

Pattern of external and internal findings in deaths owing to hanging—a study in northeast Delhi

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Abstract

Background: Hanging is a common form of asphyxial deaths. A complete profile of findings is helpful in making exact diagnosis of hanging and differentiating it from strangulation.

Objective: To assess the complete profile of findings in deaths owing to hanging.

Materials and Methods: A total of 101 cases of hanging were examined during autopsy. The details about the victims with regard to the age, sex, and type of ligature material and autopsy findings were noted. The data thus obtained were analyzed for the study.

Result: A total of 101 cases of hanging were studied during November 2009 to February 2011, of which 43.56% of cases were in the age group of 21–30 years, and 68.31% were male subjects, single mark was seen in 95.04% cases, incomplete ligature was found in 99% cases, chunni was the commonest (37.70%) ligature material used, the knot was on the right side of neck in 45.60% of cases, and fixed knot was found in 68.85% of cases. Fracture of hyoid bone was found in 5.94% of cases, and that of thyroid cartilage was found in 4.95% of cases; salivary stains were found in 66.33% of cases; petechial hemorrhages were found in 11.88% of cases on external body surface and in 87.12% cases in internal body organs. Congestion of internal body organs were found in 96.03% of cases.

Conclusion: In our study, findings in the cases of hanging varied and were found in many combinations. A correct interpretation of such findings and meticulous postmortem examination is necessary to make a confirmatory diagnosis of death owing to hanging.

KEY WORDS: Asphyxia, hanging, suicide, findings


Introduction

Hanging deaths are commonly encountered in medico-legal practice and is one of the leading methods of choice to commit suicide in India.^[1] Difficulties arise in differentiating the cases of hanging from strangulation without any obvious

external findings. The forensic medicine expert should, therefore, be conversant with the postmortem findings in hanging deaths. Sometimes, the ligature mark in hanging is not very typical as described in text books, which create confusion. It is in these cases that meticulous postmortem examination can confirm or rule out asphyxia owing to hanging. This study is aimed at postmortem findings in both neck structures and internal organs of the body so that it covers a more complete profile of findings.

Materials and Methods

A total of 101 cases of hanging, which were brought for autopsy to University College of Medical Sciences (UCMS) and Guru Teg Bahadur (GTB) Hospital mortuary, Delhi, from

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November 2009 to February 2011, were considered for the study. Information in inquest papers and history given by the investigating officer/relatives and evidence at scene of incidence were taken into account. The details about the victims with regard to the age, sex, and type of ligature material were obtained from police requisition and inquest papers. External and internal findings were noted after meticulous postmortem examination. The data thus obtained were analyzed for the study.

Result

Age group-wise and sex-wise distributions of number of cases of deaths owing to hanging are shown in Tables 1 and 2, respectively. Number of ligature marks around neck is shown in Table 3. In 100 (99%) cases of hanging, the ligature mark was incompletely encircling the neck, oblique, and above thyroid cartilage. Breadth of the ligature mark was observed in maximum number of cases [i.e., 54 (51.43%)] [Table 4]. Ligature material was found in 61 (58%) cases in situ. Ligature materials used by victims of hanging deaths are shown in Table 5. Location of ligature knot over the neck is shown in Table 6. In maximum number of cases [i.e., 42 (68.85%)], fixed knot was observed, while slipping knot was observed in 19 (31.15%) cases.

Fracture of thyroid cartilage was present in 5 (4.95%). Three cases were in the age group of 21–30 years. In one case, the age was 65 years, and in another, the deceased

Table 1: Age distribution of hanging deaths

Age in years	Total (%)
0–10	1 (0.99)
11–20	20 (19.80)
21–30	44 (43.56)
31–40	23 (22.77)
41–50	7 (6.93)
51–60	3 (2.97)
61–70	2 (1.98)
71–80	1 (0.99)
Total	101 (100)

Table 2: Sex distribution of hanging deaths

Males (%)	Females (%)	Total (%)
69 (68.31)	32 (31.68)	101 (100)

Table 3: Number of ligature mark

Number of ligature marks	Number of victims (%)
Single	96 (95.04)
Double	4 (3.96)
Triple	1 (0.99)
Total	101 (100)

Table 4: Breadth of the ligature mark

Breadth of ligature mark (cm)	Number of victims (%)
<1	17 (16.83)
1–2	50 (49.50)
2–3	22 (21.78)
>3	12 (11.88)
Total	101 (100)

Table 5: Type of ligature material used in hanging

Ligature material	Number (%)
Chunni	23 (37.70)
Sari	7 (11.48)
Nylon rope	15 (24.60)
Narah	1 (1.63)
Shawl	1 (1.63)
Unspecified soft cloth	14 (22.96)
Total	61 (100)

Table 6: Position of knot in hanging and strangulation

Position of the knot	Number of victims (%)
Right side neck	28 (45.90)
Left side neck	18 (29.50)
Back of neck	10 (16.40)
Front of neck	5 (8.20)
Total	61 (100)

was 80 years. Fracture of hyoid bone was present in six (5.94%) cases, of which four cases were in the age group of 21–30 years.

Fracture of cervical vertebrae was present in four (03.96%) cases: three cases were in the age group of 21–30 years, and in one case, the age was 53 years.

Associated injuries other than ligature mark such as abrasions, contusions, and lacerations over face, limbs, and other body parts were present in 11 (10.89%) cases. Salivary stains over angle of mouth and anterior aspect of chest over cloths were observed in 67 (66.33%) cases of hanging. Cyanosis over tip of fingers and over nail beds were observed in 21 (20.79%) cases. Petechial hemorrhages over face, neck, chest, and limbs were found in 12 (11.88) cases. Submucosal hemorrhage was present in larynx in 17 (16.83%) cases and in epiglottis in 11 (10.89%) cases.

Petechial hemorrhages over internal body organs were present in 88 (87.12%) cases. Congestion of internal body organs was present commonly in 97 (96.03%) cases.

Discussion

In this study, majority of the cases were male subjects (68.31%) and majority (43.56%) were in the age group of

21–0 years. Similar findings were also observed in the studies by Sharma *et al.*^[2] (68%) and Jani and Gupta.^[3] Our findings differ from the study done by Elfawal and Awad^[4] who observed 30–39 years as the most common age group for hanging deaths. The reason for the same could be that, in India, maximum population belongs to the younger age. In western world, the majority of population belongs to the middle-aged group. In most of the cases (95.04%), single ligature mark was observed around the neck. Similar finding was noted in the study done by Sarangi^[5] (96.03%). In this study, in most of the cases, the mark was incompletely encircling the neck (99%). Similar finding was observed in the study done by Sarangi^[5] (97.87%). In this study, the ligature mark was obliquely placed over the neck in most of the cases (99%). Similar findings were observed in studies done by Sarnagi^[5] (97.87%) and by Sharma *et al.*^[2] (98%).

In this study, the ligature mark was mostly (99%) high up in the neck above the thyroid cartilage in case of hanging. Similar findings were observed by the Sarangi^[5] (97.87%), Sheikh and Agarwal^[6] (77%), and Sharma *et al.*^[2] (85%). In this study, the breadth of the ligature mark in most of the cases (49.50%) was 1–2 cm. Our findings differ from that of study done by Jani and Gupta^[3] who observed maximum cases (39.10%) with breadth of ligature mark below 1 cm, which showed rope as the most common ligature material. In our study, soft cloth was the most common ligature material found, which has more breadth than rope and is the reason for more breadth of ligature mark in our study. In this study, the most common ligature material used was chunni in 23 (37.70%) cases. Collectively, soft ligature material was used most commonly [45 (73.77%) cases]. Similar findings were observed in study done by Naik and Patil^[7] (soft material, 53.97%) and Sharma *et al.*^[2] (chunni, 30.90%). Our findings differ from those of the study done by Jani and Gupta^[3] (cotton rope, 30.43%), and Cooke *et al.*^[8] (nylon rope, 59%). In this part of Delhi, salwar kameez with chunni and sari, are the common cloths used and, so, are the common ligature materials in our study. In this study, most commonly, the knot was placed over right side of the neck (45.90%). Our findings are similar to those in study done by Talukder *et al.*^[9] (right side of neck, 25.75%). Our findings differ from those of the study done by Samarasekera and Cooke^[10] (on posterior aspect of neck, 61.71%) The houses in urban part of Delhi mostly are low roofed, which may account for higher number of cases in with partial hanging, which lead to deviation of knot from posterior aspect of neck to one of the side of the neck.

In this study, fixed type of knot was observed most commonly (68.85%). Our findings are similar to those of the study done by Jani and Gupta^[3] (39.10%) and differ from those of Sharma *et al.*^[2] (fixed knot in 42% cases). Incidence of type of noose in hanging is variable with the local customs and usages as different class of occupation use different types of knots.

In this study, fracture of thyroid cartilage was present in 4.95% of cases. Our findings do not match with those of studies on hanging done by Morild^[11] (12.50%) and Feigin^[12]

(17.40%). In this study, fracture of hyoid bone was present in 5.94% of cases of hanging. Our findings are similar to those of Paporo *et al.*^[18] (6.30%), Sheikh and Agarwal^[6] (5.10), and Feigin^[12] (3.30%). Our findings differs from those of studies done by Jani and Gupta^[3] (17.40%), Morild^[11] (13.80%), and Uzun *et al.*^[13] (17.7%). There is an increased propensity of fracture of throat skeleton as the age advances. In our study, most of the victims (64.48%) were younger than 30 years. In the compared studies, major portion of the victims belonged to the older age group. This may be the reason for less incidence of fracture in our study. In this study, the associated injuries were present in 10.89% cases. Our findings do not match with those of study done on hanging by Samarasekera and Cooke^[10] (34.00%) and Uzun *et al.*^[13] (6.17%).

Salivary stains over angle of mouth and anterior aspect of chest over cloths were observed in 66.33% cases. Our findings differs from those of study done by Shaikh *et al.*^[14] (38.37%). Cyanosis over tip of fingers and over nail beds were observed in 21 (20.79%) cases of hanging in our study, which differ from those of study done by Sarangi^[5] (98.42%).

Petechial hemorrhages over external body parts were found in 11.88% cases. Our findings differ from those of study done by Luke^[15] (50%). Submucosal hemorrhage and hemorrhage in laryngeal muscles was present in 12.87% cases, and hemorrhage in epiglottis was present in 10.89% cases. Petechial hemorrhages over internal organs were present in 87.12% cases. Our findings were similar to those of study done by DiMaio^[16] (89%). Our findings do not match with those of study done by Miles^[17] (27.58%) Samarasekera and Cooke^[10] (48.00%). Petechial hemorrhages are common but not a universal finding, and this may account for variable incidence in most of the studies. Congestion of internal body organs was present in 96.03% cases in our study. Our findings are similar to those of study done by Sarangi^[5] (98.42%) and Dixit *et al.*^[18] (98%).

Conclusion

In our study, findings in cases of hanging varied and were found in many combinations. In these cases, findings varied depending on the type of ligature material used and type of hanging. When external postmortem findings are less conclusive, internal postmortem findings are helpful for making final diagnosis. Hence, the possible findings in a suspected case of hanging must be always anticipated so as to avoid any erroneous opinion. Correct interpretation of such findings and meticulous postmortem examination is necessary to make a confirmatory diagnosis of death owing to hanging.

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