

Pattern of Injuries to Neck Structures in Hanging Deaths- An Autopsy Study

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Abstract

Hanging has been favoured mode since time immemorial for its simplicity and efficacy in committing suicides. The rapid nature of death in hanging makes it one of the popular methods used in suicide. The present study carried out in the Department of Forensic Medicine and Toxicology, Karnataka Institute of Medical Sciences, Hubballi, from January to December 2016. Total 90 cases with history of hanging brought for autopsy were used as material for study. Rope 46.7% the commonest type of ligature material used followed by saree 38.9%. Atypical hanging observed in 67.8% of the cases, typical hanging observed in 32.2% of the cases with a fixed type of noose in 54.4% of the cases and 45.6% of the cases had running noose. In the present study 56.7% of the cases showed an oblique and incomplete ligature mark and 43.3% of the cases had complete and oblique ligature mark. In all the cases the ligature mark was situated above the level of thyroid cartilage. The features in appearance of ligature mark noted. The maximum cases showed a dry and hard ligature mark 27 cases (30%). One case each of thyroid cartilage and hyoid bone fractures was observed in males aged above 40 years.

Keywords: Hanging, Ligature material, Ligature mark, Noose, Hyoid bone, Thyroid cartilage

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Introduction:

Violent asphyxial deaths are one of the most important causes of unnatural deaths among which hanging and ligature strangulation are commonly encountered in the professional life of forensic experts during day to day autopsy. Death due to hanging is not unusual across the world; this makes the majority of asphyxial deaths.¹ Hanging is one of the 10-leading causes of death in the world, accounting for more than a million deaths annually.² In India, hanging is among the top five methods of

choice for committing suicide³ and one of the common methods of committing suicide along with poisoning, burning and drowning.⁴ Over the past 30 years the incidence of suicide by hanging has increased, especially among young adults.⁵

Hanging has been favoured mode since time immemorial for its simplicity and efficacy in committing suicides. The high incidences of suicidal hanging among the young adults impose an enormous socio economic burden on the society and are very sparingly reported from rural parts of India.⁶

The rapid nature of death in hanging makes it one of the popular methods used in suicide because it is more often painless, rapid and can occur even with partial suspension resulting from asphyxia, cardiac inhibition and obstruction of cerebral arterial flow or venous drainage. The commonly available objects and

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presence of relative isolation makes it a much adopted method.⁷

Hanging produces painless death for the victims and there is no costs involvement other than that of the ligature material. A thin rope around the neck will cause unconsciousness in 15 seconds.⁷

Visiting the scene of crime is very much helpful to ascertain circumstances and manner of hanging. It helps in differentiating suicidal hanging from homicidal hanging because deaths due to hanging as such create an area of curiosity and suspicion in minds of the people.

Materials and Methods

The present study is a cross sectional descriptive study which was carried out in the Department of Forensic Medicine and Toxicology, Karnataka Institute of Medical Sciences, Hubballi, from period of one year from January 1st, 2016 to 31st December 2016. Total 90 cases with history of hanging brought for autopsy were used as material for study. The obtained data were tabulated and analyzed.

Data analysis: Data analysis was performed by Statistical Package for Social Sciences (SPSS) (version 22), and results were presented as frequency and percentage in figures and tables.

Ethics: Ethical clearance obtained from the institution. Confidentiality of patient's information was maintained when data were obtained from the medical records. All guidelines of the declaration of Helsinki were observed in all stages of the study.

Results:

Among the 90 cases of hanging, majority belonged to age group of 31-40years, 37 cases (41.1%), followed by 21-30 years 24 cases (26.7%). It was observed that among 90 cases of hanging studied, 70 cases were male and 20 cases female. The maximum cases of males belonged to age group of 31-40years and in females the maximum were noted among the

same age group of 31-40years. Among females no cases were noted between 41-70 years. In males, least cases belonged to 61-70 years of age group, 02 cases (02.2%). (Graph 1).

Distribution of cases according to material used for hanging

Among 90 cases of hanging, the material used is rope in 42 cases (46.7%), saree in 35 cases (38.9%), veil 07 cases (07.8%), followed by lungi 03 cases (03.3%), belt 02 cases (02.2%) and curtain in 01 case (01.1%). (Table 1)

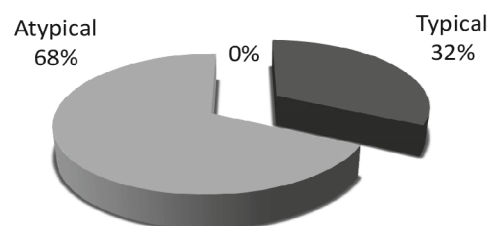
Table:1- Distribution of cases according to material used for hanging.

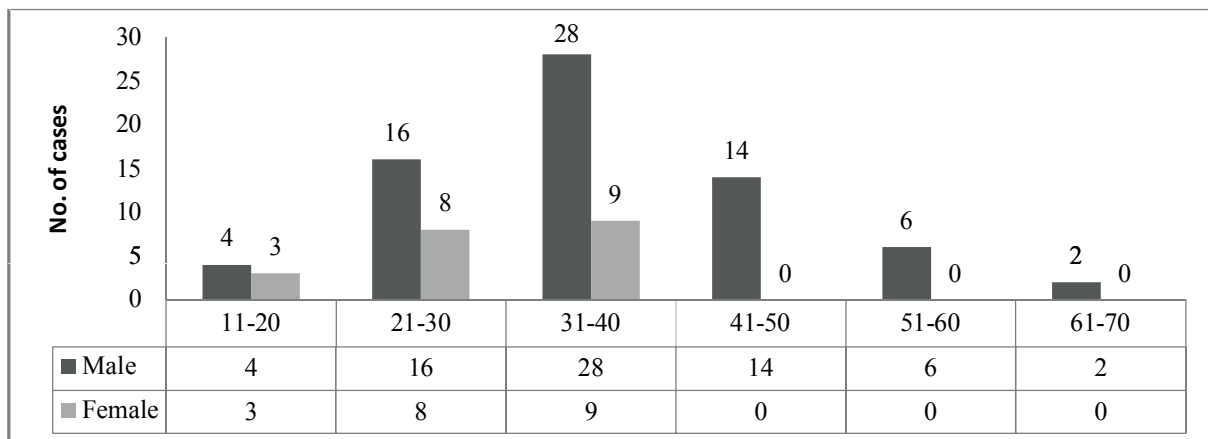
Material	No. of cases	Percentage
Rope:	42	46.7
- Nylon	32	35.5
- Jute	07	07.8
- Cotton	02	02.2
- Rixin	01	01.1
Saree	35	38.9
Veil	07	07.8
Lungi	03	03.3
Belt	02	02.2
Curtain	01	01.1
Total	90	100

Distribution of hanging cases on position of knot.

Among 90 cases of hanging, 29 cases (32.2%) are typical hanging with knot present over nape of neck and majority of the cases are atypical hanging 61 cases (67.8%), with knot present other than nape of neck. (Graph 2)

Graph: 2- Distribution of hanging cases on position of knot

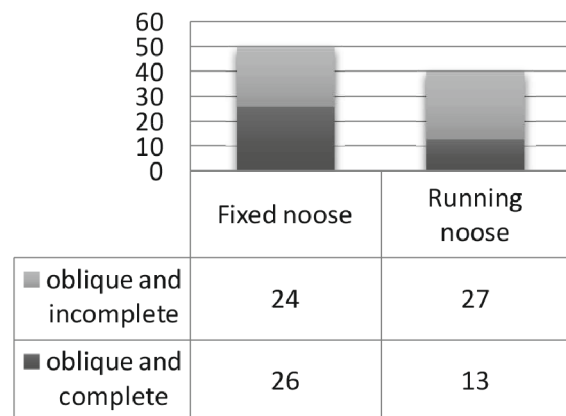


Graph 1- Age and sex wise distribution of hanging cases.**Distribution of hanging cases according to type of noose (Table 2)**

Among 90 cases of hanging, 49 cases (54.4%) have used fixed noose and 41 cases (45.6%) have used running noose.

Relation of hanging cases according to type of noose and ligature mark (Graph 2)

Among 90 cases of hanging, 26 cases (28.9%) with fixed noose and 13 cases (14.4%) with running noose showed complete and oblique ligature mark, 24 cases (26.7%) with fixed noose and 27 cases (30%) with running noose showed incomplete and oblique ligature mark.

Graph: 2- Relation of hanging cases according to type of noose and ligature mark.**Table: 2- Distribution of hanging cases according to type of noose**

Type of noose	Male		Female		Total	
	No.	%	No.	%	No.	%
Fixed	38	42.2	11	12.2	49	54.4
Running	32	35.6	09	10	41	45.6
Total	70	77.8	20	22.2	90	100

Appearance of ligature mark in hanging cases.

Among 90 cases of hanging, the ligature mark was situated above the level of thyroid cartilage in the cases, the features in the appearance of ligature mark noted were that, it was dry, hard, abraded, grooved, parchmentsied and faint depicted in the table below.

Injury to the laryngeal cartilages and hyoid bone.

Among 90 cases of hanging, one case had fracture of thyroid cartilage and one case had fracture of hyoid bone. No cases had cricoid cartilage fracture or other laryngeal cartilages injury.

Table: 3- Showing appearance of ligature mark in hanging cases.

Appearance of ligature mark	No.of cases	Percentage
Dry, Hard, Abraded, Grooved and Parchmentised	12	13.3%
Dry, Hard, Abraded, and Grooved	10	11.1%
Dry, Hard, Abraded and Parchmentised	10	11.1%
Dry, Hard, Grooved and Parchmentised	03	3.3%
Dry, Hard and Abraded	07	7.9%
Dry, Hard and Grooved	02	2.2%
Dry, Hard and Parchmentised	12	13.3%
Dry, Hard and Faint	01	1.1%
Dry, Faint and Parchmentised	02	2.2%
Dry and Hard	27	30%
Dry and Faint	04	4.5%
Total	90	100

Table: 4 - Showing injury to the laryngeal cartilages and hyoid bone.

	Total cases	Percentage
Hyoid bone fracture	01	1.1%
Thyroid cartilage fracture	01	1.1%
Other laryngeal cartilage injuries	00	00

Discussion:

The present study comprises a total of 90 cases of hanging with 70(77.78%) male victims and 20(22.22%) female victims which is similar to the studies done by Bhosle SH et al⁹ males 78.57%, females 21.43%, Sen Gupta B K¹⁰ males 71.2%, females 28.7%, Th Meera et al¹¹ males 77.38% and females 22.62%. This does not mean that males commit suicide more than females. It only signifies that, men prefer to commit suicide by hanging than women, who prefer to commit suicide by other means like burning, drowning and poisoning. In study by Rao Dinesh¹² (51.51%) and Naik S K et al¹³ (62.2%) reported female preponderance which is contrast with our study.

It was observed that rope 46.7% was the commonest type of ligature material used followed by saree 38.9%, veil 7.8%, lungi 3.3%, belt 2.2% and curtain 1.1%. Our

findings are consistent with Nayak G H et al¹⁴ 43 in which rope constituted for 50.79% and Bhosle S. H. et al⁹ 41 rope in 53.01% of the cases.

In studies by Rao Dinesh¹², Shaikh M M M et al¹⁵, Meera Th et al¹¹, the commonest ligature material used was cloth (saree/veil/dupatta/stole) which is in contrast to the present study. Rope was the commonest ligature material used for hanging in present study because it is cheap and easily available for common use for various domestic purposes.

It was observed that atypical hanging (position of knot other than nape of neck) was present in 67.8% of the cases, typical hanging in 32.2% of the cases. The findings are consistent with Guntheti B K et al¹⁶ atypical- 68.75%; typical- 31.25% and Borah A et al¹⁷ atypical-71.76%; typical-28.24%.

A fixed type of noose was observed in 54.4% of the cases and 45.6% of the cases had running noose. Similar findings are noted in study by Bhosle SH et al⁹ fixed noose in 35.71% and running noose in 34.34% and Ambade V N et al¹⁸ fixed noose in 64.6% and running noose in 21.3% cases.

In the present study 56.7% of the cases showed an oblique and incomplete ligature mark and 43.3% of the cases had oblique and complete ligature mark. In all the cases the

ligature mark was situated above the level of thyroid cartilage.

The appearance of ligature mark was dry, hard, abraded, grooved and parchmented in 12 cases (13.3%), it was dry, hard, abraded and grooved in 10 cases (11.1%), dry, hard, abraded and parchmented in 10 case (11.1%), dry, hard, grooved and parchmented in 03 cases (3.3%), dry hard and abraded in 07 cases (7.9%), dry, hard and grooved in 02 cases (2.2%), dry, hard and parchmented in 12 cases (13.3%), dry, hard and faint noted in 01 case (1.1%), dry, faint and parchmented in 02 cases (2.2%), dry and faint in 04 cases (4.5%) and dry and hard in 27 cases (30%). Similar features of the ligature mark were noted in the studies done by Rao Dinesh¹², Ballur M S et al¹⁹ and Borah A, Chaliha R¹⁷.

One case each of thyroid cartilage and hyoid bone fractures was observed in males aged above 40 years in the present study and there was no case with cricoid cartilage or other laryngeal cartilage injuries noted. The findings of the present study are consistent with the studies done by Nayak G H et al¹⁴, Shaik M M M et al¹⁵, Meera Th et al¹¹, Naik S K et al¹³, Yadav A et al²⁰ and Rank A P et al²¹.

The neck findings vary depending upon the composition, multiplicity and tightness of the ligature material used, the suspension time, type of hanging, etc. Hence, the possible findings in a suspected case of hanging must be always anticipated so as to avoid any erroneous opinion.

Conclusion:

Hanging has been favoured mode since time immemorial for its simplicity and efficacy in committing suicides. It is being viewed as giving swift painless death with easily available ligature material and ligature points in secluded place without arousing much suspicion this mode is increasingly adopted to commit suicide.

Males and females are both exposed to such stresses, but in this study it seem that being a male dominated society and more exposure to external environment, such cases are commonly seen in males.

From the medico-legal point of view, following measures and recommendations in cases of deaths due to hanging are very essential:

- ❖ To visit the scene of occurrence.
- ❖ Complete photograph of the scene of occurrence which should include point of suspension.
- ❖ In fatal cases not to disturb the ligature material and release only the suspension point or cut the ligature material away from the site of knot.
- ❖ To always bring the material along with the body for correlation with the mark.

Radiograph of the neck plays a vital role to appreciate the fractures of hyoid bone and thyroid cartilage.

Ethics committee approval: Obtained

Conflict of Interest: Nil

Source of Funding: Self

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