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Sexual Diamorphism of Humerus: A Study in Marathwada Region

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ABSTRACT

Sexual dimorphism of bones has been extensively studied in different regions by numerous authors. It is established that, the regional variations exists in the statistical values of the parameters. The present study is done to find out the standard statistical values for the sex determination with humerus. In the present study, the length, epicondylar width, mid-shaft circumference and vertical diameter of the head have been measured in 212 adult humeri of known sex (142 males and 70 females) from the Marathwada region of Maharashtra state. Index (I) was calculated and data was generated for each parameter. The data was also analysed by multivariate analysis method. The mean values of the parameters differed from those of previous studies for other regions. In the present study, the length of the humerus was found to be the most significant parameter for the sex determination. From the data, 42.26% right and 38.66% left male humeri could be sexed correctly and in case of female 25.71% right and 31.42% left humeri could be sexed correctly. Also, by using multivariate technique, the percentage of the humeri that could be sexed correctly markedly increased. 97% right and 96.5% left male humeri could be sexed correctly while 97.5% right and 91% left female humeri could be sexed correctly.

Key words: Sexual dimorphism, humerus, marathwada region, demarking points, multivariate analysis.

INTRODUCTION

Identifying the deceased is the most common and critical problem frequently encountered by Anatomist, Anthropologist and Medicolegal Experts. Determination of the identity of a person is a process of recognition of an individual utilizing unique physical features and biological parameters, which are specific to each individual. The factors that play a key role in establishing the identity of a person are age, sex, race, stature, finger prints, foot prints, photo ID, clothing, personal affects, dental examination, radiology of ossification centers, specific personal features like tattoo, scars, deformity, previous surgery etc and DNA finger printing. One of the cardinal parameters for identification is determination of sex [1-6].

Invariably anatomists, forensic anthropologists and medico-legal experts are asked to examine fragmented skeletal remains and generate data which would facilitate establishing their identity. The determination of sex is the first step in skeletal analysis since the estimation of age at death as well as race and stature to an extent depends upon the sex of the deceased.

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Assessment of sexual dimorphism in the bones is an established fact, through numerous studies conducted earlier. Most of the older studies of sexual dimorphism in the skeleton were centered on morphological traits in a descriptive manner,while newer studies focus on morphometry in a largely quantitative and statistical sense.

The statistical data for identification of sex from the humerus by using various parameters was made available by researchers like Krogman[7], Thieme[8], Dwight[9], S. Singh[10] and others [6-18].

Regional variations in the standard statistical values for determination of sex are an established fact. Numerous factors such as genetics/ inheritance, environmental, racial etc are responsible for these variations. The present study was carried out to obtain the data for sex determination by using various parameters of humerus in the Marathwada region. Also the data was analysed by using multiple discriminant analysis method.

MATERIALS AND METHODS

In the present study, 212 adult humeri of known sex (142 males and 70 females) from Marathwada region were studied. The following measurements were taken.

1. Length: measured by using the osteometric board.
2. Epicondylar width: the maximum distance between medial and lateral epicondyles was measured by vernier calliper.
3. Midshaft circumference: the circumference of the shaft in the middle was measured with the help of a millimetre graph paper.
4. Vertical diameter of the head: was taken in the plane of the tip of greater tuberosity, as maximum distance between two points on the head of humerus, with the help of vernire calliper.
5. A new index i.e. Index I was obtained

$$\text{Index I} = \frac{\text{Length in mm} \times \text{Epicondylar length in mm}}{100}$$

A multivariate discriminant analysis technique was applied and discriminant functions were generated.

RESULT

As shown in table- I, the length of right humerus ranged from 296 – 361 mm in male and 260 – 302 mm in female while on left side it varied from 283 – 357 mm in male and 268 – 304 mm in female.

It was observed that the demarking point for males was > 316.9 mm on the right and > 319.3 mm on left side while in females it was < 275.9 mm and < 274.9 mm on right and left respectively.

From these demarking points, 42.26% right and 38.66% left male humeri could be identified and in case of females 25.71% right and 31.42% left humeri could be sexed correctly.

As shown in table-II, the epicondylar width of right humerus ranged from 54 – 69 mm in male and 44 - 59 mm in female while on the left side it varied from 52 - 67 mm in males and 40 - 59 mm in females.

It was observed that the demarking point for males was > 62.66 mm on the right and > 63.02 mm on the left side while in female it was < 47.98 mm and < 50.84 mm on right and left side respectively.

From these demarking points, 17.91% right and 16% left male humeri could be correctly sexed and in case of females 25.71% right and left humeri could be sexed correctly.

As shown in table-III, the midshaft circumference of right humerus ranged from 56 - 72 mm in males and 50 - 59 mm in females while on the left side it ranged from 54 - 71 mm in males and 50 - 61 mm in females.

It was observed that the demarking point for males was > 62.72 mm on the right and > 63.54 mm on the left side while in females it was < 51.50 mm and < 51.23 mm on the right and left side respectively.

Table No. I: Showing measurements of length.

Sex	Male		Female	
Side	Right	Left	Right	Left
Range	54 - 69	52 – 67	44 - 59	40 - 59
Mean	57.67	60.17	54.14	52.23
S. D.	3.23	3.11	2.84	3.6
Calculated range	47.9 -67.4	50.8 – 69.5	45.6 – 62.7	41.4 – 63.0
Demarking point	>62.66	>63.02	<47.98	<50.84
% beyond Demarking point	17.91	16	25.71	25.71

Table No. II: Showing measurements of epicondylar width

Sex	Male		Female	
Side	Right	Left	Right	Left
Range	54 - 69	52 – 67	44 - 59	40 - 59
Mean	57.67	60.17	54.14	52.23
S. D.	3.23	3.11	2.84	3.6
Calculated range	47.9 -67.4	50.8 – 69.5	45.6 – 62.7	41.4 – 63.0
Demarking point	>62.66	>63.02	<47.98	<50.84
% beyond Demarking point	17.91	16	25.71	25.71

Table No.III: Showing measurements of Midshaft circumference.

Sex	**Male**		**Female**	
Side	**Right**	**Left**	**Right**	**Left**
Range	56 – 72	54 – 71	50 - 59	50 - 61
Mean	62.5	61.03	54.82	54.06
S. D.	3.67	3.24	2.62	3.16
Calculated range	51.5 – 73.5	51.23 – 70.7	46.9 – 62.7	44.6 – 63.5
Demarking point	>62.72	>63.54	<51.50	<51.31
% beyond Demarking point	41.79	21.33	20	27.71

From these demarking points, 41.79% right and 21.33% left male humeri and 20% right and 25.71% left female humeri could be sexed correctly.

As shown in table-IV, the vertical diameter of head of right humerus ranged from 40 – 49 mm in males and 34 - 44 mm in females while on left side it varied from 40 - 48 mm in males and 32 - 48 mm in females.

It was observed that the demarking points for males was > 46.12 mm on the right and > 45.99 mm on the left side while in females it was < 37.91 mm and < 37.53 mm on right and left respectively.

From these demarking points, 35.82% right and 25.33% left males humeri and 28.57% right and 34.28% left female humeri could be sexed correctly.

Table No. IV: Showing measurements of vertical diameter of head.

Sex	Male		Female	
Side	Right	Left	Right	Left
Range	56 – 72	54 – 71	50 - 59	50 - 61
Mean	62.5	61.03	54.82	54.06
S. D.	3.67	3.24	2.62	3.16
Calculated range	51.5 – 73.5	51.23 – 70.7	46.9 – 62.7	44.6 – 63.5
Demarking point	>62.72	>63.54	<51.50	<51.31
% beyond Demarking point	41.79	21.33	20	27.71

As shown in table-V, the Index I of right humerus ranged from 159.8 – 247.7 in males and 134.3 – 174.6 in females while on left side it varied from 147.2 – 234.3 in males and 118 – 177.6 in females.

It was observed that the demarking point for males was >185.11 on the right and >188.51 on the left side while in females it was < 144.92 and < 144.45 on the right and left side respectively.

From these demarking points, 68.17% right and 54.66% left male humeri could be identified and in case of female 28.57% right and 40.0% left humeri could be sexed correctly.

MULTIVARIATE ANALYSIS METHOD

By using multivariate analysis method, 97% right and 96.5% left male humeri and 97.5% right and 91% left female humeri could be sexed accurately.

DISCUSSION

It is an established fact that, standard metrical values derived for sexing the skeleton in one region if applied to the other region may not give 100% accuracy. Therefore it is imperative to obtain standard metrical values which are specific to a region.

In the present study 212 humeri (142 males and 70 females) were studied to obtain the standard metrical values in the Marathwada region of Maharashtra.

The observations of various workers regarding the sexual differences in the various parameters are shown in comparative table no. VI, VII and VIII.

In table no. VI, it is seen that, the mean length of the humerus is more in the present study as compared with that observed by S. Singh[10] but less than the mean length stated by Thieme [8] and Krogman [7]. Thus regional variation is present in the mean length of the humerus. It is also seen

Table No. V: Showing measurements of Index I

Sex	Male		Female	
Side	Right	Left	Right	Left
Range	159.8 – 247.7	147.2 – 234.3	134.3 – 174.6	118 – 177.6
Mean	194.87	190.66	153.46	148.73
S. D.	16.65	15.40	10.55	13.26
Calculated range	144.9 -244.8	144.5 – 236.9	121.8 – 185.11	108.9 – 188.5
Demarking point	>185.11	>188.51	<144.92	<144.5
% beyond Demarking point	68.17	54.66	28.57	40.0

that the percentage beyond D. P. is more in the present study.

In the table VII, it is seen that, the mean epicondylar width of the humerus in the present study was less than the mean length stated by Thieme [8] and Krogman [7]. But the difference in the mean values is less as compared with Singh S [10]. The regional variation exists in the mean epicondylar width of the humerus. It is also seen

Table No. VI: Comparison findings of length of humerus of present study with other studies

Authors	Mean				% beyond D. P.			
	Male		Female		Male		Female	
	Right	Left	Right	Left	Right	Left	Right	Left
Present study.	318.37	316.53	283.37	284.57	42.26	38.66	25.71	31.42
S. Singh (1972)	313.9	313.3	279.8	279.7	27	19	24	5
Thieme (1957)	338.98		305.89		–	--	--	--
Krogman (1955)	336.6		317.0		–	--	--	--

that the percentage beyond D. P. is more in the present study.

In the table VIII, it is seen that, the mean midshaft circumference of the humerus is more in the present study as compared to that observed by. Singh S [10]. The regional variation was present in the mean midshaft circumference of the humerus also. The percentage beyond D. P. was more in the present study.

To increase the accuracy in the sex determination, the technique of multivariate analysis was applied. It was found that percentage of humeri that could be sexed correctly was increased. In fact 97% right and 96.5% left male humeri and 97.5% right and 91% left female humeri could be sexed accurately.

In the present study the demarking points obtained for various parameters for the Marathwada region of Maharashtra differ from

those obtained by the researchers for other regions. This was because, the mean values of various parameters show regional variations. Such regional variations were also observed by previous researchers like Krogman [7], Thieme [8], Dwight [9], and Singh S. [10]. These regional variations are due to genetic, environmental, dietary and racial factors. Hence the mean values and demarking points obtained by the researchers in other regions cannot be generalized and applied to other regions. So in the present study the mean values and demarking points were obtained for the Marathwada region of Maharashtra. The vertical diameter of head and the total bone length were most significant parameters for sex determination from humerus. The same has been verified in studies conducted by Mall et al[17] in German population and by Steyn M and Yasar M [16] in South African population.

By using multivariate technique, the percentage of the humeri that could be sexed correctly markedly increased.

CONCLUSION

Humerus the longest and most robust bone of the upper limb plays an important role for determination of the sex of unidentified skeletal remains. The various parts of the bone and their dimensions are useful for the same, with the vertical diameter of the humeral head being the most significant. The data generated in this study would be a useful reference for practical application in future forensic and anthropological studies in Marathwada population.

Table No. VII: Comparison of Values of Epicondylar Width of present study with other studies

Authors	Mean				% beyond D. P.			
	Male		Female		Male		Female	
	Right	Left	Right	Left	Right	Left	Right	Left
Present study.	57.7	60.2	54.1	52.2	17.9	16.0	25.7	25.7
S.Singh (1972)	61.4	60.4	52.7	52.4	0	8	11	11
Thieme (1957)	83.89		56.76		–			

Table No. VIII: Comparison of values of Mid-shaft circumference of present study with other studies.

Author	Mean				% beyond D. P.			
	Male		Female		Male		Female	
	Right	Left	Right	Left	Right	Left	Right	Left
Present study.	62.51	61.03	54.82	54.06	41.79	21.33	20	25.71
S.Singh (1972)	60	58.5	49.8	49.1	14	2	11	11

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Myocardial Bridge: Findings of Postmortem Heart

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ABSTRACT

Background: - The myocardial bridges are the myocardium overlying coronary arteries. The coronary arteries may dip into the myocardium for varying lengths and then reappears on the heart's surface. **Aims:** The present study is aimed at studying the presence of myocardial bridges over coronary arteries and their branches by dissection method. **Material and Methods: -** A total of 50 adult hearts procured from dead bodies from the Mortuary of the Department of Forensic Medicine & Toxicology, CSM Medical University, Lucknow were included in this study irrespective of sex. The hearts were meticulously dissected along both the coronary arteries and the presence and location of myocardial bridges was noted along with the part of the artery and/or its branch it was crossing. **Results: -** The overall prevalence of myocardial bridging was found to be 42%. They were mostly seen over the left anterior descending coronary artery. In maximum cases, they were seen over the middle 3rd of the left anterior descending coronary artery. The reported incidence of myocardial bridges varies 5-58%. **Conclusion: -** They may be associated with a wide range of clinical problems, including acute coronary syndromes and arrhythmias. The contraction of the myocardial bridge may result in vessel compression and myocardial ischaemia.

Key words: Myocardial bridges, heart, post mortem

INTRODUCTION

The myocardial bridges describe the situation in which part of the coronary arteries, running in epicardial tissue, traversed into the myocardium for varying lengths and then reappear on the heart's surface. The muscle overlying the intra myocardial segment of the epicardial coronary artery is termed a myocardial bridge. The artery coursing within the myocardium is called a tunnelled artery. Myocardial bridge (MB) or tunnelled coronary artery is an inborn abnormality, which implicates a systolic vessel compression with a persistent mid-late diastolic diameter reduction. The myocardial bridges have been studied angiographically and by dissection method. There are variable reports about the incidence and effects of myocardial bridges. Myocardial bridges are often observed during coronary angiography with an incidence of 0.5%-5.5%. The most commonly involved coronary artery is the left anterior descending artery followed by the diagonal branches, the right coronary artery, and the left circumflex. The overall long-term prognosis is generally benign.[1]

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Tunnelled coronary arteries have long been recognized anatomically.[2] The myocardial bridges with myocardial ischemia have heightened there clinical relevance. [3]

MATERIALS AND METHODS

The study was conducted on 50 human hearts at Department of Forensic Medicine & Toxicology and associated at Mortuary, of CSM Medical University, Lucknow during September 2008 to August 2009.

SELECTION OF CASES

Cases included 50 hearts of both sexes in between the age group 30-60 years, having history of deaths due to natural as well as unnatural causes (accidental, suicidal, homicidal, etc.), brought to the mortuary, within 12 hours of death, for the autopsy examination. Decomposed bodies were excluded from the study.

PROCEDURES OF STUDY

The Hearts were dissected out with a portion of ascending aorta. Each heart was then thoroughly washed to get rid of the blood clots from its chambers. The specimens were then fixed in 10% formalin solution for 2-5 days. The visual identification of the coronary sinuses, coronary arteries and their branches and muscle bridges were based on standard anatomical knowledge [4]. Photographs were taken of all the observations at different angles by a 7 MP X digital camera at 4x optical zoom.

The number and the length of all major arterial branches number and position of myocardial bridges were recorded. The lengths were obtained by measuring the entire course of the arteries from origin to the last point of naked eye identification [5] by simple ruler. The branching pattern for the left coronary artery was documented based on its major (1st order) epicardial branches, the left anterior descending (LAD), and the circumflex (LCX) artery that were followed up-to termination and the geographic pattern of the branching determined.

The first order branches of the right coronary artery (RCA) were determined visually and carefully by following the main RCA trunk through its entire course to the posterior descending artery. The coronary artery was considered dominant if it gave the posterior descending artery. Co-dominance occurred as situations whereby both coronary arteries gave posterior descending artery [5].

OBSERVATIONS

The hearts of 50 cases including 43 of males and 7 of females were selected for study. Out of the

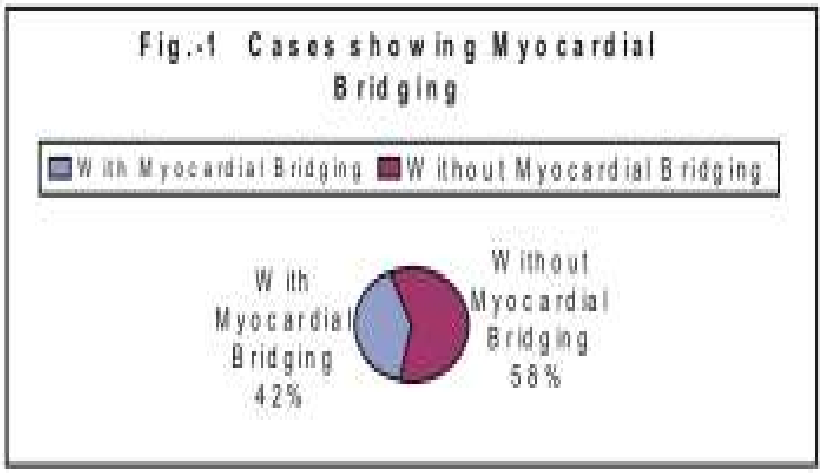


Table –I Comparison of incidence of Myocardial bridges over LCA and RCA

Heart showing myocardial bridges (No.=21)		
LCA Only No. = 15	LCA & RCA Both No. = 4	Only RCA No.=1
LAD Artery	LAD & 1st segment of RCA	PIV branch of RCA
15 (71.43 %)	4 (19%)	1 (4.76%)

LCA - Left Coronary Artery, LAD- Left Anterior Descending, RCA - Right Coronary Artery, PIV – Posterior Inter ventricular

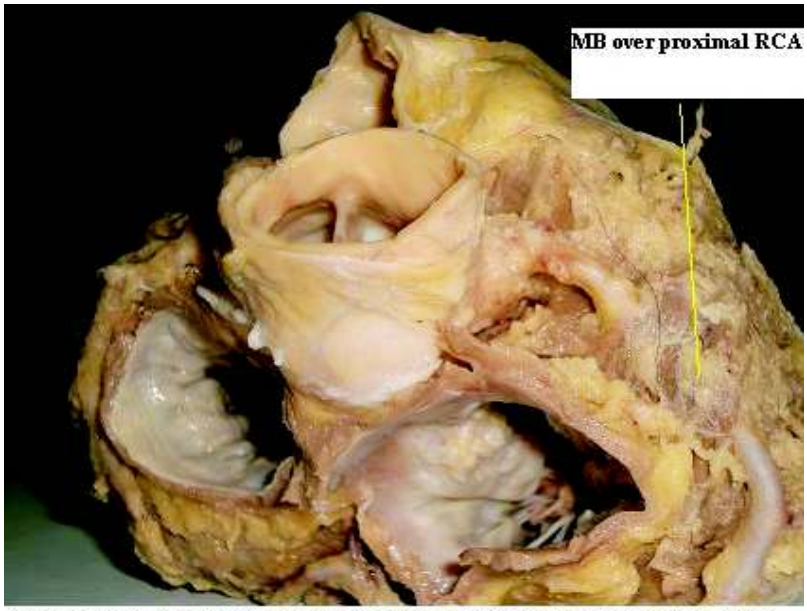
The table-II showing the distribution of myocardial bridges over LAD artery. The maximum incidences were seen in 11 cases (55%) on the middle 1/3rd, followed by 9 cases (45%) on proximal 1/3rd, while there was no myocardial bridging found on the distal 1/3rd of the LAD artery.

Table – II Distribution of myocardial bridges over LAD artery

Cases showing Myocardial Bridging over LAD (No.= 20)		
Proximal 1/3rd	Middle 1/3rd	Distal 1/3rd
9 (45%)	11 (55%)	Nil (%)

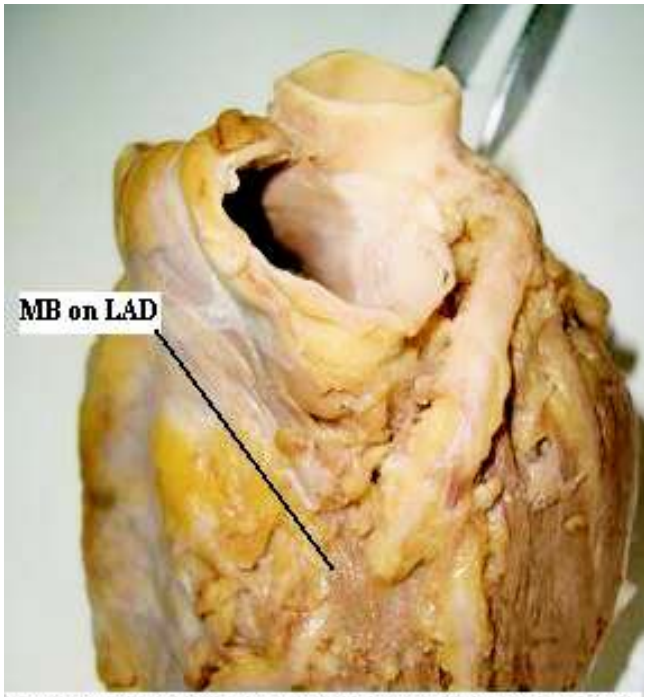
LAD =Left Anterior Descending

Figure- 2



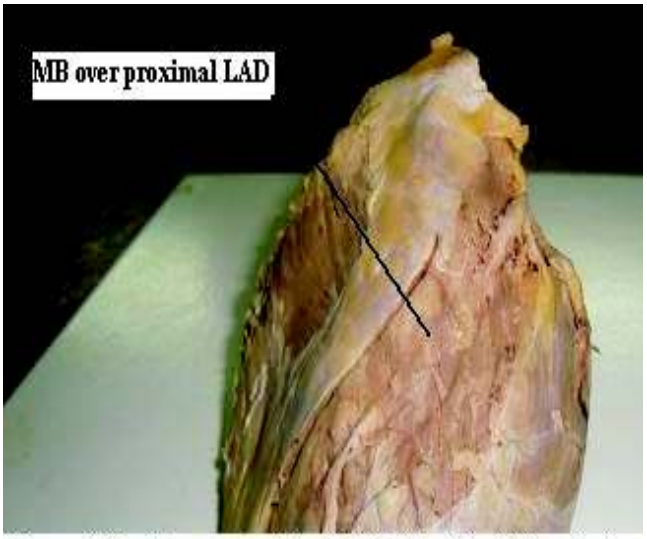
Right Lateral Aspect of Heart showing Myocardial Bridge over proximal RCA

Figure 3



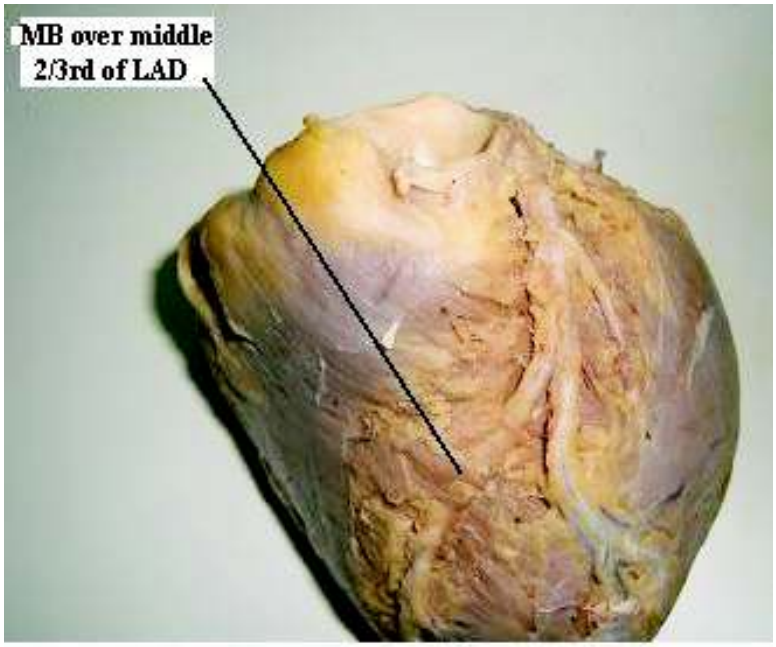
Anterior surface of heart showing Myocardial bridge on Lower 1/3rd of Left Anterior Descending Artery

Figure - 4



Myocardial bridges on proximal 1/3rd of Left Ant. Desc. Artery

Figure - 5



Anterior surfaceof Heart showing Myocardial bridge over LAD

total 50 hearts, 21 (42%) hearts were showed the presence of myocardial bridges (Fig. -1) out of which there were 20 males and only 1 female showed the myocardial bridges.

Amongst 21 hearts those showed the presence of myocardial bridges, majority 15 hearts (71 %) were showed the myocardial bridges on the left anterior descending artery (LAD) of left coronary of arteries (LCA), hearts of 4 cases (19%) showed in both left coronary of arteries (LCA) and right coronary artery (RCA), and only in a single case (4.76 %) of myocardial bridge was present only on the posterior inter ventricular branch of the right coronary artery (RCA) (Table-1). Out of the 21 hearts those 4 cases showed the myocardial bridges on both the left coronary of arteries (LCA) and right coronary artery (RCA), showed myocardial bridges both on LAD as well as 1st segment of the right coronary artery (Table- I).

DISCUSSION

Reyman et al[6] had first time mentioned about the muscle fibres of myocardium overlying coronary artery. These muscle fibres of myocardium were described as 'myocardial bridges' by Geiringer[7] in 1951. Table III depicts the incidence of myocardial bridges reported since the earliest studies on the same and compared with the present study (Ref. Table nos. I &II).

There are variable incidences of myocardial bridges reported angiographically and by dissection method. The incidence of myocardial bridging in present study (table III) is greater than the incidence reported by Loukas et al[8], Pelech et al[9] and Geiringer [7] using the dissection method of study. The incidence of myocardial bridges can be explained to some extent by the development of coronary vessel systems described by Reese et al [10]. He states that in the earliest stages of cardiogenesis the heart is tubular and made up of an endothelial tube within a muscular tube. At this stage there is no epicardium. The cells forming the epicardium arise from an outgrowth called Pro-epicardial organ from the septum transversum. These cells migrate to envelope the heart to form the epicardium and pericardium. Signalling mechanisms regulate the migration of the epicardial cells which in turn give out the signals that participate in regulation of myocyte proliferation, growth and final pattern of myocardium. The epicardial cells undergo epithelial-to-mesenchymal transition. This is controlled by various factors from the myocardium. The mesenchymal cells migrate through the spaces generated in the developing myocardium and forming finally the coronary arterial system. This migration of these mesenchymal cells through the developing myocardium could explain the embryogenesis of myocardial bridges over portions of the coronary arteries.

High incidences of 'myocardial bridges over left anterior descending artery' reported in the present study correlates with the findings of Vaishaly & Arole V.[11], Geiringer [7], Pelech et al [9] & Loukas et al [8]. In the study conducted by Angelini et al [12] and Harikrishan [13] using the method of angiography all the bridges reported were on the left anterior descending artery but the incidence was lowest i.e. 5.50% and 0.6% respectively. While in the present study, the highest incidence of myocardial bridges (22%) was observed over the middle 1/3rd of the left anterior descending artery. Vaishaly & Arole V.[11] and Vanildo et al[14] also reported a high incidence of bridging over the middle 1/3rd of the left anterior descending artery. In present study, there was no bridging on the distal 1/3rd of the left anterior descending artery. Vanildo et al[14], also not reported bridging over distal 1/3rd of the left anterior descending artery.

The findings of the present study showed that the incidence of myocardial bridging on the posterior inter-ventricular branch of right coronary artery was 4.76%, and over the 1st segment of right coronary artery, it was 19.04%. Similar findings also reported by Vaishaly & Arole V.[11] and Loukas et al [8].

The tunnelled coronary arteries are presumed to be congenital in origin. At least three factors are postulated to account for differences between the high frequency of the tunnelled major coronary

arteries observed at necropsy and lower frequency of the tunnelled coronary arteries observed angiographically [15-16] these factors are 1) length of the tunnelled coronary segment, 2) degree of systolic compression, and 3) heart rate. Longer tunnelled segment of coronary arteries, more severe systolic diameter narrowing of the tunnelled segment and tachycardia may contribute to the production of myocardial ischemia with myocardial bridging [3]. The length of coronary tunnelling may not always be an important factor in causing myocardial ischemia, as three cases with left main intra-myocardial tunnelling of greater than 40mm have been described without evidence of myocardial ischemia [3].

Lovell & Knight CJ [17] stated that though myocardial bridges may cause clinically relevant problems, including acute coronary syndromes and arrhythmias, have been reported in patients whose sole apparent cardiac abnormality is the presence of myocardial bridge.

Morales AR et al. [18] and Cutler D et al [19] have described sudden death in myocardial bridging. Bridging also occurs in 30-60% of individuals with hypertrophic obstructive cardiomyopathies.

SIGNIFICANCE OF MYOCARDIAL BRIDGES

Myocardial bridging, a congenital coronary anomaly, is a clinical condition with several possible manifestations, and its clinical relevance is debated. With each systole, the coronary artery is compressed. Myocardial bridging has been associated with angina, arrhythmia, depressed left ventricular function, myocardial stunning, and early death after cardiac transplantation, and sudden death. Evidence indicates that the intima beneath the bridge is protected from atherosclerosis, and the proximal segment is more susceptible to development of atherosclerotic lesions because of haemodynamic disturbances. Medical treatment generally includes beta-blockers. Nitrates should be avoided because

TABLE III: Previous reported incidence & distribution of myocardial bridges

		LCA					RCA	
	% Incidence of MB	Proximal 3rd of LAD	Middle 3rd of LAD	Distal 3rd of LAD	Diagonal Br.	Marginal br. of LCX	PIV br. of RCA	1st segment of RCA
Findings based on Dissection Method								
Present study, 2009	**42%**	**45%**	**55%**	**nil**	**Nil**	**nil**	**4.76%**	**19.05%**
Vaishaly K, 2007 [11]	56%	20%	28%	8%	16%	8%	6%	4%
Geiringer, 1951[7]	23%	Over AIV artery						
Ferreira 1991[20]	57%	Arteries not specified						
Reig, 1993[21]	58%	All coronary arteries						
Vanildo, 2002[13]		Out of total hearts showing MB						
		13%	87%	nil				
Pelech 2006[9]	5%-25%	AIV						
Loukas, 2006[8]	34%	17%			7%	3%	4%	7.5%
Findings based Angiographic method								
Angelini 1983[12]	6%	Over AIV artery						
Harikrishan 1999[13]	0.60%	All the MB were observed were over the AIV artery						

AIV= Anterior Interventricular

symptoms may worsen. Intracoronary stents and surgery have been attempted in selected patients.

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Violent Asphyxial deaths in rural area of Maharashtra

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ABSTRACT

Background: - The deaths due to asphyxia are so wide & varied that they are challenging the postmortem surgeon on many occasions, therefore careful study & a meticulous examination of every case is mandatory to bring the wide variety of observations in death by asphyxia. **Aim:** To evaluate the incidence and pattern of violent asphyxial deaths in a rural area where majority of the population are farmers and sugar factory workers. **Methodology:** The data on socioeconomic status, type of asphyxia, manner of death, etc were collected retrospectively from the department of forensic medicine of Rural Medical College, Loni, Tal- Rahata Dist Ahmednagar Maharashtra for a period of 5 yrs. The information recorded from hospital case records, P.M. reports, police inquest reports and history from relatives. **Results:** Total 917 autopsies were conducted during this period among 68 cases were of violent asphyxial deaths. The males were preponderant (73.53%). Majority of cases were of drowning (73.53%) followed by hanging (20.59%), strangulation (2.94%) & traumatic asphyxial (2.94 %). Majority of cases were suicidal in nature.

Key words: violent ashyxial deaths, hanging, strangulation, drowning, suffocation

INTRODUCTION

The word Asphyxial in Greek Language: meaning "Pulse less ness".[1] In the forensic field it is restricted to mechanical interference with respiration. This is some times referred to as mechanical or violent asphyxia as violence is a common factor associated with these cases. The deaths due to asphyxia are so wide & varied that they are challenging the postmortem surgeon on many occasions, therefore careful study & a meticulous examination of every case is mandatory to bring the wide variety of observations in death by asphyxia[2-3]. The violent asphyxial deaths occur in all age groups and the incidence differs from place to place due to various reasons. The present study shows the incidence, age, sex & manner wise distribution of various asphyxia deaths in rural area.

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MATERIALS & METHODS

A retrospective study was carried out in dept of forensic medicine at rural medical college Loni, Tal- Rahata, Dist Ahmednagar, Maharashtra for duration of 5 years from July 1997 to June 2002 to evaluate the violent asphyxial deaths. The data on information related to age, sex, type of deaths, manner & mode of deaths were recorded from the hospital case records, P.M. reports & police inquest reports. The cases history revealed from relatives, eyewitness police investigation officers.

The data is analyzed and presented in the form of figure and table.

RESULT

During the study period a total of 917 autopsies were conducted in the mortuary out of which 68 (7.42%) cases were of violent asphyxial deaths (Fig.-1). The majority of victims were males (73.53%) than females (26.47%) (Table-1). The most vulnerable age group was 11-30 yrs (67.64%) followed by 31-40 yrs (16.101%) (Table –2). In the study 50 cases were of drowning (73.53%), 14 cases of hanging (20.59%) & only 2 case each of strangulation (2.94%) & traumatic asphyxial a type of suffocation (2. 94 %) were observed (Table –3).

Out of 50 cases of drowning 18 cases were of suicidal, 20 cases of accidental, 5 cases were homicidal in nature & in 7 cases the manner of death was not ascertained. Out of 14 cases of hanging, 13 cases were suicidal and only in one case investigating police were not sure about the manner of death. In strangulation both the cases were homicidal & in suffocation deaths both were accidental in nature (Table –3). In this study it

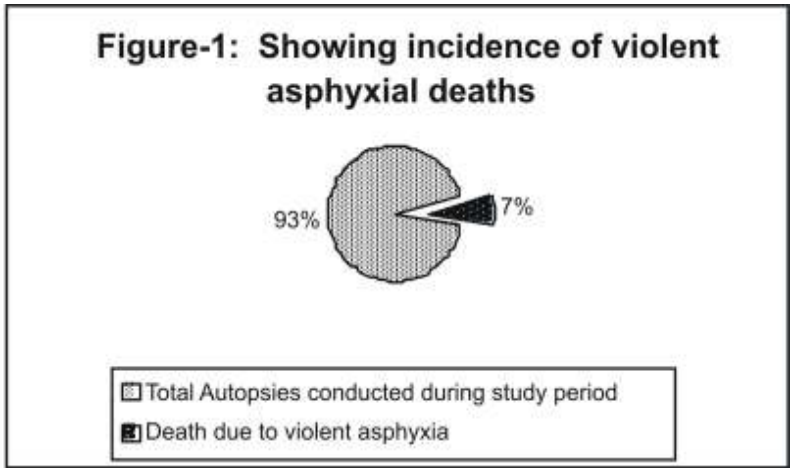

Table 1: Sex wise distribution of Cases

Sex	No. Of Cases	Percentage (%)
Male	50	73.53 %
Female	18	26 47 %
Total	68	100.00 %

Table 2: Age wise distribution of violent asphyxial deaths

Age in Year	No. Of Cases	Percentage (%)
1 - 10	02	2.94 %
11 – 20	20	29. 41 %
21-30	26	38.23 %
31-40	11	16.18%
41-50	04	5.88 %
51-60	04	5.88 %
61-70	01	1.48%
Total	68	100.00%

Table 3: Manner and type wise distribution of Cases

Type of Violent Asphyxial Deaths	Suicidal	Homicidal	Accidental	Unknown	Total
Drowning	18	05	20	07	50 (73.53%)
Hanging	13	00	00	01	14 (20.59%)
Strangulation	00	02	00	00	02 (2.94 %)
Suffocation	00	00	02	00	02 (2.94%)
Total	31 (45.59%)	07 (10.29%)	22 (32.35%)	08 (11.77%)	68 (100%)

was observed that maximum no of cases were suicidal 31 (45.59 %) followed by accidental 22 (32.35%) & homicidal 07 cases (10.29 %). In 8 cases the manner of death was unknown (Table - 3).

DISCUSSION

The incidence of violent asphyxial death in the present study (7.42%) was similar to the findings of Momanchand et al [4] (7%) & varies with that of Salachin [5] (9.3%). This variation seems to be because of the fact that the present study was carried out in rural area while the other study carried by Salachin[5] in urban area.

In the present study males (73.53%) outnumbered females (26.47), which were consistent with Salachin[5] (75.6%) & Momanchand et al[4] (80.3%). The study noted maximum percentage of violent asphyxial deaths in the age group 11- 30 years (67.64%) as it is the most active period in one's life & there is great fluctuation of emotions in this age group. The findings are consistent with the others authors[4-6]. In our study showing the findings that the drowning was the commonest type (73.53 %) followed by hanging (20.59%), strangulation (2.94%) & suffocation (2.94%) of asphyxial deaths. While the findings of other studies carried out by Momanchand et al[4] & Gargi et al[7] reported the hanging was the commonest type followed by drowning. This variation could be due to the fact that this entire area where the present study is carried out is a very well irrigated area having a well at each farmhouse & a good network of irrigation canals & rivers. So the preferred mode of committing suicide is drowning by simple jumping in the canal or wells or accidental fall in the river.

The findings of the present study also showed that the majority of the cases of hanging died due to suicidal hanging. There was not reported any case of accidental or homicidal hanging. These findings are similar to Patel et al[8] & Gargi et al[7]. In our study accidental drowning out numbered suicidal & only few case of homicidal drowning was noted. The accidental asphyxial deaths among children are more in our study it could be due to more number of wells & canals in this area & children playing near water source. The women are used to wash the utensils & clothes on the river bank; it could lead more accidental fall in river due to slippery area. The death due to suicide by drowning are more common it could be because of availability of water sources & loneliness near it. The findings of strangulation & traumatic asphyxia are similar to the findings of Gargi et al[7].

The findings of our study showed that maximum numbers of cases of asphyxial deaths were suicidal (45.59%) in nature followed by accidental (32.35%) and homicidal (10.29%). These findings are similar to findings of Sahoo PC[9] & Fimate[10]. A majority peoples are follow this mode for intentional death it could be in believe of that the asphyxia causes painless and instantaneous death.

CONCLUSION

The incidence of violent asphyxial deaths among all unnatural deaths is 7.42% in rural area. The majority of victims were male & in age group of 11 –30 yrs. Accidental drowning is the most common type of violent asphyxial deaths followed by suicidal drowning. Hangings are more common mode of suicidal deaths while strangulation commonest among homicidal deaths. All the cases of traumatic asphyxia were accidental. The maximum no of cases of violent asphyxial deaths were suicidal followed by accidental in nature.

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Erratum

It's very sorry to say that the name of **Dr. Chavan S.K.** has been not been printed alongwith article entitled **"Stature and percutaneus tibial length: A correlation study in Maharashtrian population"**on content page in volume 2, number 3 July-September 2009 issue of the journal.

On print line of the said issue July-Sept 2010; Vol. 2 No. 3 has been printed instead of **July-Sept 2009; Vol. 2 No. 3** by oversight . We have corrected in PDF version of the issue. Mistakes are regretted.

Editor-in-Chief

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Multiple Suicidal Attempts by a Pregnant Lady: A Case Report

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Attar N R**

ABSTRACT

Emergency Medicine always has varieties of cases. And it challenges the skills of treating physicians in day-to-day practice. Every suspicious case reflects with medicolegal presentation. In this article, author presenting an interesting rare case of multiple suicidal attempts during the course of pregnancy. A married pregnant 20 years old woman first; she attempted hanging by tying coconut rope to the ceiling followed by consuming Kerosene. She was admitted in the hospital with the history of Poisoning. On examination and personal history she revealed the facts. The case was further complicated due to pregnancy. On her admission she was five months pregnant. She was provided medical, obstetrical and psychiatric consultations. After discharge she was followed for the outcome delivery. She delivered a full term normal male baby. Neither she nor her relatives revealed the reason of her suicidal attempts. The case is discussed with the appropriate case histories.

Key Words: Suicidal attempt, hanging, kerosene poisoning, pregnancy.

INTRODUCTION

The new era is known to be an era of psychological stresses. Adults are noted to be the commonest victim of such situations. Middle and low socio-economic families (in Indian) are susceptible to various stresses. Suicide is opted as an ultimate solution, by the said population. Ingestion of poisons, burns, hanging and drowning are some of the preferably adopted ways of committing suicide.[1]

In the available medical literature, there are studies involving normal delivery and other risk factors but poisoning and hanging during the pregnancy is discussed here.

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CASE REPORT

A 20 years pregnant woman was admitted to the I.C.U. on 02.01.2008 with history of poisoning. On examination, we noticed intermittent marks of hanging around neck. Anteriorly it was present above the level of thyroid cartilage. On right side it was extending from the midline towards the lower border of the mandible, of size 10 x 3 cm. It was running upward and backward. Laterally it was present along the lower border of mandible on either side of size 9.5 x 1.8 cm on right and 12 x 2.5 cm on left side. It was reddish brown in colour; suggesting a fresh hanging mark. Hanging mark was absent posteriorly. With the above findings we interviewed the patient in taking confidence. She revealed that she had tried multiple attempts for suicide during this course of pregnancy. First, she attempted hanging by tying coconut rope to the ceiling. But she felt down since the rope got broken. Then she further attempted suicide by consuming Kerosene, of unknown quantity.

Initially her vital parameters were very poor. She was semiconscious and in a state of shock. Her blood pressure was 80/60 mm of Hg. She had tachycardia. Her chest examination revealed bilateral crepitations with few rhonchi. On palpation five months pregnancy was noted. During neurological examination she had hypotonia and sluggish reflexes. Plantars were equivocal. Her Glasgow Coma Scale (GCS) was between 8 to 9.

She was immediately intubated (Photograph 1) and put on artificial respiration (SIMV Mode of Ventilator). She was given sufficient IV fluids and a seven-day course of appropriate antibiotics (Cefotaxime and Metrogyl) for kerosene related aspiration pneumonia. Suction and nebulization was done as and when required. In view of pregnant uterus Obstetrician's opinion was taken. Obstetrician noticed viable foetus. Foetal heart sounds (F.H.S.) were normal indicating no foetal distress.

Meanwhile her investigations were done, which were as follows -

1. X-ray chest was suggestive of "Chemical aspiration pnuemonitis" (Photograph 2).

2. USG Abdomen was suggestive of "A single intrauterine foetus of 23.1Wk + 1 Wk.

On the 2nd day she regained consciousness. Her blood pressure and arterial blood gas parameters were normal. She gradually weaned off the ventilatory support. Her chest findings were persistent therefore the antibiotics were continued for seven days. The ventilator support was withdrawn on 3rd day. She was subsequently extubated.

Obstetrician's findings and supported U.S.G. concluded live foetus of 24 weeks gestation. Psychiatrist's consultation was taken in view of suicidal attempts. She was discharged after one week and advised for regular follow up. But as usual she did not turn up so we followed at her mother's home. She delivered male child, after normal home delivery. Both mother and child were healthy as last seen in May 2008. (Photograph 3)

3. Hemogram

Details	Patient's Values	Normal values
Hb	11.8 gm%	12-16 gm%
TLC	19000 / cu mm	4000-11000 /cumm
Serum Creatinine	1.2 mg/dl	0.7-1.4 mg/dl

4. Blood Gas Analysis Varies between:

Details	Patient's Values*	Normal values
$_{p}H$	7.35-7.46	7.38 – 7.44
$_{p}CO_2$	26-33 mm of Hg	40 + 2 mm of Hg
$_{p}O_2$	103-99 mm of Hg	95 + 5 mm of Hg
sO_2	98-95%	97 + 2%
HCO_3	14-19 mmol/L	24 + 2 meq/L
ABE	10 to –3 V mmol/L	----------

*Values were noted in this range during multiple investigations

5. Other investigations

Details	Patient's Values	Normal values
Sr. Potassium	3.3 meq/L	3.5-5 meq/L
Bleeding Time	2'=00"	2-7 min.
Clotting Time	5'=30"	4-9 min.
INR	1.0	1.0

6. Urine

Details	Patient's Values	Normal values
Specific Gravity	1.010	1.001 – 1.035
pH	7.5	5.0 – 9.0
Albumin	++	----------
Sugar	Nil	----------

DISCUSSION

Suicides have been increasing day by day in young people during the past three decades. This has lead to increase public and policy concern.[1] Risk factor domains can be enlisted as a consequence of adverse life sequences[1], socio-cultural factors like transgenerational cultural conflicts, psychosocial problems, media exposure, unemployment, social distress and family structure.[2] In addition to these Annette Beautrais[1] enlisted social and educational disadvantage, childhood and family adversity, psychopathology, individual and personal vulnerabilities, exposure to stressful life events and lastly social, cultural and contextual factors.[1] In suicides, ingestion of poisonous substances is most popular followed by hanging. [2]

There are many reported cases of survival after hanging. Kodikara S[3] reported a case of attempted suicidal by hanging that survived after resuscitation, without any adverse neurological outcome. A study conducted by Karanth S et al[4] indicates that a delayed presentation to a medical facility and a low GCS at presentation predict a poor outcome in suicidal hanging cases. Matsuyama T et al[5] counted Hanging time, presence of Cardio-pulmonary Assistance (CPA) at the scene and on arrival, and GCS on arrival as prognostic factors of outcome in hanging.

Akdemir G, & Ergüngör F [6] reported woman with a score of 7 on the GCS, who had attempted suicide by hanging. CT scan showed bitemporal hippocampal atrophy and SPECT showed non-activated area on right temporal and temporo-occipital regions. There have been few reports of involvement of the brain parenchyma in attempted suicide by hanging shown on CT, all showing ischaemic lesions. But multifocal intracerebral haematomas due to hanging on CT was first reported by Brancatelli G et al. [7]

There are noted cases of regained consciousness in hanging even after the phase of unconsciousness. Delayed deaths are also possible after survival in hanging. Various factors like complete or partial hanging, type and situation of ligature and type of knot determines the degree and rapidity of the asphyxial symptoms. [8]

Pregnancy itself is a complicated process and if the hanging and the poisoning further complicate it, then the question will arise; whether it (hanging or poisoning) is going to affect the health of the developing foetus? There are so many factors, which determine the fate of the embryo. There

was an unusual case reported by Beherab et al[9], about a pregnant woman who delivered a healthy male baby, following suicide by hanging. At the scene, the lady was found hanging in her house. The live healthy newborn baby was found lying on the ground with the umbilical cord in situ and placenta inside the uterus. [9]

Kerosene is an aliphatic hydrocarbon. Ingestion of kerosene causes hypoxia mainly due to CNS depression. The usual symptoms are giddiness, blurred vision, cyanosed face, dyspnoea and drowsiness. Coma may precede death. Aspiration of kerosene and its fumes produces chemical pneumonitis. Kerosene spreads easily and rapidly in the lungs due to its low surface tension. Maintaining ventilatory status during treatment and oxygen supplementation is of greater help.[10]

CONCLUSION

Incidence of suicide is coupled with stressful events. Survival after the episode of hanging depends on various factors like, complete or partial hanging, type and situation of ligature, type of knot and the delay for hospitalisation. The prognosis is good in cases of early hospitalisation without any major neurological deficit. Outcome of the pregnancy may not be hampered in early recovery. Respiratory distress due to hanging and pulmonary oedema as snag of kerosene poisoning, may not affect the health of the developing foetus. The further research is incalculably rewarding in such cases.

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Photograph 1

Photograph 2

Photograph 3

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Study of Effect of Substance abuse on the Pulmonary Function Tests in Rural Community in Western Maharashtra

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ABSTRACT

Background: In India substance abuse is a common habit prevalent in both urban and rural areas. Cigarette and bidi smoking, tobacco chewing, has extensive effects on respiratory function and is clearly implicated in the etiology of a number of respiratory diseases. **Objectives:** 1) to study and compare the pulmonary function tests among smokers and non-smokers in a rural area. 2) To study the role of possible associated factors and relation to type, quantity and duration of common substances abused on the pulmonary function tests. **Setting**: Pravara Rural Hospital, Loni, District Ahmednagar, Maharashtra. **Study design**: Cross sectional study. **Materials & Methods**: The pulmonary function tests were assessed on computerized spirometer in 200 male subjects, having habit of substance abuse, in Loni village of Ahmednagar district in Western Maharashtra. **Statistical analysis**: SPSS Statistical Software version 16.0. **Results & Conclusion**: Almost all the pulmonary function parameters were significantly reduced in smokers as compared to other substances of abuse liability and obstructive pulmonary impairment was commonest. By spirometry a spectrum of pulmonary disorders may be detected at an early stage and subsequent morbidity can be minimized.

Key words: Substance abuse, Spirometry, Pulmonary functions, Rural area

INTRODUCTION

The epidemic of substance abuse in young generation has assumed alarming dimensions in India. Changing cultural values, increasing economic stress and dwindling supportive bonds are leading to initiation into substance abuse. According to the World Health Organization (WHO) substance abuse is persistent or sporadic drug use inconsistent with or unrelated to acceptable medical practice[1]. About 190 million people all over the world consume one drug or the other[2]. This Drug addiction causes immense human distress and the illegal production and distribution of drugs have spawned crime and violence worldwide.

Every year, June 26 is celebrated as International Day against Drug Abuse and Illicit Trafficking. It is an exercise undertaken by the world community to sensitize the people in general and the youth in particular, to the menace of drugs. Cannabis, heroin, and pharmaceutical drugs are the most frequently abused drugs in India[3]. In India smoking is a common habit prevalent in both urban and rural areas irrespective of mode of smoking i.e. cigarettes, bidis, pipes, cigar, hookah etc.

The Adolescent drug abuse is one of the major areas of concern in adolescent and young people's behavior. It is estimated that, in India, by the time most boys reach the ninth grade, about 50 percent of them have tried at least one of the substance of

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abuse nature[4]. In last three decades, many epidemiological surveys have been carried out in India to assess the prevalence of substance abuse. At the national and cross-national level, there has to be a concerted effort of all the countries in managing the issue of substance abuse, taking into account the local socio-cultural and political scenarios.

MATERIALS AND METHODS

The present cross sectional study was conducted in Pravara Rural Hospital of Rural Medical College, PIMS, Loni, in district Ahmednagar, Maharashtra. The study population included 200 male subjects having habit of substance abuse, of one type or the other, aged between 30-60 years. Individuals with history of smoking cigarettes / bidis daily for at least one year were considered as smokers. The materials used in the study were a computerized RMS Med-spirometer, weighing machine, measuring tape and Blood Pressure set. The spirometer records the amount of air and the rate of air that is breathed in and out over a specified time.

PROCEDURE OF SPIROMETRY

1. The subject is asked to sit comfortably in a chair.
2. The complete procedure is explained, all doubts if any are cleared.
3. Subject is instructed to breathe in fully by deep inspiration with nostrils closed by putting a soft nose clip.
4. Seal the lips around the sterile mouthpiece of spirometer and forcefully expire the air out.
5. Repeat the test until three acceptable and reproducible results are obtained.

The highest FEV_1 and FVC values are recorded, out of the three spirograms. The observations of the study were analyzed by statistical methods like percentages, chi square test and t-test of significance.

OBSERVATIONS

In the present study it was observed that there was no significant difference in the mean physical parameters like age, height, weight, body mass index and body surface area by calculating mean and standard deviation in different substance abusers (Table 1).

Most of the smokers smoked only bidi (52.0%) followed by only cigarettes (9.0%). Tobacco chewers (Gutkha, Panmasala, Khaini, Pan, Mishri etc.) were 24.0%, 12.0% were alcoholics and only 3.0% were involved in hard drug abuse (Canabis, i.v.drug use, opium, ganja, brown sugar etc.) (Table 2).

All Pulmonary function parameters like FVC, FEV1, FEV_1/FVC, PEFR, $FEF_{25-75\%}$ and MVV showed statistically highly significant association between smokers and non-smokers by applying unpaired t-test of significance ($p < 0.001$). The obstructive lung changes were most common and were observed predominantly in smokers (26.27%) as compared to other substance abusers (Table 3).

DISCUSSION

In the present study it was observed that there was no significant difference in the mean physical parameters like age, height, weight, body mass index and body surface area of substance abusers. None of individuals smoked tobacco in any form other than bidis or cigarettes. Most smokers were bidi smokers. In India, tobacco is consumed mainly in the form of bidis, followed by smokeless tobacco and cigarettes. Bidi smoke may be more injurious because bidi contains unrefined form of tobacco as compared to cigarettes. Cigarette smoking has extensive effects on respiratory function and is clearly implicated in the etiology of a number of respiratory diseases, particularly chronic bronchitis, emphysema, and bronchial carcinoma. All Pulmonary function parameters showed statistically highly significant association between smokers and non-smokers by applying unpaired t-test of significance ($p < 0.001$).

In Uttar Pradesh, Dube and Handa [5] reported that 22.8 per 1000 were dependent on alcohol and drugs while Thacore [6] from Lucknow gave a figure of 18.55 per 1000. Various epidemiological surveys also revealed that 20-40% of subjects above 15 years are current users of alcohol and 10% of them are regular or excessive users[7, 8]. In a rural population of Uttar Pradesh alcohol was found to be the commonest substance abused (82.5%) followed by cannabis (16.1%).[5-6]

Varma et al [9] found that rates of current use of alcohol in Punjab were 45.9% in Jalandhar and 27.7% in Chandigarh whereas it was 28.1% in rural areas of Punjab[10]. Shukla BR [11] reported that 38.3% of the rural population in Uttar Pradesh was habitual substance users. In a study conducted in rural community in Bihar prevalence of alcohol/drug use was found to be 28.8% of the study population[12].

CONCLUSION

The pulmonary function tests were assessed by using a computerized Spirometer in 200 male substance abusers. The present study reveals the effect of type, duration and pattern of substance abuse in rural community of India. Bidi smoking was most common as the study setting was in rural India. Almost all the pulmonary function parameters were significantly reduced in smokers as compared to non smoker substance abusers and obstructive pulmonary impairment was

Table 1: Physical Characteristics of Substance Abusers

Variables	Smoking Mean ± 2 S.D.	Tobacco chewing Mean ± 2 S.D.	Alcohol Mean ± 2 S.D.	Others (Cannabis, charas, bhang, or ganja) Mean ± 2 S.D.
Age (years)	48.26± 10.09	48.10 ± 10.54	45.15 ± 12.14	46.18 ± 13.57
Height (m)	1.66 ±0.11	1.67 ± 0.12	1.62 ± 0.32	1.61 ± 0.62
Weight (Kg)	65.4 ± 8.8	64.4 ± 11.5	61.4 ± 13.7	60.4 ± 2.5
Body Mass Index	23.52 ± 3.20	23.80 ± 3.37	22.51 ± 2.68	24.86 ± 2.30
Body surface area	1.71 ± 0.06	1.74 ± 0.14	1.54 ± 0.23	1.68 ± 0.48

Table 2: Distribution of types of Substances Abused

Type of substances abused	No.	%
Bidi smoking	104	52.0
Cigarette smoking	18	9.0
Tobacco chewing (Gutkha/Pan masala/ Pan/ Khaini/Mishri)	48	24.0
Alcohol	24	12.0
Others (Cannabis products, charas, bhang, or ganja, etc.)	6	3.0
Total	200	100.0

Table 3: Interpretation of PFT results in Substance Abusers

PFT Results	Smokers No. (%)	Tobacco chewers No. (%)	Alcoholics No. (%)	Others No. (%)
Obstructive	32 (26.27)	11 (22.91)	2 (8.33)	1 (16.66)
Restrictive	8 (6.58)	4 (8.33)	2 (8.33)	1 (16.66)
Mixed	18 (14.76)	2 (4.16)	1 (4.16)	0 (0.0)
Normal	64 (52.45)	31 (64.58)	19 (79.16)	4 (66.66)
Total	122 (100.0)	48 (100.0)	24 (100.0)	6 (100.0)

Chi square value = 20.84, $p < 0.001$, highly significant.

commonest in all the substance abusers. Efforts should be made to educate the community about the harmful effects of substance abuse.

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Short Review

Cyberkinife vs Cybercrime

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Singh Bhoopendra**

The era of computer and electronic data along with information technology may be the new millennium dawned, that it has gained popularity in every aspect of our lives and making us addict and dependence. There is no doubt that the technology has tremendous capacity to provide the tools to evolve the new era in new direction in all aspects including medical, health, defense, financing, education, communication etc. If we quote an example of drugs which remove the pain or disease of sufferer and same time if same drugs made to misuse it give pain or injury to the parsons. In the same way, the judicial use of computer and IT give tremendous benefits to the society in all aspects and if misused it produce more harm and pain to society and human beings.

WHAT DO YOU MEAN BY TERM CYBER

It is a prefix used in a growing number of terms to describe new things that are being made possible by the spread of computers. Anything related to the internet also falls under the cyber category. Some words that use the cyber prefix include the following:

CYBERCAFE

The cafes whose customers sit at computer terminals and log on to the internet while they eat and drink.

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CYBERCRIME: the crime committed using a computer and the internet to steal a person's identity or sell contraband or stalk victims or disrupt operations with malevolent programs.

CYBERCULTURE: The culture that emerges from the use of computers for communication and entertainment and business.

CYBER FORENSICS: It is the discovery, analysis, and reconstruction of evidence extracted from any element of computer systems, computer networks, computer media, computer peripherals and other electronic equipment that allow the forensics experts to present and put forward the best evidence in a court of law.

CYBERNATE: The cybernate has control a function, process, or creation by a computer.

CYBERNAUT: A computer user who uses the internet; someone who explores cyberspace.

CYBERNETICS: The field of science concerned with processes of communication and control (especially the comparison of these processes in biological and artificial systems)

CYBERPHOBIA: Irrational fear of computers or technology

CYBERPUNK: A programmer, who breaks into computer systems in order to steal or change or destroy information as a form of cyber-terrorism,

CYBERSEX: the sexual arousal involving communication on the internet

CYBERSPACE: A computer network consisting of a worldwide network of computer networks that use the TCP/IP network protocols to facilitate data transmission and exchange.

CYBERWAR

An assault on electronic communication networks

CYBORG: A human being whose body has been taken over in whole or in part by electromechanical devices

CYBERSUICIDE : An Internet suicide pact (cybersuicide pact) is a suicide pact made between individuals who meet on the Internet.

CYBER-TERRORIST: A programmer who breaks into computer systems in order to steal or change or destroy information as a form of cyber-terrorism.

CYBERKNIFE

The **CyberKnife** is a frameless image guided robotic radiosurgery system. It is invented by John R. Adler, a Stanford University Professor of Neurosurgery & Radiation Oncology[1]. The cyberkinfe system is based on two main elements that are (1) the radiation produced from a small linear particle accelerator and (2) a robotic arm which allows the energy to be directed at any part of the body from any direction.

Once the tumour is marked with help of an X-ray opaque material, the CyberKnife system may used treat. It is a method of delivering radiotherapy, with the intention of targeting treatment more accurately than standard radiotherapy.[1]

Its uses pencil beams of radiation which can be directed at any part of the body, from any direction with the help of robotic arm. The system tracks the tumour's position; detects any movements of' the tumour or patient and automatically corrects its positioning. It then targets the tumour with multiple beams of high energy radiation, destroying abnormal tissue without damaging surrounding areas. The treatment is so accurate that it's now possible to treat tumours previously through to be inoperable. Although the results of the treatment do not always show immediately, in most cases, the procedure will initially stop the growth the tumour before gradually reducing their size.

As there is no open surgery the risk complications normally associated with an operation are eliminated, as is the need for a long recovery time, it makes treatment suitable even for those who are not well enough to cope with surgery, most patients leave the hospital the same day.

APPLICATION AND ADVANTAGES OF CYBER KNIFE

1. Noninvasive procedure
2. Pain free and bloodless
3. Alternative to conventional open surgery
4. Can be generally done as an OPD patient procedure
5. No anaesthetic required
6. No recovery time
7. Lesions/tumor's that have previously had the maximum dose of standard radiation can be treated.
7. Lower risk than with conventional surgery
8. Treatments of lesion / tumours previously inoperable by surgery or standard radiation
9. Can often achieve comparable or better outcomes than conventional surgery
10. The ability to give stronger, more accurate doses or radiation directly to tumours
11. Means that the number of treatment doses can be shortened
12. Immediate return to normal activity

CYBER CRIMES

The first recorded cyber crime took place in the year 1820. The era of modern computers, however, began with the analytical engine of Charles Babbage.[2] Cyber crime is an evil having its origin in the growing dependence on computers in modern life. In a day and age when everything

from microwave ovens and refrigerators to nuclear power plants is being run on computers, cyber crime has assumed rather threatening implications.

Today, directly or indirectly computers play a major role in almost every crime that is committed. Every crime that is committed is not necessarily a computer crime, but it does mean that law enforcement must become much more computer literate just to be able to keep up with the criminal element. According to Donn Parker[3], "For the first time in human history, computers and automated processes make it possible to possess, not just commit, a crime. Today, criminals can pass a complete crime in software from one to another, each improving or adapting it to his or her own needs."[3]

The majority of what are termed "cyber-crimes" is really violations of longstanding criminal law, perpetrated through the use of computers or information networks. The problems of crime using computers will rarely require the creation of new substantive criminal law; rather, they suggest need for better and more effective means of international cooperation to enforce existing laws.

On the other hand, there are new and serious problems posed by attacks against computers and information systems, such as malicious hacking, dissemination of viruses, and denial-of-service attacks. Recently, Google, the world's most popular search engine has planned to stop its service to China's 384 million netizens due to a sophisticated cyber attach take place in China that resulted in theft of its intellectual property.[4] Such attacks should be effectively prohibited, wherever they may originate. At the same time, it is to be remembered that often the most effective way to counter such attacks is to quickly deploy technical countermeasures; therefore, to the extent that well-meaning but overbroad criminal regulations diminish the technical edge of legitimate information security research and engineering, they could have the unintended consequence of actually undermining information security.

WHAT IS A COMPUTER CRIME ?

1. Criminals can operate anonymously over the Computer Networks.
2. Hackers Invade Privacy.
3. Hackers destroy "Property" in the form of Computer Files or Records.
4. Hackers injure other Computer users by destroying Information Systems.
5. Computer Pirates Steal Intellectual Property.

CLASSIFICATION OF CYBER CRIMES

The Information Technology Act deals with the following cyber crimes along with others:

1. Tampering with computer source documents
2. Hacking
3. Publishing of information, which is obscene in electronic form
4. Child Pornography
5. Accessing protected system
6. Breach of confidentiality and privacy

Cyber crimes other than those mentioned under the IT Act

1. Cyber Stalking
2. Cyber squatting
3. Data Diddling
4. Cyber Defamation
5. Trojan Attack
6. Forgery
7. Financial crimes
8. Internet time theft
9. Virus/worm attack
10. E-mail spoofing
11. Email bombing
12. Salami attack
13. Web Jacking

Offences Related to Computer which is Punishable under the Sections of IT Act 2008

The various offences related to computer which are punishable under the sections of IT Act 2008 (modified IT Act 2000) are as follows:

Section under IT Act, 2008	Offences	Punishments
65	Tampering with Computer Source Documents	Imprisonment up 3 years, or with fine which may extend up to two lakh rupees, or with both
66	Dishonestly, or fraudulently, does any act referred to in section 43	Imprisonment for a term which may extend to two three years or with fine which may extend to five lakh rupees or with both.
66 A	Punishment for sending offensive messages through communication service, etc. (Introduced vide ITAA 2008)	Imprisonment for a term which may extend to two three years and with fine.
66 B	Punishments for dishonestly receiving stolen computer resource or communication device (Inserted Vide ITA 2008)	Imprisonment of either description for a term which may extend to three years or with fine which may extend to rupees one lakh or with both.
66C	Punishment for identity theft. (Inserted Vide ITA 2008)	Imprisonment of either description for a term which may extend to three years and shall also be liable to fine which may extend to rupees one lakh.
66D	Punishment for cheating by personation by using computer resource (Inserted Vide ITA 2008)	Imprisonment of either description for a term which may extend to three years and shall also be liable to fine which may extend to one lakh rupees.
66E	Punishment for violation of privacy. (Inserted Vide ITA 2008)	Imprisonment which may extend to three years or with fine not exceeding two lakh rupees, or with both
66F	Punishment for cyber terrorism	Imprisonment which may extend to imprisonment for life'
67	Punishment for publishing or transmitting obscene material in electronic form (Amended vide ITAA 2008)	Imprisonment of either description for a term which may extend to five years and also with fine which may extend to ten lakh rupees.
67 A	Punishment for publishing or transmitting of material containing sexually explicit act,etc. in electronic form (Inserted vide ITAA 2008)	Imprisonment of either description for a term which may extend to seven years and also with fine which may extend to ten lakh rupees.
67 B	Punishment for publishing or transmitting of material depicting children in sexually	Imprisonment of either description for a term which may extend to seven years and also with fine which may extend to ten lakh rupees.

Computer Related Crimes Covered under IPC and Special Laws		
Section under IPC	**Offences**	**Punishments**
383	Web-Jacking or Extortion	Punishment as per sec. 384 of IPC
420	Bogus websites, cyber frauds	imprisonment of either description for a term which may extend to seven years, or with fine, or with both
463	Forgery of documents or electronic records or Email spoofing	Punishment as per sec. 465 of IPC
465	Punishment for forgery	Imprisonment of either description for a term which may extend to two years, or with fine, or with both
499	Sending defamatory messages by email	Under IPC Sec 500
500	E-Mail Abuse	Imprisonment for a term which may extend to two years, or with fine, or with both
503	Sending threatening messages by email	Under IPC Sec. 504 that is imprisonment of either description for a term which may extend to two years, or with fine, or with both

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The Council of Science Editors (CSE) has produced "Editorial Policy Statements" that cover the responsibilities and rights of editors of peer-reviewed journals. Publishers who would like to incorporate these Statements into their review and publication process are encouraged to link to: http://www.councilscienceeditors.org/services/draft_approved.cfm.

INTRODUCTION

The formal component of the scholarly communication system, that is to say the publication of an article in a peer reviewed learned journal, serves many purposes outside of simple communication. It is a building block in the development of a coherent and respected network of knowledge. It is prima facie evidence for the quality and impact of the research work of its authors and by extension the institutions that support them. It supports, and is itself an example, of the scientific method. For all these reasons and more it is important to lay down standards of expected ethical behaviour by all parties involved in the act of publishing: the author, the journal editor, the peer reviewer, the publisher and the society for society-owned or sponsored journals.

These guidelines have been written with all these requirements in mind but especially recognising that it is an important role of the publisher to support the huge efforts made by journal editors, and the often unsung volunteer work undertaken by peer reviewers, in maintaining the integrity of the scholarly record. Although ethical codes inevitably concentrate on the infractions that sometimes occur, it is a tribute to scholarly practice that the system works so well and that problems are comparatively rare. The publisher has a supporting, investing and nurturing role in the scholarly communication process but is also ultimately responsible for ensuring that best practice is followed in its publications.

These guidelines are designed specifically for primary research journals, but may also be relevant for review and professional publications as well. Individual journals will often have more elaborate or more distinct ethical procedures, generally reflected in their instructions document, and many journals also accept and are in many cases founding participants with respect to discipline-specific standards or standard-setting bodies such as ICMJE, CONSORT, and the like (see references below).

Elsevier, as the world's leading journal publisher, takes its duties of guardianship over the scholarly record extremely seriously. Our journal programmes record "the minutes of science" and we recognise our responsibilities as the keeper of those "minutes" in all our policies,

not least the ethical guidelines that we have here adopted.

Elsevier is adopting these policies and procedures that support editors, reviewers and authors in performing their ethical duties under these guidelines. We are committed to ensuring that the potential for advertising, reprint or other commercial revenue has no impact or influence on editorial decisions. We will provide help in communications with other journals and/or publishers where this is useful to editors, and we are working with other publishers and industry associations to set standards for best practices on ethical matters, errors and retractions. Finally, Elsevier is prepared to provide specialised legal review and counsel if necessary.

DUTIES OF EDITORS

Publication decisions

The Editor of a learned journal is solely and independently responsible for deciding which of the articles submitted to the journal should be published, often working in conjunction with the relevant society (for society-owned or sponsored journals). The validation of the work in question and its importance to researchers and readers must always underwrite such decisions. The Editor may be guided by the policies of the journal's editorial board and constrained by such legal requirements as shall then be in force regarding libel, copyright infringement and plagiarism. The editor may confer with other editors or reviewers (or society officers) in making this decision.

Fair play

An editor should evaluate manuscripts for their intellectual content without regard to race, gender, sexual orientation, religious belief, ethnic origin, citizenship, or political philosophy of the authors.

Confidentiality

The editor and any editorial staff must not disclose any information about a submitted manuscript to anyone other than the corresponding author, reviewers, potential reviewers, other editorial advisers, and the publisher, as appropriate.

Disclosure and Conflicts of interest

Unpublished materials disclosed in a submitted manuscript must not be used in an editor's own research without the express written consent of the author. Privileged information or ideas obtained through peer review must be kept confidential and not used for personal advantage.

Editors should recuse themselves (i.e. should ask a co-editor, associate editor or other member of the editorial board instead to review and consider) from considering manuscripts in which they have conflicts of interest resulting from competitive, collaborative, or other relationships or connections with any of the authors, companies, or (possibly) institutions connected to the papers.

Vigilance over published record

An editor presented with convincing evidence that the substance or conclusions of a published paper are erroneous should coordinate with the publisher (and/society) to promote the prompt

publication of a correction, retraction, expression of concern, or other note, as may be relevant.

Involvement and cooperation in investigations

An editor should take reasonably responsive measures when ethical complaints have been presented concerning a submitted manuscript or published paper, in conjunction with the publisher (or society). Such measures will generally include contacting the author of the manuscript or paper and giving due consideration of the respective complaint or claims made, but may also include further communications to the relevant institutions and research bodies.

DUTIES OF REVIEWERS

Contribution to Editorial Decisions

Peer review assists the editor in making editorial decisions and through the editorial communications with the author may also assist the author in improving the paper. Peer review is an essential component of formal scholarly communication, and lies at the heart of the scientific method. Elsevier shares the view of many that all scholars who wish to contribute to publications have an obligation to do a fair share of reviewing.

Promptness

Any selected referee who feels unqualified to review the research reported in a manuscript or knows that its prompt review will be impossible should notify the editor and excuse himself from the review process.

Confidentiality

Any manuscripts received for review must be treated as confidential documents. They must not be shown to or discussed with others except as authorised by the editor.

Standards of Objectivity

Reviews should be conducted objectively. Personal criticism of the author is inappropriate. Referees should express their views clearly with supporting arguments.

Acknowledgement of Sources

Reviewers should identify relevant published work that has not been cited by the authors.Any statement that an observation, derivation, or argument had been previously reported should be accompanied by the relevant citation. A reviewer should also call to the editor's attention any substantial similarity or overlap between the manuscript under consideration and any other published paper of which they have personal knowledge.

Disclosure and Conflict of Interest

Unpublished materials disclosed in a submitted manuscript must not be used in a reviewer's own research without the express written consent of the author. Privileged information or ideas obtained through peer review must be kept confidential and not used for personal advantage.

Reviewers should not consider manuscripts in which they have conflicts of interest resulting from competitive, collaborative, or other relationships or connections with any of the authors, companies, or institutions connected to the papers.

DUTIES OF AUTHORS

Reporting standards

Authors of reports of original research should present an accurate account of the work performed as well as an objective discussion of its significance. Underlying data should be represented accurately in the paper. A paper should contain sufficient detail and references to permit others to replicate the work. Fraudulent or knowingly inaccurate statements constitute unethical behaviour and are unacceptable.

Review and professional publication articles should also be accurate and objective, and editorial 'opinion' works should be clearly identified as such.

Data Access and Retention

Authors may be asked to provide the raw data in connection with a paper for editorial review, and should be prepared to provide public access to such data (consistent with the ALPSP-STM Statement on Data and Databases), if practicable, and should in any event be prepared to retain such data for a reasonable time after publication.

Originality and Plagiarism

The authors should ensure that they have written entirely original works, and if the authors have used the work and/or words of others, this has been appropriately cited or quoted.

Plagiarism takes many forms, from 'passing off' another's paper as the author's own paper, to copying or paraphrasing substantial parts of another's paper (without attribution), to claiming results from research conducted by others. Plagiarism in all its forms constitutes unethical behaviour and is unacceptable.

Multiple, Redundant or Concurrent Publication

An author should not in general publish manuscripts describing essentially the same research in more than one journal of primary publication. Submitting the same manuscript to more than one journal concurrently constitutes unethical behaviour and is unacceptable.

In general, an author should not submit for consideration in another journal a previously published paper.

Publication of some kinds of articles (eg, clinical guidelines, translations) in more than one journal is sometimes justifiable, provided certain conditions are met. The authors and editors of the journals concerned must agree to the secondary publication, which must reflect the same data and interpretation of the primary document. The primary reference must be cited in the secondary publication. Further detail on acceptable forms of secondary publication can be found at www.icmje.org.

Acknowledgement of Sources

Proper acknowledgment of the work of others must always be given. Authors should cite publications that have been influential in determining the nature of the reported work. Information obtained privately, as in conversation, correspondence, or discussion with third parties, must not be used or reported without explicit, written permission from the source. Information obtained in the course of confidential services, such as refereeing manuscripts or grant

applications, must not be used without the explicit written permission of the author of the work involved in these services.

Authorship of the Paper

Authorship should be limited to those who have made a significant contribution to the conception, design, execution, or interpretation of the reported study. All those who have made significant contributions should be listed as co-authors. Where there are others who have participated in certain substantive aspects of the research project, they should be acknowledged or listed as contributors.

The corresponding author should ensure that all appropriate co-authors and no inappropriate co-authors are included on the paper, and that all co-authors have seen and approved the final version of the paper and have agreed to its submission for publication.

Hazards and Human or Animal Subjects

If the work involves chemicals, procedures or equipment that have any unusual hazards inherent in their use, the author must clearly identify these in the manuscript. Ethical Guidelines for Journal Publication Version 1.0, October 2006.

If the work involves the use of animal or human subjects, the author should ensure that the manuscript contains a statement that all procedures were performed in compliance with relevant laws and institutional guidelines and that the appropriate institutional committee(s) have approved them. Authors should include a statement in the manuscript that informed consent was obtained for experimentation with human subjects. The privacy rights of human subjects must always be observed.

Disclosure and Conflicts of Interest

All authors should disclose in their manuscript any financial or other substantive conflict of interest that might be construed to influence the results or interpretation of their manuscript. All sources of financial support for the project should be disclosed.

Examples of potential conflicts of interest which should be disclosed include employment, consultancies, stock ownership, honoraria, paid expert testimony, patent applications/ registrations, and grants or other funding. Potential conflicts of interest should be disclosed at the earliest possible stage.

Fundamental errors in published works

When an author discovers a significant error or inaccuracy in his/her own published work, it is the author's obligation to promptly notify the journal editor or publisher and cooperate with the editor to retract or correct the paper. If the editor or the publisher learn from a third party that a published work contains a significant error, it is the obligation of the author to promptly retract or correct the paper or provide evidence to the editor of the correctness of the original paper.

Further reading

http://www.consort-statement.org/

(standards for randomized trials)

http://www.publicationethics.org.uk/

(COPE—Committee on Publication Ethics)

http://www.icmje.org/

(Uniform requirements for manuscripts submitted to biomedical journals)

http://www.wame.org/

(World Association of Medical Editors)

http://www.stm-assoc.org/

(The STM trade association— see the public documents section for "Preservation of the Objective Record of Science — An STM Guideline")

DECLARATION FORM

(Should be sent with original signatures by all authors alongwith one hard copy of the article)

I hereby submit that the paper entitled "…….....” along with two photographs of mine. This paper is my original work and has neither been published anywhere else, electronically or in print, nor has been submitted elsewhere simultaneously for publication. I have agreed for this paper to be published in your renowned journal "**Indian Journal of Forensic Medicine and Pathology**".

I vouchsafe that the authorship of this article will not be contested by anyone whose names are not listed by me here.

The article contains no libelous or other unlawful statements and does not contain any materials that violate any personal or proprietary rights of any other person or entity.

We also agree to the authorship of the paper in the following sequence:

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