

Pattern of Fatal Compression of the Neck-A Five Year Study in Lahore

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This is a five-year study to know the pattern of deaths due to compression of the neck in our country. Out of a total of 4833 autopsies, 91 cases of fatal compression of the neck were selected and studied regarding Age, Sex, Type of compression of neck, Manner of death, Level of ligature mark, Presence of non-specific signs of asphyxia and Fracture of hyoid bone. Cases in which the cause of death was other than compression of the neck were excluded from the study. Cases of fatal compression of neck constituted 1.88% of all autopsies conducted during 1984-1989 at K. E. Medical College, Lahore. Hanging constituted 57%, Ligature strangulation 21%, Throttling 18%, and Compression by other means 4% of the total cases. Victims were primarily 11-30 years of age (67%) and predominantly males with a male to female ratio of 2:1. Fracture of the hyoid bone is twice as likely to occur in those above 40 years of age in deaths due to compression of neck.

Key words: Compression of neck, suicide, homicide

Incidence of deaths due to compression of neck occurs all over the world and has been studied by many authors^{1,2,3,4,5,6}. There is difference in description of pattern of deaths due to compression of neck among the authors^{1,2,3,4,6,14}. There is no such study carried out in Pakistan except Saeed et al⁵ who mainly observed fracture of hyoid bone in deaths due to compressive neck injuries.

In order to know the patterns of deaths due to compression of the neck in our country we conducted a five year study of all autopsies performed at the Department of Forensic Medicine King Edward Medical College Lahore between April 1984 and march 1989.

Ninety one cases in which the cause of death was compression of the neck were selected for the present study. Cases in which injuries were present on the neck but the cause of death was other than compression of the neck were excluded from the study.

The selected cases were studied regarding Age, Sex, Type of compression of the neck, Manner of death, Level of ligature mark, Presence of non-specific signs of asphyxia, other associated injuries and fracture of the hyoid bone.

Materials and Methods

A total of 4833 autopsies were carried out at the department of forensic medicine, King Edward Medical College Lahore in the five-year period under study. In the 91 cases selected on the basis of cause of death being compression of neck, the various parameters were extracted from autopsy reports, police inquest reports and death certificates.

Results

The 91 cases of death due to compression of the neck constituted 1.88% of the total of 4833 autopsies conducted during the period under study.

Types of compression of the neck

The cases under study were divided into four types depending on the method of compression

1. Hanging
2. Ligature Strangulation
3. Throttling
4. Compression by other means i.e. by forearm, stick, etc.

The Frequency of occurrence of the above is shown in table I.

Age And Sex Distribution of Victims of Fatal Neck Compression

The victims were predominantly between the ages of 16-30 years (58.24%). The third decade of life showed the highest incidence having 34 cases (37.36%).

Males were more commonly the victims showing an overall male to female ratio of 1.93:1 except in infants where the ratio was reversed to 1:3. This gender difference was most marked in the sixth decade of life showing a ratio of 5:1 and least marked in the second decade having a ratio of 1.6:1 as evident from table II.

Age and Sex Distribution of Types of Fatal Neck Compression

Victims of hanging and ligature strangulation were primarily in the second and third decades of life. Victims of throttling on the other hand were mostly at extremes of age i.e. infants and the sixth decade of life.

Males were the predominant victims in cases of hanging showing a male to female ratio of 2.7:1. There was a slight male preponderance in cases of ligature strangulation (1.11:1) but this was reversed to 1: 3 in the age of peak incidence (21-30 years) as reflected in table III.

Manner of Death in Fatal Compression of Neck

The manner of death is the legal classification of death, whether it be natural, suicide, homicide, accident or undeterminable. As all the autopsies conducted during the

present study were those of unnatural deaths, the manner of death was divided into homicide, suicide, accident and undeterminable. Out of the total of 91 cases, 45.05% were homicidal, 49.45% were suicidal and in 5.49% the exact manner of death could not be determined due to natural or acquired limitations. No case of accidental compression of the neck was autopsied during the period of study.

In homicidal deaths the male to female ratio was 1.27:1. Homicidal compression of the neck in males were highest in those 1-10 years of age and in those over fifty where 66.66% of deaths due to compression of neck were homicidal in nature. In females the highest percentile of homicides were at the two extremes of age i.e. infants (75%) and those above 60 years (33.33%).

In cases of suicide the male to female ratio was 2.46:1 and the highest probability of suicide in males is 41-50 years of age (50%) and in females is 11-20 years (28.57%).

All suicidal deaths were due to hanging. Out of 52 death due to hanging 45 cases were of suicide (86.53%). Of these 45 cases, 32 were male and 13 were female. In 5 out of 52 cases, manner of death could not be exactly determined. Sixty percent of these were in the third decade of life and 20% each in the fourth and fifth decade of life. (Tables IV & V).

Level of Compression of Neck in Hanging & Ligature Strangulation

A total of 71 cases of ligature compression were studied, 52 cases of hanging and 19 cases of ligature strangulation. Out of the 52 cases of hanging, the ligature mark was above the thyroid cartilage in 40 cases (76.92%) and at the level of the thyroid cartilage in 12 cases (23.07%). In the two cases of homicidal hanging the ligature mark was above the thyroid cartilage in both cases (100%).

In the 45 cases of suicidal hanging the ligature mark was above the thyroid cartilage in 35 cases (77.77%) and at the level of thyroid cartilage in 10 cases (22.22%). No case with ligature mark below the level of thyroid cartilage was found.

In ligature strangulation, the ligature mark was above the level of the thyroid cartilage in 3 cases (15.78%), at the level of the thyroid cartilage in 10 cases (52.63%) and below the level of the thyroid cartilage in 6 cases (31.57%) as shown in table VI.

Associated Injuries on Neck

Injuries in the form of abrasion and bruises were found in 20 out of 91 cases. They were present in 14 out of 16 cases of throttling, 2 out of 19 cases of ligature strangulation and 3 out of 52 cases of hanging.

Injuries other than Neck

These were present in a total of 27 out of 91 cases, 21 out of 41 cases of homicide, in 4 out of 45 cases of suicidal hanging and in 2 out of 5 cases of compression in which

the exact manner of death could not be determined.

Non Specific Signs of Asphyxia

Three cardinal signs of asphyxial deaths i.e. congestion, cyanosis and petechial hemorrhages were studied. Congestion was present in 74 cases, petechial hemorrhages were noted in 68 cases and cyanosis was found in 52 cases.

Fracture of Hyoid Bone

Fracture of hyoid bone was found in a total of 20 cases out of 91 [21.97%]. It's occurrence was most prevalent in throttling where it was present in 9 out of 16 cases (56.25%). In ligature strangulation it occurred in 5 out of 19 cases (26.31%).

In hanging it occurred in only 4 out of 52 cases (7.69%) and it was present in 2 (50%) out of 4 cases of compression of neck by other means.

Table 1. Types of fatal compression of neck

Type	No	%age
Hanging	52	57.14
Ligature Strangulation	19	20.87
Throttling	16	17.58
Compression by other means	04	4.39
Total	91	99.98

Table 2. Age and sex distribution of victims

Age in Years	Total (n = 91)	Male (n = 60)	Female (n = 31)
< 1	4 (4.39%)	1 (1.09%)	3 (3.29%)
1-10	3 (3.29%)	2 (2.19%)	1 (1.09%)
11-20	26 (28.57%)	16 (17.58%)	10 (10.98%)
21-30	34 (37.36%)	22 (24.17%)	12 (13.18%)
31-40	11 (12.08%)	9 (9.89%)	2 (2.19%)
41-50	4 (4.38%)	3 (3.29%)	1 (1.09%)
51-60	6 (6.59%)	5 (5.49%)	1 (1.09%)
> 60	3 (3.29%)	2 (2.19%)	1 (1.09%)

Table 3. Types of neck compression age+ sex analysis

Age (Years)	Total	Hanging (n=52)		Ligature Strangulation (n=19)		Throttling (n=16)		Compression by other means (n=4)	
		M	F	M	F	M	F	M	F
< 1	4	-	-	-	-	1	3	-	-
1-10	3	-	-	1	-	1	1	-	-
11-20	26	11	9	2	1	3	-	-	-
21-30	34	18	5	2	6	1	1	1	-
31-40	11	6	-	1	1	1	1	1	-
41-50	4	2	-	-	1	1	-	-	-
51-60	6	1	-	2	-	2	-	1	-
> 60	3	-	-	2	-	-	-	-	1
TOTAL	91	38	14	10	9	10	6	3	1

Table 4. Manner of death. age and sex distribution

Age (Yrs)	Total	Homicide		Suicide			Undetermined			
		Total	M	F	Total	M	F	Total	M	F
< 1	4	1	3	-	-	-	-	-	-	-
1-10	3	2	1	-	-	-	-	-	-	-
11-20	7	5	2	19	11	8	-	-	-	-
21-30	12	5	7	19	14	5	3	3	-	-
31-40	5	3	2	5	5	-	1	1	-	-
41-50	2	1	1	2	2	-	-	-	-	-
51-60	5	4	1	-	-	1	1	1	-	-
> 60	3	2	1	-	-	-	-	-	-	-
Total	41	23	18	45	32	13	5	5	-	-

Pattern of Fatal Compression of the Neck

Table 5. Manner of death in hanging

Age (Years)	Total	Homicide (n = 02)		Suicide (n = 45)		Undeterminable (n = 05)	
		M	F	M	F	M	F
< 1	-	-	-	-	-	-	-
1-10	-	-	-	-	-	-	-
11-20	20	-	1	11	8	-	-
21-30	23	1	-	14	5	3	-
31-40	6	-	-	5	-	1	-
41-50	2	-	-	2	-	-	-
51-60	1	-	-	-	-	1	-
> 60	-	-	-	-	-	-	-
Total	52	1	1	32	13	5	-

Table 6 Level of ligature in reference to thyroid cartilage

Level of ligature mark	Hanging			Ligature Strangulation
	Homicide	Suicide	Undetermined	Homicide
Above	2(100%)	35(77.77%)	3(60%)	3(15.78%)
At Level	-	10(22.22%)	2(40%)	10(52.63%)
Below	-	-	-	6(31.57)
Total	2(100%)	45(99.99%)	5(100%)	19(99.98)

Discussion

Our study revealed that compressive neck injuries occurred in 1.88% of all autopsies performed during the five-year period. Out of this 0.80% cases were of strangulation. These figures compare well to those given by other authors^{1,2} but were less than those given by Srivasta, Das & Tripathy³. The percentile of ligature strangulation's (48.71%) was higher, the incidence of throttling was similar and the incidence of compression of neck by other means was less than the figures quoted by Srivasta, Das & Tripathy³. The peak incidence of hanging was in 21-30 years of age (44.23%) while Bowen⁴ has shown a peak incidence in 50-59 years of age. The median age of hanging in our study was 23.1 years compared to 31 years mentioned by Guarner & Hanzlick⁶ for studies in U.S.A. In our study, the higher incidence of hanging in males (73.07%) as compared to females (26.92%) is contrary to the figures given by others⁴ and may be attributed to the increasing economic and social pressure with rising unemployment.

In cases of strangulation 58.97% were males and 41.02% females as against 30.77% and 69.23% given by others³. The peak incidence of strangulation was also in the third decade with 28.20% cases. Others³ have also shown a peak incidence in the same age although with a higher percentage (38.46%)

Majority of cases of hanging were suicidal (86.53%) while 3.84% cases were homicidal. About 9.61% cases were undeterminable due to putrefaction and other autopsy limitations. No case of accidental hanging was noted. This compares with 95% suicidal hangings and 5

% accidental hangings stated by Bowen⁴. This higher incidence of accidental hangings is because of cases of autoerotic hanging, something still un-reported in our part of the world.

The level of ligature was above the thyroid cartilage in 15.78%, at the level of thyroid cartilage in 52.63% and below it in 31.57% of cases of ligature strangulation. This finding is comparable to those observed by Srivasta³.

Fracture of the hyoid bone was present in 15 out of 78 cases (19.23%) below 40 years of age while above the 40 years of age, fracture of hyoid bone was found in 05 out of 13 cases (38.46%). This indicates a probability of fracture of hyoid bone of two times in those above 40 years of age and similar results have been found in other studies^{8,9,10,11,12,13}.

We thus conclude that

1. Deaths due to compression of the neck in our country are mainly because of hanging.
2. Suicide by hanging occurs at a younger age in our country than the west.
3. It is primarily males who commit suicide by hanging.
4. A ligature mark above the thyroid cartilage indicates death due to hanging while that below it is indicative of ligature strangulation. A ligature mark at the level of thyroid cartilage also goes in favor of it being due to ligature strangulation.
5. An absence of fracture of hyoid bone does not rule out compression of the neck even in those above 40 years of age.

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