) and kidney (23.14%). Among the visceral organs stomach (9.09%) was mostly affected followed by intestine (7.43%) of cases.

Lower limb was most commonly affected (55.11%) followed by upper limbs (28.97%) and spine (15.90%) of cases.

Discussion:

In the present study a total of 270 cases of fatal road traffic accidents were studied for the duration of 2 years from 1st January 2012 to 31st December 2013.

Males (84.81%) outnumbered the females (15.18%). This may be due to fact that males are more prone to road traffic accidents because of more involvement in outside activities and use of vehicles is also more in males as compared to females. Findings of our study are comparablewith the findings of ZhaNilambar and etal[2],Jakkam surrender[4] study.

Present study reveals that majority of victims were from age group (21 to 30) years followed by (31 to 40) years.These 2 groups in combination account for (53.69%). This group represents the working population in our society. Similar findings were reported by Sharma Deepak etal[1],Nzegwu M. A. etal[3],ZhaNilambar and etal[2], Jakkam surrender[4] and Kyada C Hetal etal[5] etc.

Among the injuries to different body regions in our study, it is revealed that head was most commonly affected body part (61.11%) followed by thorax (53.70%) and abdomen (44.81%). Similar findings are reported by ZhaNilambar and etal[2], Jakkam Surrender[4], Kyada C Hetaletal[5]. This may be due to reason that head is target of choice in majority of cases of assault, fall and blunt trauma by any reason.[7]

Intracranial hemorrhage (66.66%) was the commonest injury observed among the head injury patients. These findings are similar to the study done by Ahmed M etal[6].This may be due to the fact that the brain is covered with meninges and skull, but the brain moves into the cavity in case of jerking, acceleration and de-acceleration injuries and due to architecture of the skull bones and its prominences, vulnerability of the vessels of the brain leads to intracranial hemorrhage even in case of without injury to the calvarium.

Among thoracic injuries, fracture of the ribs (76.55%) was commonest followed by injuries to the lungs (51.72%) and heart (8.27%). This may be due to the reason that the organs are well protected by the ribs and sternum having elastic nature, so ribs are commonly injured in cases of violence, accidents and fall.

In abdominal injuries, liver (59.50%) was the most commonly affected organ followed by spleen (28.92%) and kidneys (23.14%), as the location of the liver in the cavity, its size, shape and sometimes pathological conditions leading to its enlargement; making the liver most vulnerable organ. Similar findings were reported by Kyada C Hetaletal[5].

Amongst the other injuries, injuries to the lower limbs were commonest; this is similar to study of Kyada C Hetaletal[5]. This may be due to the fact that in road traffic accident cases pedestrians are worst affected and impact by any vehicle usually involves dash to the lower limbs.

Conclusion:

This study showed that road traffic accident deaths are more common among males as compared to females in a ratio of (5.82:1) and in younger age group between 21-40 years. The study also showed maximum numbers of cases were having head injury (61.11%), thoracic injury (53.70%) and among abdominal injuries, the liver was most affected organ and among other injuries, an injury to the lower limbs was commonest.

The morbidity and mortality due to road traffic accidents can be reduced by providing prompt, adequate and timely medical aid to the victim and also by increasing the awareness among the people about traffic rules, regulations, discouraging alcohol consumption and use of modern technology like alcohol safety car among the drivers.

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Original Article

KNOWLEDGE AND PRACTICES OF OBTAINING INFORMED CONSENT FOR MEDICAL PROCEDURES AMONG MEDICAL INTERNS

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Original Article

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Abstract

The informed consent process involves communication between a physician and a patient. It should not be a passive and unilateral process where the physician takes the decision. Most people have the reasonable expectation that they should be treated with respect as autonomous individuals. They also expect that they have the right to make decisions about what will and will not be done to their persons and about what personal information they will share with others. Every new budding doctor or intern should have the knowledge about the informed consent because they are one who is going to become treating physician in future. The intern's knowledge and attitudes toward informed consent considerably differ. This article mainly aims to evaluate the knowledge and attitudes of interns or trainees regarding the informed consent process.

Key words

Informed Consent, Interns, Knowledge, Medical Practice

Introduction

Informed consent means the consent of a patient, to the performance of the health care services, provided by a registered medical practitioner; that prior to the consent having been given, the medical practitioner has informed the patient of the nature of the proposed procedure or treatment, of those risks and alternative treatment or diagnosis that a reasonable patient would consider material to the decision whether or not to undergo treatment and diagnosis.[1] Consent to treatment is the principle that a person must give their permission before they receive any type of medical treatment. Consent is required from a patient regardless of the treatment, from blood test to organ donation.

Consent is a communication process betweena patient and his or her health-care provider, which ultimately leads to the patient's agreement to health services.[2] The doctrine of consent to treatment, or informed consent, dates back at least to the writings of early Greek and Byzantine authors.[3] It has its roots in several disciplines, including health, law, social sciences and philosophy.[4]

The informed consent process involves communication between a physician and a patient. It should not be a passive and unilateral procedure in which a medical decision is left to the discretion of the physician. The completion of a consent form is only one part of the informed consent process, which also consists of discussions between patients and physicians regarding any proposed medical procedures.[5,6] A patient's signature on an informed consent form is necessary to initiate the treatment procedures, however, signing the consent form does not confirm a patient's complete and correct understanding of the issues surrounding a medical procedure. Our study indicates that, more training is needed for interns about the informed consents and its importance. It has been shown that interns have more of theoretical knowledge when compared to the practicalities. We conducted this study to compare

knowledge and practices for obtaining informed consent for medical procedures among interns in Rajrajeswari Medical College and Hospital.

Materials and Methods

The survey was conducted among interns. An anonymous and voluntary survey of knowledge and practices for obtaining informed consent was conducted among 71 interns working in hospital. Prior to study inclusion, all participants were informed about the purpose of the study and that participation was voluntary and anonymous. The interns present at the time of the survey filled out the questionnaire on their own and returned the questionnaire form.

Questionnaire

The questionnaire consisted of 10 questions. The questions were formulated according to the guidelines for obtaining patients' consent. The questionnaire contained general knowledge about informed consent.

Results

Questionnaires are given to 65 interns and asked to mark appropriate answers. There were 31 male and 34 female respondents.

Almost 51% of interns are having good knowledge about informed consent. 09% of interns are below average. Female interns have better knowledge than males.

Level	Number	Percent
Very Good	26	40%
Good	33	51%
Average	4	6%
Poor	2	3%
Not Aware	0	0%
Total:	65	100%

Table: 1- Level of knowledge among medical interns

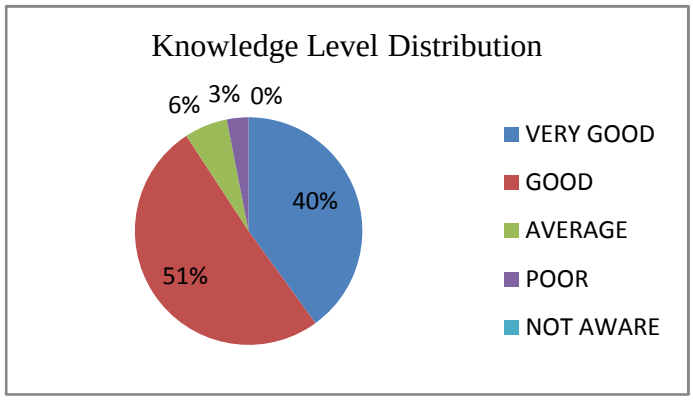

Fig 1- Pie Diagram Showing Level of knowledge among medical interns

Level	Male	Female
Very Good	11	15
Good	16	17
Average	2	2
Poor	2	0
Not Aware	0	0
Total:	31	34

Table :2–Level of knowledge among males and females

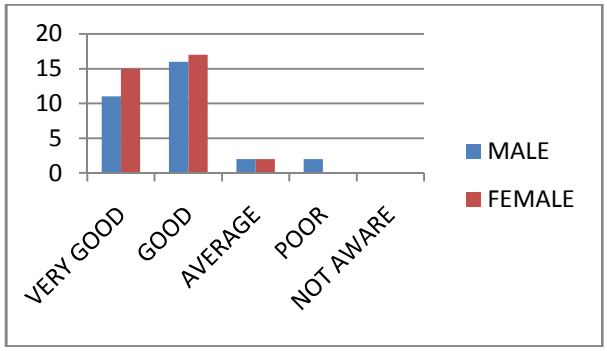

Fig 2 – Level of knowledge among males and females

Discussion

Consent means agreement, compliance or permission given voluntarily without compulsion. The consent will be legally valid when it is given freely and voluntarily without any fear or fraud after due understanding, what it is given for and of the risks involved. The consent can be express or implied type. Informed consent has now been recognized by all that the patient has the right of full information about his disease and future plan of treatment for it.[7]

The history of consent to treatment in the United States dates back to *Slater v. Baker and Stapleton*in 1767.[8,9] In *Slater*, the court stated that "It is reasonable that a patient should be told what is about to be done to him, that he may take courage and put himself in such a situation as to enable him to undergo the operation".[10] However, informed consent was not extensively discussed in the American medical literature until the late 1950s and early 1960s.[11] The expression "informed consent" was coined in 1957case law.[12] Martin Salgo, who became paralyzed following treatment, sued his physicians for failing to disclose risks and alternate treatments. Until late 1950s, "the justification of practices of disclosure and consent seeking were strictly governed by what we shall call a beneficence model rather than anautonomy model of the physician's responsibility for the patient"[13].

Few authors say informed consent is like contract. A contract is, by definition, "an agreement between two or more parties creating obligations that are enforceable or otherwise recognizable at law".[14]Contracts, both implied and written, are essential to society. In clinical settings, capacity concerns may arise in relation to consent for treatment as well as the converse, to refuse treatment, be that treatment psychiatric or medical/surgical in nature. Justice Benjamin Cardozo described the concept of consent in 1914 when he wrote, "Every human being of adult years and sound mind has a right to determine what shall be done with his own body".[15]In the present day, patient autonomy remains an important concern.[16]

Consent must be informed, voluntary, and competent.With informed consent, a competent individualmust understand: [17,18]

1. The nature of the medical condition,
2. The nature of the proposed treatment,
3. The risks and benefits of the proposed treatment as well as no treatment, and
4. Possible alternatives to the proposed treatment

The events that led to the implementation of the principles behind the informed consent process in scientific research were some of the most terrible in human history. For example, the experiments conducted in Nazi Germany led to the creation of the Nuremberg Code after the war was over. Ever since then, the scientific community has continued to revise such principles in order to ensure the ethical treatment of participants. The Declaration of Helsinki and the Belmont Report also attest to the ongoing need to refine the rules and regulations behind the informed consent process.[19]

Informed consent of a patient or other recipient of services based on the principles of autonomy and privacy; this has become the requirement at the center of morally valid decision making in health care and research. Seven criteria define informed consent:[20]

1. Competence to understand & to decide,
2. Voluntary decision making,
3. Disclosure of material information,
4. Recommendation of a plan,
5. Comprehension of terms (3) & (4),
6. Decision in favor of a plan, and
7. Authorization of the plan.

A person gives informed consent only if all of these criteria are met. If all of the criteria are met except that the person rejects the plan, that person makes an informed refusal

Good medical practice involves:[21]

1. Providing information to patients in a way that they can understand before asking for their consent.
2. Obtaining informed consent or other valid authority before you undertake any examination, investigation or provide treatment (except in an emergency), or before involving patients in teaching or research.
3. Ensuring that your patients are informed about your fees and charges.
4. When referring a patient for investigation or treatment, advising the patient that there may be additional costs, which patients may wish to clarify before proceeding

In nonemergency situations, written informed consent is generally required before many medical procedures, such as surgery, including biopsies, endoscopy, and radiographic procedures involving catheterization. The physician must explain to the patient the diagnosis, the nature of the procedure, including the risks involved and the chances of success, and the alternative methods of treatment that are available. In medical research, the patient must be informed that the procedure is experimental and that consent can be withdrawn at any time. In addition, the person signing the consent form must be informed of the risks and benefits of the experimental procedure and of alternative treatments.[20]

Medical emergencies, when treatment decisions regarding life-threatening conditions must be made in the moment, constitute an exception to the requirement for consent. For instance, informed consent is not required prior to treating an unconscious patient who requires surgery to stop severe internal bleeding.[22]

Documentation of consent provides a record that the initial process took place. It generally consists of a consent form signed by the subject or the subject's legal representative. In practice, this document is often used as a tool for engaging in the consent process, which consists of providing information about the research to potential subjects. Sometimes, informed consent can be documented by other means, as approved by an Institutional Review Board (IRB), for example, audio or video recording.[23]

A medical intern is a term used for a physician in training who has completed medical school. An intern has a medical degree, but does not have a full license to practice medicine unsupervised. After four and half years of medical school (degree of MBBS) every doctor in India has to go through a one year compulsory rotatory internship in various specialties to get permanent registration in Medical Council of India as a physician. Interns work in hospitals, where they often rotate between different departments so they can be exposed to different medical specialties.

Interns are given responsibility for patient care, and they are supervised by senior residents and attending physicians. General interns perform medical procedures such as catheterization, biopsies and intubation like minor procedure and assist along with the surgeons in case of major surgery and are also responsible for documentation of patient care and evaluation of incoming patients.

Informed consent is a professional ethics issue emanating from the fiduciary responsibility of the physician to the patient. It is an integral component of the physician’s fiduciary responsibility. In many countries informed consent for medical procedures is a standard procedure for providing the patients with the information on diagnostic and treatment procedures, risks, complications, and alternative treatment options in non-emergency cases thereby considerably improving the communication between physician and patient.[24.25]

A signed form is the evidence that their conversation led to a mutual understanding. However, the implementation of the informed consent process differs among countries

because informing the patient and requiring the consent are still not regarded as a legal obligation of the physician.[26]

It is a fact that a large percentage of interns and even the physicians are not familiar with the concept of informed consent and its importance. Currently, it is mechanically followed just as a formal procedure, rather than a real interaction between the physician and patient. Although interns may complete the informed consent form and the information regarding the informed consent, however, educating of patients is a physician's responsibility – it is not a piece of paper. Informing the patient and getting consent is a process that should be provided by a physician and it should be carried out or followed by the interns. This consent process helps that at least some patients reach a decision. It therefore must result from exchange of information, understanding, deliberation, and balancing of alternatives between physicians and patients.

The majority of physicians and interns respect patients' autonomy and their decisions and requires the consent of relatives when the patient is not capable of reaching a decision. However there are still many interns who have a paternalistic attitude toward their patients, they thought that patients would consent to the method recommended by them.

Conclusion

Interns here have no formal education in art of taking informed consent and implement the informed consent process is a rather formal manner, regardless of the medical specialty. Systemic approach at education and training at the higher level is needed to improve the informed consent process. Creating the knowledge may increase the quality of health care provided to the patients, and the legal security for both patients and their physicians and fellow interns. Since informed consent process is an ethical duty, emphasis should not be merely on filling up the forms but rather on establishing communication between the physician, budding doctors like interns and patient and on the individual human values, principles, and standards.

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Questionnaire

1. One of the following is not a recognized type of consent in medical practice ?
   a. implied
   b. expressed
   c. informed
   d. blanket

2. In MLC to examine the person not in police custody consent is
   a. Required
   b. Not required
   c. Can be taken from police
   d. None of the above

3. Spouse consent is necessary in
   a. Abortion
   b. Life saving treatment
   c. Treatment involving sterility, impotence

4. According to you who should educate the patient?
   a. Physician
   b. Nurse
   c. Interns

d. Relatives

5. How will you explain about medical condition and treatment procedures to patient?
   a. In detail
   b. As much as I think it is necessary
   c. Only as much as is needed for patient to make decision

6. How many informed consent have you taken till now?
   a. 0
   b. 1-5
   c. 10-15
   d. 20-30

7. Is it necessary to take consent for extended surgery?
   a. Yes
   b. No
   c. Don't know

8. For any surgery who should take the consent?
   a. Anesthetist
   b. Surgeon
   c. Nurse
   d. Intern

9. For emergency care will you take consent?
   a. Yes
   b. No need
   c. Don't know
   d. Depends on patients condition

10. Is it necessary to take informed consent for injection?
    a. Only for IV
    b. For any injection
    c. Don't know

11. Is that verbal consent is necessary to perform minor surgery?
    a. Yes
    b. No
    c. Don't know

Original Article

A RETROSPECTIVE STUDY OF PATTERN OF CLINICAL MEDICO-LEGAL CASES REGISTERED AT TERTIARY HEALTH CARE CENTRE IN KOLHAPUR DISTRICT

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Original Article

A RETROSPECTIVE STUDY OF PATTERN OF CLINICAL MEDICO-LEGAL CASES REGISTERED AT TERTIARY HEALTH CARE CENTRE IN KOLHAPUR DISTRICT

Dr. SV Haridas, Dr. DA Pawale

Abstract:

This study was aimed to know the pattern of clinical medico-legal cases registered at tertiary health care centre in Kolhapur district. We found that Males were involved in 80.66% cases and maximum cases (35.00%) were from age group 21 to 30 years. Common indications for registering Medico-legal case were Assault (28.90%), Road traffic accidents (15.10%), Poisoning (8.50%) and Burns (5.77%). Use of hard and blunt weapons for assault was observed in 85.99% cases. Poisoning by organophosphorus compounds was observed in 37.18% of poisoning cases.

Keywords: Casualty, Medico-legal cases, Assault, Burns, Poisoning, Road traffic accidents

Introduction:

Casualty department is very crucial for any hospital as all the medical and surgical emergencies first report to casualty and also all the medico-legal cases are registered in casualty. Further it serves as an outpatient department after the routine outpatient department hours. Medico-legal case can be defined as a case of injury or ailment, etc. in which investigations by the law-enforcing agencies are essential to fix the responsibility regarding the causation of the said injury or ailment. In simple language it is a medical case with legal implications for the attending doctor where the attending doctor, after eliciting history and examining the patient, thinks that some investigation by law enforcement agencies is essential[1, 2]. The on duty doctor in the casualty department has to first stabilise the patient of any emergency. He is also duty bound to register a particular case as a Medico-legal case whenever indicated and has to examine the same. In the present study an attempt is made to know the workload of clinical medico-legal cases and their pattern.

Aims and objectives:

1. To know the pattern of clinical medico-legal cases registered at tertiary health care centre in Kolhapur district.
2. To know the various indications for registering a case as medico-legal case.
3. Suggestions to avoid unnecessarily registering a case as medico-legal case.

Materials and Methods:

This study was a retrospective hospital based observational study conducted at the casualty of R. C. S. M. Govt. Medical College and C. P. R. Hospital, Kolhapur. Twelve thousands seven hundred eighty nine clinical cases registered as Medico-legal cases from 01st January 2013 to 31st December 2013 were included in this study. Data was collected in various parameters from Medico-legal case register and was analysed using percentages and discussed.

Inclusion criteria: All the clinical medico-legal cases registered at the casualty of R. C. S. M. Govt. Medical College and C. P. R. Hospital, Kolhapur.

Exclusion criteria: Brought dead cases at the casualty of R. C. S. M. Govt. Medical College and C. P. R. Hospital, Kolhapur.

Observations:

In the year 2013 total 12,789 cases were registered as Medico-legal cases from 01st of January to 31st of December.

Sex	No. of Cases	%
Male	10316	80.66
Female	2473	19.34
Total	12789	100

Table 1: *Sex wise distribution of Medico-Legal Cases*

Present study showed maximum cases of medico-legal cases were males (80.66%)
Present study showed that most of the medico-legal cases were from the age group 21-30 years (35.00%) followed by 31-40years (21.79%). Even the individuals of extremes of ages were also involved in medico-legal cases.

Age group	No. of cases	%
0-10	342	2.60
11-20	1214	9.50
21-30	4496	35.00
31-40	2789	21.79
41-50	1949	15.27
51-60	1145	9.12
61-70	662	5.21
71-80	158	1.30
81-90	34	0.18
Total	12789	100

Table 2: *Age wise distribution of Medico-Legal Cases*

Age group	Male		Female		Total
	No. of cases	%	No. of cases	%	
0-10	183	01.78	159	06.42	342
11-20	941	09.12	273	11.04	1214
21-30	3767	36.52	729	29.49	4496
31-40	2297	22.28	492	19.91	2789
41-50	1651	16.00	298	12.05	1949
1-60	840	08.14	305	12.33	1145
61-70	502	04.86	160	06.48	662
71-80	114	01.10	44	01.75	158
81-90	21	00.20	13	00.53	34
Total	10316	100	2473	100	12789

Table3: *Age and Sex wise distribution of Medico-Legal Cases*

Present study showed that most of the medico-legal cases were from the age group 21-30 years (35.00%) followed by 31-40years (21.79%) in both the sexes.

Most of the medico-legal cases registered were due to assault (28.90%) and followed by the routine medical examination for fitness of prisoners and accused for police custody (23.68%), Road Traffic Accidents (15.10%), poisoning cases (8.50%) and burn (5.77%).

Indication for registering medico-legal cases	No. of cases	%
Assault	3697	28.90
Burn	737	05.77
Road Traffic Accidents	1931	15.10
Poisoning	1087	08.50
Fall	345	02.70
Attempted Suicide by sharp edge/pointed tip weapons	12	00.09
Drunkenness	351	02.75
Routine Medical examination for fitness of prisoners and accused for custody	3027	23.68
Complications due to disease process (like brought in unconscious state, operated at private hospital, no accompanying relative, etc.)	833	06.51
Fasting	47	00.38
Unknown bite	142	01.11
Snake bite	317	02.48
Bison and wild pig and other animal injuries	39	00.30
Workplace injuries	71	00.55
Domestic work injuries	51	00.39
Attempted Hanging	02	00.01
Firearm injuries	04	00.03
Suspected criminal abortion	02	00.01
Sexual assault	94	00.74
TOTAL	12789	100

Table 4: *Indication wise distribution of Medico-Legal Cases*

Most of the medico-legal cases registered were due to assault (28.90%) and followed by the routine medical examination for fitness of prisoners and accused for police custody (23.68%), Road Traffic Accidents (15.10%), poisoning cases (8.50%) and burn (5.77%).

Age group	Male		Female	
	No	%	No	%
0-10	102	06.13	11	04.08
11-20	147	08.84	25	09.29
21-30	659	39.66	103	38.29
31-40	390	23.47	61	22.67
41-50	146	08.79	29	10.79
51-60	171	10.29	34	12.64
61-70	47	02.82	06	02.24
Total	1662	100	269	100

Table 5: *Age and Sex wise distribution of cases of Road Traffic Accident*

Age group	Male		Female	
	No	%	No	%
0-10	8	02.01	23	06.79
11-20	49	12.31	57	16.81
21-30	178	44.73	193	56.94
31-40	86	21.61	39	11.50
41-50	70	17.59	15	04.42
51-60	4	01.00	8	02.36
61-70	3	00.75	4	01.18
Total	398	100	339	100

Table 6: *Age and Sex wise distribution of cases of Burn*

Age group	Male		Female	
	No.	%	No.	%
0-10	21	02.99	4	01.04
11-20	108	15.36	88	22.92
21-30	347	49.36	196	51.04
31-40	172	24.46	79	20.58
41-50	39	05.55	12	03.12
51-60	10	01.42	3	00.78
61-70	6	00.86	2	00.52
Total	703	100	384	100

Table 7: *Age and Sex wise distribution of cases of Poisoning*

Age group	Male		Female	
	No.	%	No.	%
0-10	4	00.14	8	00.80
11-20	453	16.79	92	09.22
21-30	1170	43.35	415	41.59
31-40	547	20.27	248	24.85
41-50	358	13.26	176	17.64
51-60	120	04.45	35	03.50
61-70	27	01.00	14	01.40
71-80	20	00.74	10	01.00
Total	2699	100	998	100

Table 8: *Age and Sex wise distribution of cases of Assault*

Kind of Weapon	No. of cases	%
Hard and blunt	3179	85.99
Sharp edged	136	03.68
Pointed tip	122	03.30
Throttling	01	00.02
No Detectable Injury	259	07.01
Total	3697	100

Table 9: *Kind of Weapon used for Assault*

We observed that commonly used weapon for assault was hard and blunt followed by sharp edged and pointed tip weapons. In 259 cases (7.01%) there was history of assault but on examination there was no injury.

Poison	**No**	**%**
Battery acid	3	00.27
Chlorphenoxy Comp	53	04.88
Detergent	7	00.64
Formalin	2	00.18
Kerosene	32	02.94
OC compounds	257	23.65
OP compounds	404	37.18
Paraquat	128	11.77
Phenol	49	04.50
Ratkill	64	05.89
Sedatives	6	00.55
Unknown	82	07.55
Total	1087	100

Table 10: *Poison wise Medico-Legal Cases*

Manner	Male		Female	
	No.	%	No.	%
Suicidal	623	88.62	311	80.99
Accidental	80	11.38	73	19.01
Homicidal	00	00	00	00
TOTAL	703	100	384	100

Table 11: *Manner wise cases of Poisoning*

We observed that most of the cases (37.18%) of poisoning were due to Organophosphorus compounds followed by Organochlorine compounds (23.65%) and Paraquat (11.77%).

We observed that most of the poisoning cases were suicidal in both the sexes.

% area	No.	%
1-30%	235	31.89
31-70%	331	44.91
71-100%	171	23.20
Total	737	100

Table 12:*% Burnt surface area*

Manner	Male	%	Female	%
Suicidal	130	32.66	141	41.60
Accidental	268	67.34	198	58.40
Homicidal	00	00	00	00
Total	398	100	339	100

Table 13: *Manner wise cases of burns*

We observed that 44.89% of cases were having percentage of burn within 31 to 70.
We observed that accidental burns were most common in both the sexes. Suicidal burns were more in females (41.6%) as compared with males (32.66%).

Indication of Medico-Legal Cases	No.	%
Burn	466	13.20
Road Traffic Accident	1931	54.69
Poisoning	153	04.33
Fall	345	09.78
Unknown bite	154	04.36
Snake bite	317	08.98
Bison and wild pig and other animal injuries	39	01.10
Workplace injuries	71	02.01
Domestic work injuries	51	01.44
Firearm injuries	04	00.11
TOTAL	3531	100

It was observed that Road Traffic Accidents (54.69%) formed most of the accidental causes of Medico-Legal Cases followed by burn (13.2%), Fall (9.78%) and snake bite (8.98%).

Table 14: *Medico-Legal Cases due to Accidental causes*

Indication	No.	%
Burn	271	22.24
Poisoning	934	76.63
Hanging	02	00.16
Sharp edged	08	00.65
Pointed tip	04	00.32
Total	1219	100

Table 15: *Medico-Legal Cases due to Attempted Suicide*

Weapon	No.	%
Hard and blunt	3179	85.99
Sharp edged	136	03.68
Pointed tip	122	03.30
Throttling	01	00.02
No detectable injury	259	07.01
Total	3697	100

Table 16: *Homicidal Medico-Legal Cases as per kind of weapon used*

We observed that the most common way for attempting suicide was poisoning (76.63%) followed by burns (22.24%).

Discussion:

In the present study we found that sex wise most of the Medico-legal cases were males (80.66%). Similar findings were reported by Garg V[3], Malik Y[4], Marri MZ[5] and Hussaini SN[6]. This is because males are more exposed to outdoor activities as well as disputes in family matters.

In the present study we observed that age group 21-30 years (35.00%) was most commonly involved in Medico-legal cases followed by age group 31-40 years (21.79%). Similar findings were reported by Garg V[3], Malik Y[4], Marri MZ[5] and Hussaini SN[6] as it is the most working age group in society and having hyper temperament.

In the present study we observed that most of the Medico-Legal Cases are due to assault (28.90%) and the age group 21-30 years was most commonly involved. Similar results were observed by Bhullar DS[7] and Aggarwal KK[8].

The second common reason for registering Medico-Legal Cases in this institute was routine medical examination for fitness of prisoners and accused for custody. As there is regional central jail in Kolhapur and as more cases of assaults were reported; so that the examination of accused also increases the number of Medico-Legal Cases.

As Kolhapur district is better developed and per capita income is higher, there are more vehicles with people so that more road traffic accidents are there, but in this study only injured cases are included and fatal cases were excluded. And also there is national highway nearby Kolhapur and density of vehicles is more in Kolhapur so it resulted in the increase of Medico-Legal Cases due to road traffic accidents. The most common age group involved in Road Traffic Accidents is 21-30years. Similar results were also found in the studies conducted by Singh H[9], Menon A[10], Choudhary BL[11] and Aggarwal KK[8].

In this study we found that insecticides are commonly used by farmers as it is easily available with them. The most common age group involved in poisoning was 21-30years. Similar results were found in the studies by Gupta BD[12], Sharma BR[13] and Aggarwal KK[8].

In burn cases we found that suicidal tendency was more in females than males and accidental burns were more in males than females. The most common age group involved in burn was 21-30years. Similar results were observed in the studies conducted by Batra[14], Tirpude[15] and Aggarwal KK[8]. In the cases of poisoning, males are more affected than females and on study we found that farmers are more affected than other professionals. Organophosphorus insecticide is used by farmers in most of the time with intention to end their life.

As there is more forest area in Kolhapur district as well as sugarcane farming, bull-gore injury by bison and bite by wild pig and snake bites were reported as Medico-Legal Cases. It was also observed that firearm weapons are least used as compared to hard and blunt objects and sharp edged weapons in assault.

Conclusion:

In the present study we found that males were involved in 80.66% cases and maximum cases (35.00%) were from age group 21 to 30 years. Common indications for registering as Medico-legal case were Assault (28.90%), Routine medical examination for fitness of prisoners and accused for custody, Road traffic accidents (15.10%), Poisoning (8.50%) and Burns (5.77%). Use of hard and blunt weapons for assault was observed in 85.99% cases. Poisoning by organophosphorus compounds was observed in 37.18% cases.

Suggestion:

We found that all unconscious cases brought, even though they are suffering from natural diseases were registered as Medico-Legal Cases. But to avoid the inflation of number of Medico-Legal Cases we suggest that when an unconscious case is brought and if it is a known case of any disease undergoing treatment for that, then it should not be registered as Medico-Legal Cases case. But while treating the case, if treating doctor suspects any foul play then these cases to be registered as Medico-Legal Cases.

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Original Article

STUDY OF DEATHS DUE TO BURNS IN KOLHAPUR REGION

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Original Article

STUDY OF DEATHS DUE TO BURNS IN KOLHAPUR REGION

Dr. SV Khandare, Dr. DA Pawale

Abstract:

A retrospective study of all burn cases that were brought to the morgue of RCSMGMC and CPR Hospital, Kolhapur during the period January 2014 to December 2014 was carried out. 1500 medicolegal autopsies were conducted by the Dept. of Forensic Medicine, RCSMGMC and CPR Hospital, Kolhapur out of which 120 were deaths due to burns.

The commonest age group of victims was 21-30 years. Majority of burn cases occurred during summer season and were maximum were reported from rural areas.

Key Words: Burns, manner of death, percentage of burns.

Introduction:

There is only one-way to be born but there are many ways to die. Death due to burning is an important cause of unnatural death commonly encountered in Medico legal Practice. Homicidal burning of married women in India is a major concern for the Government, law-enforcing authorities, the judiciary, the police and medicolegal experts all over the country who are associated with dowry disputes.[1] Dowry deaths by burns was most common in India & at the same time accidental burns in females also occur often while cooking food in their kitchen. Newly married girls are abused, cruelly treated and tortured by the husband, in laws, relatives for purpose of dowry or any other demand. In extreme cases women may be killed by burns or any other method. If death occurs within 7 years of marriage from above mentioned acts then it is termed as dowry death and in such cases the culprit may be sentenced to imprisonment for a term not less than 10 years and up to life imprisonment.[2] A burn is an injury, which is caused by application of heat on the external or internal surfaces of the body, which causes destruction of tissues.

The higher incidences of burns in the Kolhapur region, high mortality rates in these cases and trend of the changing profile of death due to burns motivated us to undertake this study.

Material and Method:

A retrospective study of all burn cases that were brought to the morgue of RCSMGMC and CPR Hospital, Kolhapur during the period from January 2014 to December2014 was done. 120 cases of death due to burns were studied. The age and sex of the deceased, the venue and time of sustaining burn injuries, socioeconomic status of the victims, body surface area involved, survival period and cause of death, circumstances of burns, etc. were ascertained from the autopsy records. The findings are tabulated in various tables to analyze the whole picture.

Results:

During the period a total of 1500 medicolegal autopsies were conducted by the Department of Forensic Medicine, RCSMGMC and CPR Hospital, Kolhapur out of which 120 were deaths due to burns.

Female preponderance was observed, with 77.5% and 22.5% deaths due to burns in females and males respectively (Table-1). The age group mostly involved was 21-30 years with an incidence of 34.2% in females, which was more than in males. At the extremes of

ages i.e., less than 10 yrs, there was only one case and there were 15 cases above 60 yrs. (Table-1).

Age in Yrs	Male (%)	Female (%)	Total (%)
<10	0 (0)	01 (0.8)	01 (0.8)
11-20	4 (3.3)	10 (8.3)	14(11.6)
21-30	5 (4.2)	41(34.2)	46(38.4)
31-40	8 (6.6)	17(14.3)	25(20.9)
41-50	2 (1.7)	10 (8.3)	12 (10)
51-60	3 (2.5)	04 (3.3)	07 (5.8)
>60	5 (4.2)	10 (8.3)	15(12.5)
Total	27 (22.5)	93 (77.5)	120 (100)

Table-1: Age-gender distribution

No. of Cases	Day (%)	Night (%)	Total (%)
120	64(53.3)	56(46.7)	100

Table-2: Time of occurrence

Socio-economic status	Male (%)	Female (%)	Total (%)
High	6 (5)	8(6.6)	14(11.6)
Middle	4(3.3)	5(4.2)	09(7.5)
Low	17(14.2)	80(66.7)	97(80.9)
Total	27(22.5)	93(77.5)	120(100)

Table-3: Socio-economic status

Period	No. of cases	%
Brought dead	11	9.2
< 24hrs	19	15.8
> 24hrs	90	75
Total	120	100

Table 4: Survival period

On the whole, 53.3% sustained burn injuries during daytime. (Table-2) Most of the victims i.e., 80.9% belonged to lower socio-economic strata. (Table-3). Maximum percentage of victims survived for more than 24 hours and 15.8% for less than 24 hours (Table-4) 91.7% died in the hospital whereas 8.3% at the site of occurrence. (Table-5)

Place	No. of cases	%
hospital	110	91.7
Burn site	10	08.3
Total	120	100

Table 5: Place of death

Area	No. of cases	%
<50	06	05
51-70	84	70
71-90	18	15
91-100	12	10
Total	120	100

Table 7: Body surface area involved

Cause of death	No. of cases	%
Shock due to burns	24	20
Septicaemia following burns	92	76.7
Complications	04	03.3
Total	120	100

Table 6: Cause of death

Manner	No. of cases	%
Accidental	64	53.3
Suicidal	54	45
Homicidal	02	1.7
Total	120	100

Table 8: Manner of death

The cause of death was septicaemia in 76.7% cases and shock due to burns in 20% cases. (Table-6). In 70% of the study subjects, 51-70% body surface area was involved (Table-7).

Month	No. of cases	%
Jan	13	10.8
Feb	13	10.8
March	14	11.7
April	16	13.4
Ma y	13	10.8
June	06	5
July	04	3.3
Aug	05	4.2
Sept	09	7.5
Oct	10	8.3
Nov	12	10
Dec	05	4.2
Total	120	100

Table-9:Monthly distribution

In 53.3% cases the death was accidental in nature, in 45% it was suicidal and in 1.7% cases the death was homicidal in nature. (Table-8). Maximum death (13.4%) occurred in summer season. (Table-9)

Total 4 cases of dowry deaths were noticed which belonged to age group 21-30 years.

Discussion:

Inability to bear a child, sexual jealousy, marital infidelity in married females, chronic incurable diseases and failure in love are other reasons behind unnatural female deaths. To a forensic expert, analyzing dowry death is an important duty. For investigating agencies, it is a starting point for their inquiries and allows them to deal more efficiently because any unnatural death may be suicidal, accidental or homicidal. In cases of burns, casual explanation is that a woman caught fire accidentally while cooking meal, lighting lamp or an explosion in a stove.[3]

The present study demonstrated preponderance of female 93 (77.5%) victims over male 27 (22.5%) victims. Similar findings are also reported by other researchers.[4,5,6,7,8,9] In the present study, maximum i.e. 41 (34.2%) were female victims in the age group of 21- 30 years. This finding is consistent with the studies of other researchers.[4,5,3,6,8,10]

84 (70%) of victims sustained 51 to 70% burns, which is an observation that is consistent with H.M. Mangal et al but it was not consistent with the study of Usama B. Ghaffar et al where maximum i.e. 116 (28.8%) victims sustained 26 to 50% burns. Most common manner of death was accidental burns 64(53.3%) which was consistent with other studies.[4,5,6,11,9].

53.84% sustained burn injuries during daytime which is consistent with study carried out by Memchoubi Ph. This may be due to the fact that people are usually occupied in their work during daytime and therefore the burns are sustained in the course of their activities.[6]

Among those who die in suspicious circumstances, family quarrels and marital disharmony are the two important predisposing factors. Illiteracy, arranged marriage, joint family structure, unemployment, economic dependence of the husband on the parents, complete dependence of the women on their husband and in-laws and lack of social security were other contributory factors affecting the incidence in some way.[6,11]. This is supported by the observation that 80.9% of the victims in our study belonged to low socio-economic stratum.

Maximum percentage of victims survived for more than 24 hours, because majority sustained 51-70% burns. Victims sustaining >50% burns died in maximum numbers which suggest that burns >50% are fatal. Considering the seasonal variation, it was observed that, more cases were reported in summer, which is a finding that is consistent with study done by Dhillon s and sekhon s [3].

Septicemia and neurogenic shock were the main causes of death, which is consistent with the observations by study conducted by Bangal et al, and which is also with the studies of sevilk(1957), Teplitz(1965), Foley et al (1968) [4,3]. Most common cause of death was septicaemia.

Conclusion:

From our present study it can be concluded that suicidal tendencies are seen more in females, septicaemia is most common cause of death, maximum deaths occur after 24 hours and greater than 50% burns are fatal in nature.

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Case Report

IMAGING FEATURES IN BOTTLE GOURD POISONING – A CASE REPORT

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Case Report

IMAGING FEATURES IN BOTTLE GOURD POISONING – A Case Report

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Abstract:

Bottle gourd is consumed in various forms worldwide. Toxins can sometimes develop in the bottle gourd fruit. Consumption of such toxic bottle gourd fruit in any form can be dangerous. Radiological features of this are not mentioned in the published literature. Here we present a case of bottle gourd poisoning with its radiological features.

Key words: Bottle gourd, Cucurbitacin, CT scan, Bowel wall oedema

Clinical Summary:

A 50 Yrs male presented with haematemesis and abdominal pain. He was a known case of hypertension, acid- peptic disease. On examination the extremities were cold with weak pulses.

Pathological and Radiological Findings:

Routine lab investigations done on emergency basis revealed –Haemoglobin - 23.9 gm %(Hemaotcrit 60.3 %) Total leukocyte count – 24600/cumm, Platelets- 3.24m/cc, Serum creatinine -1.3mg%, Bleeding time 2min 30 sec; Clotting time- 4min; Prothrombin time – 45sec /15sec / International Normalized Ratio (INR)- 3, Activated partial thromboplastin time- 55 Sec . Liver Function Test - Bilirubin 1.5 mg% , Alanine aminotransferase – 214IU/L , Aspartate aminotransferase- 280IU/L, Serum alkaline phosphatase -224IU/L, Serum albumin-3gm%. HIV antibodies - Negative.

Bed side sonography was done on emergency basis which showed mild oedema of transverse colon and a small bowel loop on left side which was thought to be a jejunal loop. No free fluid or nodes were seen. Considering these findings possibility of ischemic bowel was raised. For further evaluation of these findings Computed Tomography (CT) scan was recommended.

Two hours after the sonography patient had malena with passage of voluminous clots. This again raised the suspicion of bowel ischemia.

The vitals were stabilized by supportive (Inotropic and hematological support) treatment and patient was sent for abdominal CT scan.

The CT scan of abdomen showed a large segment of oedematous jejunal loop extending from D-J flexure downwards. The Superior mesenteric vein in the distal portion was partially filling but this was viewed suspicious as a flow related finding. The CT scan findings were thought to be suspicious of ischemic bowel.

Management and outcome:

Patient was treated with heparin followed by oral anticoagulation along with antibiotics and IV fluids. A follow up bed side USG after two days revealed significant reduction in bowel wall oedema. No ascites or nodes were seen.

Patient improved dramatically in couple of days and was discharged subsequently. In view of radiological findings, lab reports and clinical history a strong possibility of ischemic bowel was raised and the patient was treated accordingly however, the response alarmed us to go for more clinical history. After prolonged interview with patient he revealed that he was

habitual drinker of bottle gourd juice. One hour prior to episode of haematemesis he had a glass of bottle gourd juice which was bitterer than routine.

Image 1: Edematous small bowel loop (arrow).Note absence of free fluid or air.

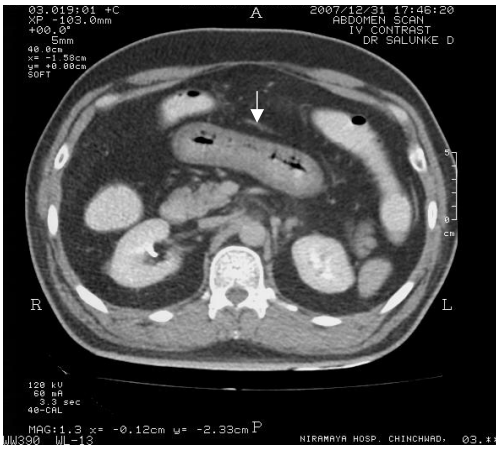

Image 2: Edematous small bowel loop (arrow). Note absence of fat edema around.

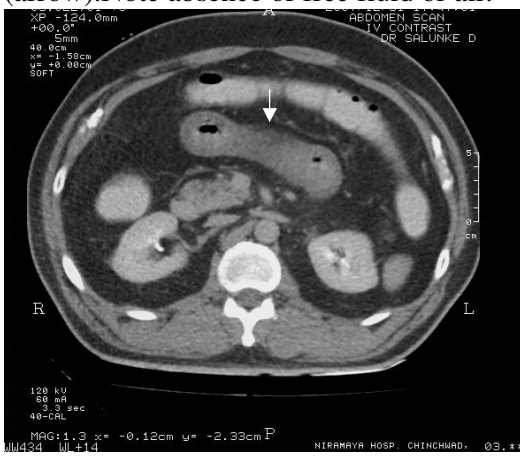

Image 3: Edematous small bowel loop (arrow). Note well enhancing SMA (block arrow).

Image 4: Edematous small bowel loop (arrow). Block arrow shows enhancing mesenteric vessels.

Discussion:

Alternative medicine and consumption of functional or medical food has emerged as current trend in developed as well as developing countries. Changing life style has attributed to this.[1,2]. More and more people now consume medicinal fruits and vegetables in various forms. Sometimes toxins develop in to these fruits or vegetables and in that case consumption of such fruits or vegetables becomes dangerous.[1,4,7]

Consumption of fresh Bottle gourd (Lagenaria siceraria) juice is a known such practice in India as this has proved to have hypolipedemic and antihyperlipidemic effects.[1,2,3]

Bottle gourd belongs to cucurbitaceae family. Fruits and vegetables like cucumber, squash, melon, pumpkins, zucchini and gourd are included in this family[3,5,6] . The toxicity of these plants is attributed to the toxin cucurbitacin[1,5,6,7,8]. This is a tetracyclic triterpenoid compound and gives bitterness in these vegetables and fruits.[1,7]

This toxin is known to have cytotoxic and carcinostatic properties[1,3,5,6,7] and is known to cause kidney dysfunction and haemoconcentration in animals[9].

Human poisoning is known[1,4,6,7] but their radiological findings are not mentioned yet in any of these articles.

USG and CT scan showed diffuse oedema of small bowel and large bowel. No free peritoneal or pleural fluid was seen. No obvious mesenteric fat oedema was seen. No obvious thrombus was seen in the mesenteric and portal vessels.

Ischemic bowel and entero-colitis are common causes of bowel wall edema and in this case considering age and presentation of the patient the features were thought to be mimicking bowel ischaemia.

The points that were going against bowel ischaemia or entero-colitis were - absence of free peritoneal or pleural fluid, no obvious mesenteric fat oedema and no obvious thrombus in the mesenteric and portal vessels.

Possibility of poisoning should be kept in mind whenever, a patient who presents with bowel wall oedema without mesenteric vascular thrombosis.

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Case Report

Bear bite: A case report

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Case Report

Bear bite: A case report

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Abstract:

Attack on humans by bears is relatively rare event, and the intent is always defensive. As a result of de-forestation, bears, along with other wild animals are enforced to enter into human inhabitations and para-jungle areas such as farms. Their encounter with humans in above situations is inevitable. Either defensive or predative attack, bear can cause extensive soft tissue and bony destruction that may lead to death of the victim. We are presenting a case of 45 year female-while collecting wood in her own farm was attacked by a bear. She sustained severe injuries over her face, left arm and right leg leading to death.

Key words: Bear bite, Human, severe injuries.

Introduction:

As we all know bears are strong, agile, potentially dangerous and unpredictable mammals inhabiting jungle, sanctuaries, and provinces. A search of scientific literature reveals very few articles detailing case reports or an in-depth analysis of injuries due to bear mauling. Attack on humans by bears is relatively rare event, and the intent is always defensive. Recent rise in bear attacks on human indicates intrusion of humans in animal ecosystems as a result of greed and need of human beings. Bear bite injuries to head and neck region can result in facial disfigurement with distressing physical and psychological consequences. Here we are presenting a case of bear bite that lead to death.

Case report

Photo no.1 Sustained facial injuries by bear bite

A 45 year female resident of a village was attacked by bear, while collecting wood in her own farm. The history of the incidence was revealed by her son, who was an eyewitness to the incidence. He rescued his mother from the attack of the bear by pelting stones on bear's mouth. The bear got frightened and ran away. But in meanwhile she sustained severe injuries over her face, left arm and right leg and started bleeding profusely from her right ear, nose and right eye. She collapsed and lost her consciousness. She received first aid at rural Govt. hospital. However, no fluid replacement or wound inspection was done. She was referred to emergency department of Govt. Medical College & Hospital, Aurangabad.

She was admitted in emergency department in a state of semiconscious, disorientation, and in hypovolemic shock.

She was treated by a multi- disciplinary team of surgeon, anesthetic, ENT surgeon and dental experts. Her Glasgow Coma Scale was 9/15. BP was 80/40; pulse was feeble with tachycardia, tachypnea, and cool clammy skin. There was active bleeding from the right eye and nose. She had multiple lacerations of varying sizes on head, face and limb. The patient was immediately put on intravenous fluid resuscitation with Ringer Lactate and Normal Saline and broad-spectrum antibiotics. Anti-rabies and tetanus vaccines were administered. The wounds were thoroughly debrided and haemorrhage was controlled by ligating the bleeding points.

After radiological examination i.e. C.T. scan of brain, para nasal sinuses & orbit they observed that there was dehiscence of medial wall of right orbit with collection in ethmoidal air cells. Right eye globe was seen outside the orbit. Fracture of right zygoma, maxilla and hard palate, external auditory canal, and right nasal bones and a linear displaced fracture of nasal septum were noted. Also there was an ill-defined hypo dense area over right high parietal area of brain. There were no other injuries to brain parenchyma. On X-ray, fracture of left humerus at distal 1/3rd was noticed. The patient stabilized after 24 hrs following admission. Neurosurgical fitness was obtained. Patient was immediately taken up for surgical exploration and wound debridement and primary suturing under GA. But subsequently she developed septicemia due to infected wounds and expired on 11th day of admission. Police were informed. They referred the body for medicolegal autopsy.

Autopsy findings:

Photo no.2 Sustained facial injuries by bear bite with suture

On external examination of body, we confirmed the wounds noted by treating team. There were signs of reconstructive face surgeries. There was a tracheostomy wound in infra-cricoid region. We noted following injuries after suture removal: an irregular shaped laceration of size 24 cm x 3.5 cm x bone deep over right parietal-tempero-frontal area of scalp extending to right eye with margins of wound inflamed. Also multiple irregular shaped bone deep lacerations of varying sizes over mid-face leading to disfiguring of face. A laceration of size 7cm x 4cm x bone deep was seen over medial 1/3rd of left forearm, with two graze abrasions of size 6cm x 3 cm and 7cm x 3 cm each over right knee. All injuries were blackish with margins of wound infiltrated with pus and inflamed.

Internally, both lungs (Right: 850 gm. Left: 650 gm) revealed yellowish pus plaques on inter-lobar surfaces. Both lungs were firm in consistency and consolidated. Liver was enlarged, congested with evidence of yellowish pus plaques under the capsule. Spleen and both kidneys were enlarged and congested. In spite of

extensive face and bony injuries, there were minimal brain parenchymal damages in the form of infarcted areas in right parietal lobe.
The cause of death was finalized as, "Septic shock with bilateral lobar pneumonia due to infected injuries to face with fracture of left humerus (Injuries consistent with Bear bite.)"

Discussion

Bear attacks are rare, however, incidents are often publicized in the media, even if few of the victims suffer serious injuries[1]. Researchers and managers believe that many bear attacks can be prevented by applying the knowledge of bear behavior and ecology. Fragmentation of forests may lead to isolated, nonviable bear population[2]. Degradation, in the form of overgrazing, tree felling, fire, conversion, and reclamation for other uses, and over-extraction of forest resources that are essential for sloth bear survival appear to be occurring throughout the sloth bear range, particularly in the dry forests[3].

There are eight types of bears in the world. They include the American Black Bear, Brown Bear, Polar Bear, Giant Pandas, Asiatic Black Bear, sloth Bear, Spectacled Bear, and the Sun Bear. The sloth bears inhabit forests and tall grasslands in India, Nepal, Sri Lanka, and Bhutan. For those who frequent forests in India, sloth bear present a considerable danger, worse than that of tigers or leopards[3]. As per review of literature the injuries due to bear jaws are in the form of puncture wounds, lacerations, abrasions caused due to canines; crush injuries and bruises caused due to molars; cuts caused due to incisors. Injuries due to paws include abrasions, bruises and incised looking wounds lacerations, due to nail tips. Other injuries may cause fractures; either of skull bones and axial skeleton.

The physical nature of injuries by animals can extend from trivial scratches to savage and mortal wounds. Bargali et al.[4] did a study in a forest division in India to describe sloth bear attacks and human injuries while defining an "attack" as an encounter that ends with human injury or death. His study observes that attacks were predominantly by a single bear (93%) and rarely by 2 (4%) or 3 bears. Most victims suffered multiple injuries (52%): single injuries on legs (25%), hand (12%), and head (8%). He also quoted that 8% of bear attacks were fatal. Victims suffered injuries such as fractures and severed body parts (eyes, scrotal sac).

These injuries involves substantial struggle on the part of victim on the ground, which forces mud, grass and other contaminating material in to wounds. Death due to bear bite is due to hemorrhage due to vessel disruption, crushing injuries with its consequences, suffocation, anaphylaxis due to wound contamination with earth material, rabies.

It is necessary to draw a protocol for the treating physician and autopsy surgeon to act in unison in case of an animal attack. This should be based on the following considerations.

1. Identification: Identify the animal (the subspecies) and determine if it is a domestic or wild animal. Information that can help determine the patient's risk of infection includes the time of the injury, whereabouts of the animal (i.e., is it observable in quarantine?) and the general health, immunization status, and current location of the animal[5].
2. The Risk of Rabies: The foremost danger that any wild animal poses to humans apart from physical insult is the danger of transmission of rabies. Post-exposure prophylaxis (PEP) must be started immediately. The paper concluded that the impact of rabies on the population dynamics of polar bears probably is minimal and that rabies in polar bears constitutes a potential health hazard for polar bear hunters[6].
3. Bacteriology: Wild animals carry a large number of bacteria in their mouth, and they may transmit a number of zoonotic diseases including viruses. Bears may carry rabies, hepatitis, distemper, trichinella, and other organisms. In one reported case, cultures of

bacteria from a deep wound in the thigh grew Streptococcus sanguis,Neisseria sicca, Bacillus spp. and Mycobacterium fortuitum[7].

4. Management: Essentials of treatment are necessary inspection, debridement, irrigation, and closure, if indicated. Removing devitalized tissue, particulate matter, and clots prevents these from becoming a source of infection, much like any foreign body. Many animal bite wounds result in disfiguring scars, which require reconstructive plastic surgery.

Conclusion:

Wild-animal attacks, though rare, remind us that humans can still be food or prey. Awareness, education, knowledge, and prevention, rather than the elimination of animal populations, may be the best way to control wild-animal attacks on humans in the future.

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Case Report

HANGED BY HANGING ROOT'S - A CASE REPORT

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Case Report

HANGED BY HANGING ROOT'S - A CASE REPORT

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Abstract:
This is a unique case where a person chose a temple in the village for committing suicide by hanging. The roots of the banyan tree were effectively used to hang.

Key Words:
Hanging, roots of banyan tree, Ligature material

Introduction:

Hanging is a process in which the body is suspended with a ligature around the neck which causes constriction of the air passage preventing exchange of air between the atmosphere and the alveoli of lung leading to asphyxia and death, The constricting force is either the weight of the whole body or the weight of the head alone.[1] The ligature material used for hanging can be anything that may be tied around the neck with some additional length for fixing it to the point of suspension. This may be a rope, Electric wire, Belt, Neck tie, Saree, bedsheet, scarf, duppata, cycle chain or any such thing[1].

A forensic expert encounters many unique and innovative methods used by the suicide to constrict the neck. The present case is being reported, as in this case the victim has effectively used the hanging roots of a banyan tree for getting hanged. He has intelligently selected the roots after giving due consideration to his height and length of suspension, so as to ensure complete hanging.

Case Report:

A 24 Years Male body was sent for medicolegal postmortem examination to the department of Forensic Medicine, Rural Medical College of Pravara Institute of Medical Sciences, Loni, Rahata, Ahmednagar, Maharashtra. The body was sent from a part of Loni village, with history of death due to Hanging by using root of the banyan tree at around 7.30 pm in the village. On 21/09/2012

The scene of crime revealed a body of young male hanging from the Banyan tree suspended with the help of the hanging roots of the tree. The place of occurrence and the point of suspension were approachable to the deceased. It was a complete hanging, with the legs free from ground. The site of selection of the roots used for hanging was such that the victim has well calculated the distance between the point of suspension and the floor and his height. The higher platform must have been used to position the loop around the neck and the roots were selected from above the lower platform to ensure complete hanging.

Suicide note indicating the motive was available with the investigating police officers. There was no evidence of use of any other method to end life. Also, there was no any circumstantial evidence of homicidal nature of the crime. There is no evidence of any foreign material on the hands or signs of struggle. The circumstances also did not point towards accidental hanging.

The ligature is made in form of a loop and the knot over the ligature is of sliding type. The knot is behind the neck and above the head.

Discussion:

Commonly the victims use a fan, any hook at roof, transverse bar, branch of tree etc as a suspension point for hanging. Usually closed rooms of a house or trees at open places are preferred for committing suicide by hanging.

Being rare, this case highlights the unique method of hanging where natural source is used as a ligature material. In the present case the victim has used multiple hanging roots of the banyan tree located at an open area near to his residence.

The case is in fact unique in the sense that it cannot be categorized in any routinely conducted autopsies of cases of Hanging. In general, public places are avoided for committing suicide by hanging. The timing for the performance of act was such that no one can see the act or interrupt the action of hanging and no one can save him from his motive to die.

Usually proper planning is required to perform the act of hanging. A strong ligature material for hanging as well as a secluded place is searched for and a time is finalized in order to avoid any interference. Usually people prefer places outside the village.

In this case some of the interesting findings were:

1. The ligature material chosen was hard and difficult to twist into a knot. Still it was used successfully for hanging.
2. The hanging was successfully completed by use of minimum material. There was no paraphernalia required for the preparation of the death as usually seen in other cases e.g rope, stool, room, anchor etc.

3. The victim has used the handkerchief to cover the ligature material (roots of banyan tret). This was another unusual finding, the intention of the victim behind this act cannot be logically explained.
4. Even with the multiplicity of the roots involved in the process of hanging only few are utilized for the purpose of inflicting pressure and production of ligature mark.
5. The thick white mucoid secretion emerging from the nose and hanging from the nose for a distance of 5 cm in the form of white dried streak was an unusual finding in this case.

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Case Report

FATAL SELF POISONING WITH FORMALIN- A CASE REPORT

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Case Report

FATAL SELF POISONING WITH FORMALIN- A CASE REPORT

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Abstract:

Formalin is a protoplasmic poison and causes coagulation necrosis, protein precipitation, and tissue fixation. Suicidal ingestion of formalin is uncommon as the general population does not have an easy access to it, and it is more often seen in people working in the health industry. Formaldehyde ingestion has only rarely been described in the literature. Hence, a case of suicidal ingestion of formalin by a 42-year-old health care worker is reported.

Keywords: suicide, formalin, corrosive

Introduction:

Commercially available formalin is a 37 to 50% aqueous solution of formaldehyde that contains up to 15% methanol. It is, however, generally referred to as 100% formalin. Formalin is a protoplasmic poison and causes coagulation necrosis, protein precipitation, and tissue fixation[1]. Formaldehyde has wide commercial and medical applications. It is used as disinfectant, tissue preservative[2]. Formaldehyde is also used as an ingredient in fertilizers, biocides, antimicrobial hair shampoos and conditioners, industrial and soil sterilants etc. Formaldehyde reacts rapidly with DNA, RNA, and proteins in biologic systems. When cells are exposed to high concentrations, cellular functions cease and necrosis is rapid. Formaldehyde may affect neural functions by condensing nonenzymatically with neuroamines, catecholamines and indolamines to form tetrahydroisoquinolines and tetrahydrobetacarbolines respectively[3]. It targets CNS, GI, liver, and all other organs (systemic toxicity). The ingestion of formalin causes disorders in the oral cavity, the gastrointestinal tract, liver, kidney, lung, heart, and central nervous system in the early phase of reaction[4]. Accidental exposure to formalin is common as an occupational hazard. Suicidal cases are uncommon as the general population does not have an easy access to it, and it is more often seen in people working in the health industry. Very few cases of suicidal formalin poisoning are reported in the literature. Hence, a case of suicidal ingestion of formalin by a 42-year-old laboratory attendant is reported.

Case report:

A 42-year-old man was brought for autopsy to the mortuary of medical college hospital. As per history provided by the police, the deceased was a laboratory attendant working at Civil Hospital and was told to have consumed unknown substance at his home. He was brought to the hospital in dead condition. Postmortem examination was conducted on the deceased the following day.

On external examination, the deceased was moderately built and averagely nourished. No appreciable external injuries were present. Body was emitting formalin-like smell. There was no oozing from nostrils, mouth and ears. Rigor mortis was present all over the body. Bluish purple postmortem staining was present over the back, buttocks and was fixed.

On internal examination mouth, pharynx, larynx and trachea showed brownish black discoloration (figure 1). Mucosa of oesophagus showed grayish black discoloration with oedematous appearance. Stomach appeared like tea-pot containing 50ml of grayish fluid with formalin smell and brownish black appearance of mucosa (figure 2). Small and large

Fig 1: *Mouth, pharynx, larynx and trachea showing brownish black discoloration*

intestines were shrunken in size. Mucosa of intestines was grayish black in color and mucosal folds were distinctly marked. Inferior surface of the liver showed black discoloration. Lungs were heavy and oedematous. Rest of internal organs were intact. Blood and viscera were sent for chemical analysis to Regional Forensic Science Laboratory. The chemical analysis report confirmed the presence of aldehyde compound

The chemical analysis report confirmed the presence of aldehyde compound. The cause of death was opined to be due to pulmonary oedema consequent upon consumption of aldehyde containing compound.

Fig 2*: distinct mucosal folds of stomach with brownish black appearance*

Discussion:

Formaldehyde is a highly reactive substance; it may be irritating to the eyes, skin, and mucous membranes. Ingestion may cause corrosive injury to the gastrointestinal mucosa and the mucous membranes of the respiratory tract. Clinical effects of acute poisoning include hypotension and cardiovascular collapse; upper respiratory tract irritation, coughing, bronchitis, pulmonary oedema, or pneumonia, ARDS (adult respiratory distress syndrome); lethargy and coma; nausea, vomiting, and severe abdominal pain; corrosive gastritis, oedema, ulceration, and even perforation of the oesophagus may

Formaldehyde is a protoplasmic poison and the cases of acute exposure to it might be through the route of inhalation and ingestion. Inhalation may cause coughing, lacrimation, dyspnoea, chest pain and wheezing. Ingestion of as little as 30 ml of 37% (approximately 2 tablespoons) formaldehyde solution (formalin) has been reported to cause death in an adult[3]. The ingestion of formalin has caused several deaths, preceded by severe corrosive damage to the stomach and small intestine, circulatory collapse and kidney damage[6]. Ingestion may show signs and symptoms like severe abdominal pain, vomiting, diarrhoea, haematemesis, tachypnoea, and hypotension[1]. The stomach suffers the most severe damage in such cases because formalin is in contact with the gastric mucosa longer than other parts of the gastrointestinal tract. Gastric ulcers and mild hemorrhages are frequently seen[4]. The phenomenon of perimortal fixation is a useful indication for the forensic pathologist and should direct the suspicion to oral poisoning. The detection of fixation facilitates toxicology screening by indicating that the relevant substance must have the capability to precipitate proteins. The "fixing" of the stomach by formaldehyde may produce delayed absorption following formalin ingestion[7]. Formaldehyde is a corrosive material that can produce late sequelae similar to the more common ingestion of acids and alkali[8]. In addition, renal failure is a frequent complication in severe poisoning. Skin and mucous membrane may appear whitened[1]. At autopsy, the smell of formalin might be noticed upon opening the body. Odour

of formalin may be present in the stomach. The mucous membrane of the stomach may be red, inflamed and eroded with the extravasation of blood, or may be leathery, fixed, and hard to touch as seen in our case[2]. The duodenum may present the same appearance as that of the stomach and histological details may be well preserved. Kidneys may reveal microscopic evidence of tubular necrosis. To confirm the presence of formaldehyde in the gastric content, a small quantity of the latter is dissolved in resorcinol in a test tube and sulphuric acid is gently poured along the sides of the tube. A red to violet colored ring will develop at the junction of the two solutions [1].

Conclusion:

Suicidal poisoning with formalin is rare due to its selective availability, strong taste and odour. Very few cases of death due to formalin ingestion are reported in literature. This case shows that the forensic expert should be alert in such cases and the proper autopsy protocol should be followed. Meticulous dissection and the proper preservation of the viscera for histopathology are indicated in such cases, which help in identifying the cause of death.

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Case Report

SKELETON SPEAKS – A CASE REPORT

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Case Report

SKELETON SPEAKS – A CASE REPORT

Dr. SV Khandare, Dr. SS.Bhise, Dr. AJ Taware

Abstract:

Examination of skeletal remains by a forensic expert may help to reveal a crime, which might have lost sight of otherwise. Skeletal remains may be recovered from an open land, ditches, rubbish dumps, etc., or a Skeleton may be exhumed from a home-courtyard, a burial ground, or even ordinary places during excavation for new constructions.[1]
The presented case reports about cause of death and manner of death from skull sent for post-mortem examination.

Keywords: Identification, Skull, Skeleton.

Introduction:

The corpus delicti means the body of any criminal offence. The main part of the corpus delicti is the establishment of identity of the dead body and proof of its death by criminal act of the accused. The case against the accused cannot be established unless there is convincing proof of this points.[2] If the victim's identity is not known, it becomes difficult for the police to solve the crime. In trial of homicide not only identity of the deceased but also nature and mode of death whether unnatural and homicidal need to be established.[3] The identification of dead body and proof of corpus delicti is essential before a sentence is passed in murder trials, as unclaimed, decomposed bodies, bones are sometimes produced to support false charge. However cases have occurred where death sentence was passed even when the body was not found or was not identified.[1]

In the forensic medicine, a great deal of effort is spent on the identity or confirmation of identity of the victim and perpetrator and also to know whether death is natural or unnatural. This aspect of a medico legal examination focuses on the expertness to decide whether the remains are human or animal, and once it is decided that the remains are human in origin then we can proceed further to estimate the other data like age, sex and stature , Manner of death, cause of death. The experienced forensic pathologist considers a range of the available features and techniques before reaching a conclusion as multiple indicators are having the key role.[4]

In all medico-legal cases, the investigation of a deceased body involves two major methods of approach. One is the examination of the body details of a cadaver or skeletal remains in comparison with the ante-mortem details of the suspected victim. Formal records like dental charts, x-rays, medical records, passports and photographs, etc, along with personal effects like family photographs, personal belongings and news paper clippings are some of the important means of comparative identification. The second method is used when no formal records are available. Here a systematic and thorough scrutiny of the body might reveal the sex, age, stature, personal habits or any previous medical history. Although specific information regarding a definite identification might not be possible, the data so collected might be of great aid in narrowing the possibilities of identification and in emphasizing the most likely potential victims.[4]

The medico-legal expert or specialist in Forensic Medicine is not a detective. One of his important functions is to furnish the investigating agencies with specific information on matters of which he has specialized knowledge. He sees the case as a whole; he observes, infers and even speculates. To him, because of his special knowledge, a non-medical clue

may have a significance that even an astute policeman may not be able to grasp. His peculiar experience and talents may enable him alone to deduce the correct interpretation of the facts [5].

Case history:

In September 2014, Unknown skeletal remains in the form of skull, part of both tibia, part of right fibula and part of right humerus were sent for post-mortem Examination to the Forensic medicine dept, Government medical college, Pune. As per police inquest skeletal remains were found near Hill base of wadaki,Taluka-Haveli and medico legal post-mortem was requested to Know the cause of death.

After examination we found that the bones were human in origin, belonged to one and the same individual and skull was showing male characteristic. We found a Circular depressed fracture of size 4 x 4 cm over right frontal bone with fissured fracture of length 4 cm present vertically in its middle. Fractured margins were dark reddish brown. Inner table of skull was intact. Cause of death was given as head injury. Right tibia bone sent for DNA fingerprinting.

Discussion:

Since the bone resists putrefaction and destruction by animals, they can lead to the reliable determination of age, sex, race, stature in decomposed bodies and skeletal remains. The cranium is frequently the best preserved portion of the recovered skeleton.[6] Since ages the criminals in their attempts to conceal the crime have devised different ways out, may it be Parkman murder or Ruxton murder or the Acid Bath Cases but in the end they had all failed to achieve their goals.[3]

Fig.1 ***Circular Depressed fracture of skull***

A dead body is evidence, evidence to be photographed, X-rayed, described, analyzed in depth and correlated with circumstances. The objective is to search thoroughly for crucial information that enables one to judge what did happen and did not happen to the decedent [7].A forensic expert, with his specialized knowledge, would be able to deduce - who was the person, what happened, and what evidence indicates the presence or the absence of culpability? This is essential to establish the *Corpus Delicti*, which in cases of homicide consists of three parts-a) the identity of the victim, b) determination that death was not natural, and c) the death resulted from the criminal act of another person.[2]

Presence of depressed comminuted fracture, cut injury or bullet wounds in the skull, fracture of ribs or any other limb bones is informative and often points towards the cause and nature of death. So it is important to note the nature of injury on bone carefully.[3] From the type and depth of cut in the bone nature of offending weapon can be made out.[1]

A careful and thorough examination of bones may yield a wealth of information, which if properly interpreted, may tell a lot about the individual during his life. But, usually the cause of death may not be easily ascertainable. The case reported here, however, point towards a definite cause of death-Blunt force impact to head leading to cranial damage. This

is particularly true in this case, where the depressed signature fracture on the right frontal bone, gave the following information:

1. That the weapon of assault (probably a hammer like object) had an oval striking face of about 4 x 4cms.
2. That the assailant was to the left of the victim at the time of assault.

Recommendation:

A thorough examination of skeleton if done by expert person may yield valuable information which may help police authorities in investigation. As in this case we found depressed fracture of skull over right frontal bone, cause of death was given as death due to head injury and Manner of death as unnatural.

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Review Article

MYOCARDIAL BRIDGING A BOON OR BANE? : A CASE REVIEW

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Review Article

MYOCARDIAL BRIDGING A BOON OR BANE? : A CASE REVIEW

Ashish Saraf, AP Rayamane, R Dayananda, Shashidhar, MP Kumar, Jagadeesh

Abstract:

Myocardial bridging is an entity in which the coronary artery instead of lying in the epicardial fat of the heart, dips down into the myocardium. The earliest known literature of this phenomenon was in 1737 by Reyman, but a thorough analysis was reported by Geiringer in 1951. The most common artery showing this phenomenon is the left anterior descending artery. It usually has a benign course as nearly all coronary blood flow to the left ventricle occurs during diastole. But cases of sudden cardiac death have been reported with myocardial bridging. It can also lead to other complications like arrhythmia, myocardial infarction etc. The development of complications depends on the extent of hemodynamic obstruction. Herewith an autopsied case of myocardial bridging leading to myocardial infarction, myocardial rupture and cardiac tamponade is discussed.

Keywords: Myocardial bridging, Autopsy, Arrhythmia, Myocardial infarction.

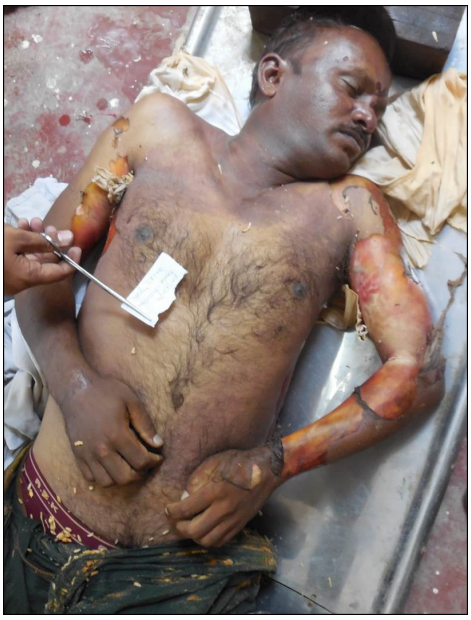
Introduction:

Myocardial bridge is defined as an intramural segment of a coronary artery that normally courses epicardially. It is considered a benign congenital anomaly that most commonly affects the mid portion of the left anterior descending artery (LAD).[1,2]

In cross sections it is seen to be traversed by a bridge of myocardium, hence the name. It is also known by other names like muscular bridge, intramural coronary artery, mural coronary, tunnelled coronary artery, myocardial loop, coronary artery over bridging, etc. The earliest known literature of this phenomenon was in 1737 by Reyman[3]. In 1951 a thorough analysis was reported by Geiringer.[4]Myocardial bridging remains clinically silent in the vast majority of cases and is a benign condition; however, clinical complications may occur leading to sudden cardiac deaths.[5]

Case Report:

History: The deceased was a 37 years old male, cook by profession, working for a catering agency. He sustained scalds after a vessel slipped in which he was preparing rice. He was rushed to the hospital but was declared brought dead.



External Examination: It was a male dead body, aged about 37 year, measuring 165cm in length, moderately built and nourished. Post mortem staining was present over the back of body and was fixed. Rigor mortis was appreciated all over the body. Scalds were present over neck (1%), upper half of front of chest (4%), sides of chest and abdomen (2%), inner aspect of right arm (2%), left upper limb sparing the hand (7%) and parts of both knee (2%). Thus, 18% of the body surface area was scalded. (Fig. 1).

Fig. 1 Showing Scalds over body with spillage of rice particles.

Fig.2 Showing Recent Myocardial infarction with left ventricle posterior free wall rupture and cardiac tamponade blood clot.

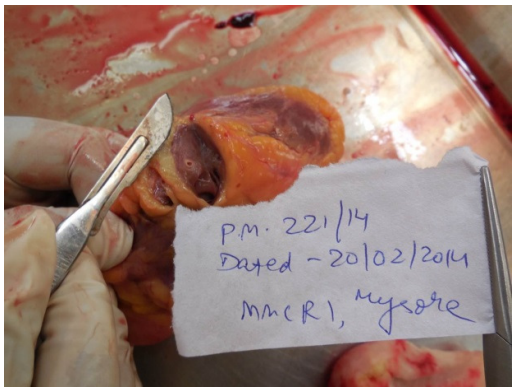


Fig. 3 Showing left anterior descending artery myocardial bridging at middle 1/3.

Internal Examination: On opening chest cavity, pericardium appeared bulged. On cut section of pericardium, fist size clot was observed, a laceration of size 1 x 0.2cm x Cavity deep was present on the left posterior free wall, (Fig.2), surrounded by hyperaemia and necrosed tissue margins suggestive of recent myocardial infarction. Heart weighed 290grams and was normal in size and shape. Left anterior descending artery showed myocardial bridging (intramyocardial segment) in middle one third of its course for about 15mm and at a depth of 5mm with patent lumen (Fig. 3). Left coronary artery, Right coronary artery and Left circumflex arteries were patent. Left ventricular wall was 12 mm thick and the Right ventricular wall was 6 mm thick. Valves were normal. Both coronary ostia were patent.

Rest all organs were intact and congested. Heart was preserved for histopathological examination in 10% formalin.

Histopathology findings: LAD artery was circumferentially surrounded by myocardial fibres at its middle 1/3 of course suggestive of Myocardial bridging (Fig. 4) and at rupture site shows coagulation necrosis with loss of nuclei and neutrophilic infiltrates suggestive of early (1 to 3days old) myocardial infarction (Fig. 5)

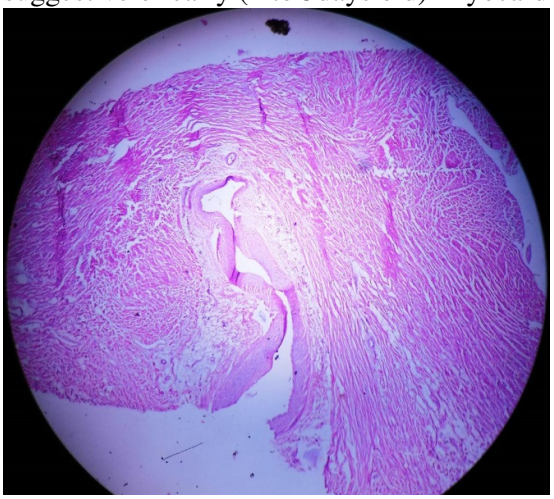


Fig.4 Showing microphotograph of LAD artery surrounded by myocardium(Myocardial Bridging).(H &E Stain, 40X)

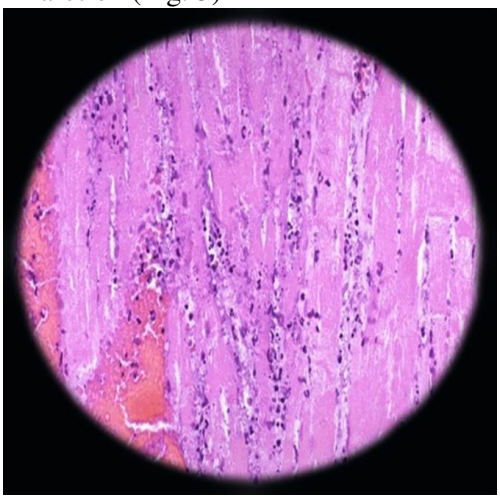


Fig.5 Microphotograph of infarcted site showing coagulative necrosis and neutrophilic infiltrates.(H&E Stain, 40X)

Final Cause of Death: Death is due to cardiac tamponade as a result of rupture of free wall of left ventricle as a complication of myocardial infarction with myocardial bridging.

Discussion:

Myocardial bridges are congenital in origin (38–40%) and likely reflect an evolutionary remnant in the genetic code.[6-8] Incidence of myocardial bridge varies considerably between angiographic (0.5–2.5%) and pathologic (15–85%) series.[9] It is most commonly seen in the left anterior descending artery especially at its middle one third. Patients undergoing investigations for hypertrophic obstructive cardiomyopathy have a reported myocardial bridging incidence of 40%.[8]

Myocardial Bridging a boon:

Most believe that myocardial bridging seldom generates ischemia rather it prevents or delays atherosclerosis[10]. It was reported that the intima of a mural coronary segment is significantly thinner than the proximal portion of the artery. Endothelial cell permeability was found to be increased in atherosclerotic epicardial segments of hypercholesterolemic rabbits, but not within myocardial bridges. Other studies indicated that the intimal layer of a bridge is spared from foam cells and synthetic-type vascular smooth muscle cells, which precipitate plaque formation. Mechanism responsible for the absence of atherosclerosis within bridges revolves around tensile stress, shear stress and coronary wall motion.

Tensile stress (TS) also known as circumferential stress constitutes the blood pressure-derived force imposed circumferentially on the arterial wall. In the myocardial bridges, at the time that peak systolic pulse tends to expand the wall, the 'tunnelled' coronary segment undergoes remarkable compression and lumen radius reduction due to contraction of the surrounding myocardium. Although the blood pressure exhibits a significant increase within the bridged segments compared with the adjacent proximal regions, the net effect of these counteracting forces (i.e. myocardial compression and blood pressure) is a reduced pressure gradient across the wall of the bridge and subsequently, a decreased TS, which maintains a normal endothelial function, thereby preventing the development of atherosclerosis.[11]

Shear Stress (SS) is the frictional force exerted by the circulating blood onto the endothelial surface. It is defined as the product of the velocity gradient near the wall and the blood viscosity. Through complex mechanotransduction processes similar to those initiated by TS, coronary endothelium responds to low and oscillatory SS by adopting a vaso-constrictive (ET-1), pro-inflammatory (adhesion molecules and cytokines), pro- oxidative, growth-promoting and pro-thrombotic phenotype, ultimately acquiring a predisposition to atherosclerosis. At the proximal segment, a time varying bi-directional flow occurs, generating an atherogenic low and oscillatory SS microenvironment, whereas within the bridge, the SS remains unidirectional and normal, or even high, maintaining the endothelium in an atheroprotective state.

Coronary wall motion: As long as the epicardial coronary segments are closely attached to the beating heart, they sustain a periodic motion during the cardiac cycle. Pulsatile coronary motion affects coronary geometry and this, in turn, influences the local hemodynamic environment, initiating a self-perpetuating vicious cycle, which drives atherosclerosis. This observation could potentially provide a mechanistic explanation for the void of atherosclerosis at the bridges because, on contraction of ventricular muscle, the 'tunnelled' coronary segment undergoes remarkable systolic compression, thereby limiting its motion over the cardiac cycle.

The presence of a myocardial bridge was shown to suppress atherosclerosis below the obstruction site, irrespective of serum cholesterol and blood pressure. Reason could be the development of a dynamic obstruction which proximally decreases endothelial shear stress and subsequently favours various metabolic pathways involved in atherogenesis, although other factors like increased proximal wall stress or coronary geometry can be involved as well.[12,13]

The degree of the obstruction caused by the myocardial bridge depends on factors such as location, thickness and length of the muscle bridge. Histologic studies have shown that the intramyocardial segment consists only of contractile type smooth muscle cells and lacks synthetic type of smooth muscle, explaining the absence of atherosclerosis. A few case reports of atherosclerosis occurring in the intramyocardial segment like the one by Thej et al have been reported.[14]

Myocardial Bridging a bane:

However there are numerous reports linking myocardial bridging with myocardial ischaemia[15] and infarction[16], coronary thrombosis and infarction[17], acute left ventricular dysfunction[18], arrhythmias[19], abnormal ventricular repolarisation[20], ventricular septal rupture[21] and sudden deaths[22]. Direct measurement of pressure and flow using sophisticated Doppler ultrasound techniques has shown that pressure within the bridged segment is increased, causing impediment or even temporary reversal of blood flow[1]. But most of the blood supply to heart occurs during diastole so ischaemia in context of myocardial bridging is most likely multifactorial in origin. Altered coronary vasoreactivity has also been detected in patients with myocardial bridging[23]. There is a strong association between strenuous exercise and sudden cardiac death in the young[24], and sudden death has also been linked with myocardial bridging[25]. Acute coronary syndrome linked to coronary spasm during exercise is also described[26].The pathological significance of Myocardial bridging is said to occur when a length of 20mm and a depth of 2mm are exceeded.[27]

Myocardial bridging is a predisposing condition to vasoconstriction-mediated ischemia: endothelial dysfunction, even in the form of localized nitric oxide depletion[28] is present, and the response to vasoconstrictors is more pronounced than in non-bridging segments.[29] In addition, it is established that catecholamines do increase coronary vasomotor tone whenever endothelial dysfunction is present.[30]

Angina, myocardial ischemia, myocardial infarction, left ventricular dysfunction, myocardial stunning, paroxysmal AV blockade, as well as exercise-induced ventriculartachycardia and sudden cardiac death are accused sequelae of myocardial bridging.[31-35]

Diagnosis:

The current gold standard for diagnosing myocardial bridges is coronary angiography.[9] In the presence of a proximal stenosis, myocardial bridging may only be identifiable after PTCA when higher intravascular pressures and reversed hypokinesis unmask myocardial bridging.[36] In patients with thin bridges newer imaging technique such as IVUS, intracoronary Doppler ultrasound (ICD), and intracoronary pressure devices can be used.[37-41]

Treatment:

In symptomatic patients therapeutic options are as follows.[9]

(1) Negative inotropic and/or negative chronotropic agents, ie, beta-blockers and calcium antagonists;

(2) Surgical myotomy and/or CABG; and

(3) Stenting of the tunnelled segment.

Prognosis:
Myocardial bridge is usually asymptomatic and long-term prognosis in patients with isolated myocardial bridging is generally good.[2,42,43]

Conclusion:
Myocardial bridging is a relatively common finding with majority being benign. Many feel that there is insufficient evidence for myocardial bridging as a cause of sudden cardiac death. However this needs to be assessed in view of the significant finding of a deep bridge with ischaemic changes.

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