

Significance of External Findings in Hanging Cases during Autopsy

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Abstract

The external findings are utmost important in the opinion formation during autopsy of hanging deaths. Thus the current study was done with the aim of studying the significance of external findings in hanging cases during post-mortem examination in the Department of FMT, RIMS, Ranchi prospectively from 1st March, 2013 to 30th May, 2014. Majority of cases of hanging had not received any treatment. In maximum cases the nature of suspension was complete type. Atypical hangings were seen in most cases. Most commonly used ligature materials were Jute Rope and Dupatta. In majority cases the ligature mark was above the thyroid cartilage followed by at and above the thyroid cartilage. In maximum cases the position of knot was present at occipital region of the neck, followed by at over left mastoid region of the neck. In majority of case the ligature mark was prominent and discontinuous. The colour of ligature mark was dark brown in more than half of the cases followed by yellowish brown. In majority of cases the post-mortem staining was present. Only about 39% of cases the dried salivary stain was found. Involuntary discharge was seen only in 17% of cases. Tongue protrusion was found in 29.87 % of cases.

Keywords: Significance, external findings, autopsy, hanging deaths.

1. Introduction

Hanging is that form of asphyxia which is caused by suspension of the body by ligature which encircles the neck. The constriction force is being the weight of the body. Hanging may be partial or complete depending on the position or posture of the body at the time of hanging. Hanging is a common method of suicide around the world. In India hanging is among the top 5 methods of choice for committing suicide.[1]

The typical external findings that should be looked for in a case of hanging death are the ligature mark, knot position, color of the face, frothing, glove and stocking pattern of post-mortem lividity, dribbling of saliva, tongue position, eye open or closed, dilated pupil etc. [2] All these have immense importance in concluding the various objectives of autopsy.

1.1 Aim and Objective

The present study was undertaken with the aim of studying the significance of external findings in hanging cases during post-mortem examination.

2. Material and Method

The present study was carried out in the Department of FMT, RIMS, Ranchi prospectively from 1st March, 2013 to 30th May, 2014. The materials for the present study were dead body brought for autopsy from various police stations. Cases which died due to asphyxia as a result of hanging either alone or in association with other injuries are included for the study.

Before proceeding with the dissection of the body, external examination of the whole body was carried out carefully and minutely. The ligature material including the knot was examined and external examination of the whole body was carried out with great precaution. The different regions of the body are inspected one by one and the details of the injuries present were recorded. The main materials used during the work are measuring tape (steel), hand lens, probes, necessary instruments kit in the mortuary, photographic camera with accessories.

To make the study more systematic and error free a proforma was designed and tested to record detailed observation of post-mortem examination including other relevant detailed information. The findings noted were carefully compiled, tabulated and analyzed.

3. Results and Observation

There were 3307 cases of PM examinations conducted during the study period and among those 77 cases were hanging i.e. 2.32 %.

Table 1: Hospital Admission

Treatment taken in hospital	No. of case	%
Yes	10	12.99
No	67	87.01
Total	77	100

In the present study majority of cases of hanging had not received any treatment and death occurred at the place of incidence.

Table 2: Distribution of the Population According To Nature of Suspension (Complete/Partial)

Type of hanging	No. of cases	Sex	No. of cases	%	% of total cases
Complete	68	M	46	59.74	88.32
		F	22	28.58	
Partial	9	M	6	7.79	11.68
		F	3	3.89	
Total	77		77	100	100

Maximum cases were found where the nature of suspension was complete type. The ratio among males and females were almost similar in both type of hanging 2:1.

Table 3: Position of Knot

Type of hanging	Knot Position	Total no. of cases
Typical	Occipital Region	33 (42.86%)
Atypical	Front of Neck	00 (0%)
	Right Mastoid Region	14 (18.18%)
	Left Mastoid Region	30 (38.96%)
Total		77 (100%)

In maximum cases the position of knot was present at occipital region of the neck, followed by left mastoid region of the neck and least over right mastoid region of the neck. There was not a single case found where the position of knot at the front of the neck.

Table 4: Type of Ligature Material Used

	Ligature material	No.	(%)
Hard (51.95%)	Electric Wire	2	5
	Plastic Rope	9	22.5
	Jute Rope	29	72.5
	Sub-Total	40	100
Soft (48.05%)	Dupatta	26	70.27
	Others (Saree, Lungi, Muffler)	11	29.73
	Sub Total	37	100
(100%)	Total	77	

Considering the information gathered from the police record and from the relatives of the deceased and taking the examination findings of the ligature material wherever it has been sent along with the dead body it was observed that the maximum peoples used hard ligatures like jute rope, plastic rope, and electric wire. While in soft ligatures (48.05%) Dupatta, Saree, Muffler and Lungi were used. This showed that most commonly used ligature among hard ligature material is Jute Rope, whereas Dupatta are most commonly used among soft ligature material.

Table 5: Distribution of Cases According To the Colour of the Ligature Mark

Colour of ligature mark	No. of cases	%
Dark brown	45	58.44
Red	2	2.60
Pale	8	10.39
Yellowish brown	22	28.57
Total	77	100

In the present study, the colour of ligature mark was dark brown in more than half of the cases (58.44%); followed by yellowish brown in 22 cases (28.57%), and pale in 8 (10.39%) cases. Only 2 cases (2.60%) where it was red in colour.

Table 6: Post Mortem Staining (Gloves And Stockings)

PM Staining	No. of cases	%
Present	52	67.53
Absent	25	32.47
Total	77	100

Out of total 77 cases of hanging majority of cases (67.53%) the post-mortem staining in the form of glove and stocking was present.

Table 7: Based on Occurrence of Dribbling of Saliva

Dribbling of saliva	No. of cases	%
Yes	30	38.96
No	47	61.04
Total	77	100

Dribbling of salivary stains over the angle of mouth is considered as an important ante-mortem sign of hanging, in our study it was found that only about 39% of cases where dried salivary stains was present over the angle of mouth.

Table 8: Involuntary Discharge (Semen/ Faeces)

Involuntary Discharge (Semen /Faeces)	No. of cases	%
Yes	13	16.88
No	64	83.12
Total	77	100

Involuntary discharge is often encountered in cases of hanging. In the present study Involuntary discharge was seen in only 13 cases (16.88 %).

4. Discussion

In the present study majority of cases of hanging (87.01 %) had not received any treatment and death occurred at place of incidence, only 12.99% of the people admitted to hospital after fatal attempt prior to death. Similar findings were observed that about 89 % of victims had not received any type of treatment before death. [3] The external findings may vary depending upon the time of survival.

In present study it was found that in maximum cases where the nature of suspension was complete type, which accounted for 88.32% where as partial type of hanging was few in number accounting for 11.68%. In complete hanging, the male to female ratio (46 males to 22 females) is about 2.09: 1. In partial hanging, the male to female ratio (6 males to 3 females) is 2:1. The ratio among male and female are almost similar in both type of hanging. The present findings

are comparable with the findings of the other authors where the complete hanging cases were about 64% and partial hanging cases were about 36%. [4]; another author reported that the complete type of hanging in about 99% of total cases studied.[5] in other study about 88% complete and 12 % incomplete.[6] While the authors from other country observed higher number of incomplete hanging cases (55%) as compared to complete hanging cases (45%) in a study at Thailand. This is in sharp contrast to the present study where complete hanging was seen in 88.32%. [7] Position of the ligature mark and its shape may vary according to the force of contraction.

In the present study, typical hangings were seen in about 43% and atypical hangings were seen in 57% of cases. In typical hanging, the male to female ratio was 1.75:1 and in atypical hanging the male to female ratio was 2.38:1. There are some other studies which have also showed similar findings reported that the atypical hanging in about 97% and only 3% were typical of total cases studied. [5]; in about 89% cases the hanging was atypical and in 11% it was typical. [4] and findings other study showed that the atypical hanging was seen in about 96% of the cases and typical hanging in only 4%. [6] Similar findings are also reported by the various authors from different countries like about 82% cases showed right or left sided knot that indicate atypical hanging while only 13 cases about 18% showed knot was located on nape of neck that indicates typical hanging.[8] The atypical ligature mark was observed in majority of cases in studies, which is comparable with the present study.[9,10] Dribbling of saliva and the sympathetic nerve compression may depend upon the knot position.

Maximum peoples were used hard ligature (51.95%) like jute rope, plastic rope, and electric wire in percentage of 72.5 %, 22.5% and 5% respectively amongst the hard ligature material. While soft ligatures (48.05%) like Dupatta, Saree, Muffler and Lungi were used and amongst these maximum peoples used Dupatta with 70.27%. This showed that most commonly used ligature among hard ligature material was Jute Rope, whereas Dupatta was most commonly used among soft ligature material.

Other studies have reported that most common ligature material used was dupatta (Soft) in 40 (54.05%) cases followed by Nylon rope (Hard) in 18 (24.32%) cases. [8], similarly reported that about 57% were used cloth as a ligature material which were either scarf, towel, Khudei (Lungi worn by men in the local population), etc (Soft) and about 43% were used ropes - nylon or jute (Hard). [6] The impression over the neck may depend on the type of ligature material used.

In present study showed that about 69% cases where the ligature mark was above the thyroid cartilage and about 23% cases where the ligature mark was at and above the thyroid cartilage. Only 6 cases in which, the ligature mark was at overriding the thyroid cartilage (about 8%). The

present findings are comparable with others findings where in about 83% the ligature mark was above the thyroid cartilage, followed by about 12% overriding the thyroid cartilage and about 5% below the thyroid cartilage[3]; in about 88% cases the mark was present above thyroid cartilage, in 10% it was present over the thyroid cartilage and in 2% it was present below the thyroid cartilage.[4] Similar observation was made by author showed that in about 62% of cases where the ligature mark was above the thyroid cartilage followed by in about 20% cases over the thyroid cartilage, about 13% on and above the thyroid cartilage and about 5% cases below the thyroid cartilage.[11] Its position give clue towards the manner, the type of suspension and the internal structures involved.

The present study showed that the in majority of cases where the ligature mark are prominent (67.53%) and discontinuous (81.82%). The similar observation was made where majority of cases where the ligature mark was prominent (77%) and discontinuous (95%).[3] There was incomplete encircling of the mark in 82% cases and complete encircling of the mark was present in 18% of cases.[4] It gives impression of the type of ligature material, type of suspension and about manner.

In the present study, the colour of ligature mark was dark brown in more than half of the cases (58.44%); followed by yellowish brown in 22 cases (28.57%), and pale in 8 (10.39%) cases. Only 2 cases (2.60%) where red in colour. Similar findings were also observed where the colours of ligature marks was dark brown in majority of the cases (32.76%); followed by yellowish brown in (27.15%), Red in (21.56%) cases and pale in 18.53%. [3] The variation in colour of ligature mark depends on the duration of suspension and the complexion of the person. The ligature produces a furrow or groove in the tissue which is pale in colour, but it later becomes yellowish or brownish yellow and dark brown (hard like parchment) due to the drying of the slightly abraded skin.

In the present study it is observed that the in majority of cases (67.53%) the post-mortem staining were present in limbs. While in another study majority of cases (71%) where post-mortem staining was not present in the limbs and about 29 % of showed post-mortem staining in limbs.[3]

If the body has been suspended for sometimes post-mortem hypostasis is seen in legs, feet, hands, forearms while upper part of the body will pale, Petechial haemorrhages may be found in skin of legs in 2 to 4 hours. If the body is removed within 4 hours after death and is placed in supine position, post-mortem hypostasis in the limbs will fade and new areas of lividity will appear along the back and buttocks.

In the present study it was found that about 39% of cases where dried salivary stains were present over the angle of mouth and in majority it was absent. Similar findings are also reported where it is about 32% of total cases studied

[12], in about 30% of the cases [8] while by another author the dried salivary stains were present in about 71% cases.[5] Dribbling of saliva occurs from the angle of the mouth which is at a lower level i.e., from the angle opposite the side of the knot. When the knot is on the nape of the neck it occurs across the middle of the lower lip. When the knot is under the chin, then it occurs through either or both angles of the mouth. The saliva drops down in front of the chest when the body is bare or it stains the clothes in front, when the deceased is dressed. When dried or partly dried, it becomes quite fixed and cannot be easily removed or rubbed out. Dribbling of the saliva is considered a very important phenomenon in support of death due to ante-mortem hanging, as because, excessive salivation is an ante-mortem reaction which occurs due to irritation of the submandibular salivary glands during life, due to the pressure and friction caused by the ligature material.

. In the present study Involuntary discharge was seen in only 13 cases about 17 %. Similar observation was also made where about 11 % of victims had involuntary discharge and 89 % victims had not any involuntary discharge.[3] Involuntary discharge is often encountered in cases of hanging due to sudden raised intra-abdominal pressure and/or relaxation of sphincter muscles after death.

In the present study it is observed that the tongue protrusion was found in about 30 % of cases. Other reported that the protrusion and clinching of tongue is seen 50% of cases of hanging deaths. [4] The tongue is projecting because of upward pressure on the larynx and root of the tongue.

5. Conclusion

A keen external examination is mandatory before proceeding towards the dissection of the dead body in hanging cases during post-mortem examination. Certain important objectives of autopsy may be achieved from such external study like manner, time since death/injury or survival period, position of body, type of suspension, ante-mortem or post-mortem nature, type of ligature material used etc. Thus a meticulous external examination of body facilitates opinion formation in hanging deaths.

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