

## Original Article

# Study of Postmortem Findings in Hanging Cases

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## ABSTRACT

**Background and objectives:** Deaths resulting from hanging show features amongst which the ligature mark in the neck is considered to be decisive. The ligature mark is a pressure abrasion on the neck at the site of the ligature which appears as a groove. A sincere attempt is being made to study the correlation between the ligature mark and the material producing it along with the relation between external and internal features in the neck in cases of hanging. **Methods:** This prospective study was conducted among victims of hanging brought to Dr. B. R. Ambedkar Medical College morgue, Bangalore during the period November 2010–October 2012. Of all the cases brought to the department for medicolegal autopsy, cases in which death had resulted from hanging were identified. A sum total of 232 cases were selected for this prospective study. Detailed information regarding the deceased and the circumstances of death was collected from the police and relatives. **Results:** Dried salivary stains over the angle of mouth were observed in 65 cases. Knot was present on the right side of neck in 109 cases. Parchementisation was present in 156 cases. Peri-ligature injuries in the form of rope burns, contusions and abrasions were seen in 33 cases. Involuntary discharge of faeces and semen was seen in 25 cases. Fracture of great cornu of hyoid bone was observed in 9 cases. Fracture of superior horn of thyroid cartilage was observed in 11 cases. **Conclusion:** Dried salivary stains over the angle of mouth were observed in one-fourth of the total cases studied. Knot was present on the right side of neck in half of cases. Parchementisation was present in many cases. Peri-ligature injuries were seen in 33 cases. Involuntary discharge of faeces and semen was seen in 25 cases. Fracture of great cornu of hyoid bone was observed in 9 cases. Fracture of superior horn of thyroid cartilage was observed in 11 cases.

**Keywords:** Hanging, Ligature mark, Post-mortem findings, Salivary stains, Periligature injuries, Hyoid bone fracture, Thyroid cartilage fracture

## INTRODUCTION

Hanging is a form of violent asphyxial death produced by suspension of the body by a ligature around the neck, with the constricting force being the weight of the body (complete hanging), or part of the weight of the body (partial hanging). Deaths resulting from hanging show features amongst which the ligature mark in the neck is considered to be decisive. The ligature mark is a pressure abrasion on the neck at the site of the ligature which

appears as a groove. Character of the ligature mark depends on various factors like the nature of the ligature, body weight, length of time the body has remained suspended and the number of turns of the ligature round the neck. It is easy to diagnose hanging when one finds the classical features. However, all features are seldom present together. The application of pressure on the neck often results in findings, which are quite variable. Thus, the ligature mark around the victim's neck constitutes an extremely precious piece of evidence to arrive at a

conclusion as to cause of death and manner of death. A sincere attempt is being made to study the correlation between the ligature mark and the material producing it along with the relation between external and internal features in the neck in cases of hanging.

**METHODS**

This prospective study was conducted among victims of hanging brought to Dr. B.R. Ambedkar Medical College morgue, Bangalore during the period November 2010–October 2012. Of all the cases brought to the department for medicolegal autopsy, cases in which death had resulted from hanging were identified. A sum total of 232 cases were selected for this prospective study. Detailed information regarding the deceased and the circumstances of death was collected from the police and relatives. Apart from this, we have visited the scene of crime wherever possible. Photographs of scene of suicide were also evaluated.

**RESULTS**

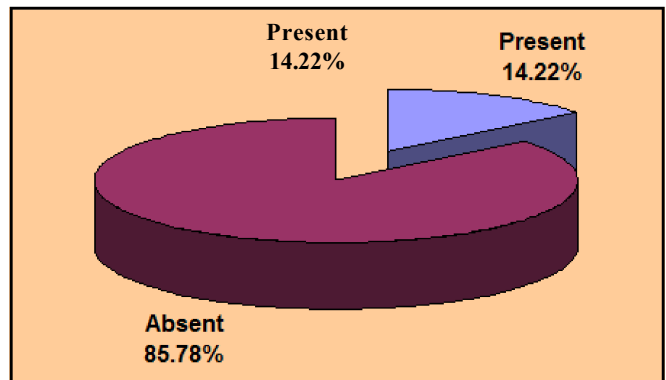
Dribbling of salivary stains over the angle of mouth is considered as an important antemortem sign of hanging but was not present in all the cases studied. Dried salivary stains over the angle of mouth were observed in 65 cases (28.01%) and depending on the position of knot, dried salivary stains were present. On the right angle of mouth in 31(47.69%) cases and on the left angle of mouth in 34(52.30%) cases, out of 65 cases (Table 1). Knot was present on the right side of neck in 109(46.99%) cases, over the left side of neck in 72(31.03%) cases and over centre of occipital region in 51(21.98%) cases (Table 2). In the present study, parchematisation was present in 156(67.24%) cases and absent in 76(32.76%) cases (Figure 1). In the present study, 199 cases (85.78%) did not show any changes around the ligature mark, but in 33 cases (14.22%), peri-ligature injuries in the form of rope burns, contusions and abrasions were seen (Figure 2).

**Table 1: Distribution of the study population according to the salivary stains**

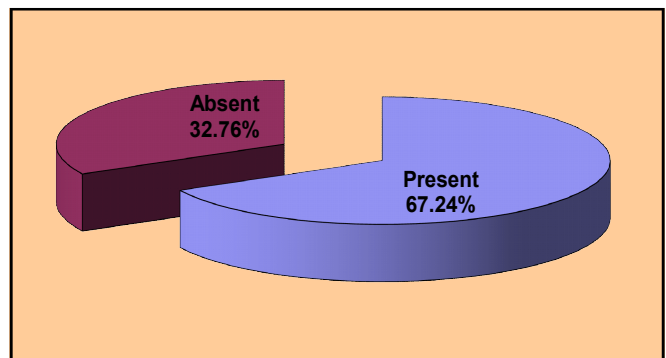
S.No.	Salivary stains	No. of cases	Percent
1.	Present	65	28.01
	a) Right	31	47.69
	b) Left	34	52.30
2.	Absent	167	71.99
	<b>Total</b>	<b>232</b>	<b>100</b>

**Table 2: Distribution of the study population according to the position of knot**

S.No.	Position of knot	No. of cases	Percent
1.	Right	109	46.99
2.	Left	72	31.03
3.	Centre of occipital region	51	21.98
	<b>Total</b>	<b>232</b>	<b>100</b>



**Figure 1: Pie chart showing distribution of the study population according to the peri-ligature injuries**



**Figure 2: Pie chart showing distribution of the study population according to the parchematisation of the ligature mark**

Involuntary discharge is frequently encountered in cases of strangulation compared to hanging. Involuntary discharge was seen in 25 cases (10.77%), out of which in 17cases faecal discharge was present, seminal discharge was noted in 6 cases and faecal + seminal discharge were noted in 2 cases. In the present study, the fracture of great cornu of hyoid bone on right was observed in 5 cases and on left side was observed in 4 cases. In the present study, the fracture of superior horn of thyroid cartilage was observed in 11 cases (4.74%), out of which in 6 cases there was a fracture superior horn on the left side of thyroid cartilage and in 5 cases

there was the fracture of superior horn on the right side of thyroid cartilage.

## DISCUSSION

Dried salivary stains over the angle of mouth were observed in 65 cases. Knot was present on the right side of neck in 109(46.99%) cases. Similar findings were observed in the studies conducted by Ahmad<sup>[1]</sup>, Sharija<sup>[2]</sup> and Saini<sup>[3]</sup>. Our study was in contrast to the findings observed by Saisudheer<sup>[4]</sup> where knot was present on the left side of neck and in another study conducted by Charoonnate<sup>[5]</sup>, knot was present at the back of the neck. In the present study, parchementisation was present in 156(67.24%) cases and absent 76(32.76%) cases, with the reasons for the above observations being the form of ligature material and the duration of suspension leading to parchementisation in the majority of the cases. Sharma<sup>[6]</sup> and Sharma<sup>[7]</sup> also got the same findings.

In the present study, 199 cases (85.78%) did not show any changes around the ligature mark, but in 33 cases (14.22%), peri-ligature injuries in the form of rope burns, contusions and abrasions were seen. The reasons of the production of peri-ligature injuries are knot mark contusions, fibres projecting from ligature material and the nail scratch marks inflicted by the struggling victim to free himself at the moment of death. The present study tallies with the findings observed in the studies conducted by Mohanty<sup>[8]</sup> and Tumram<sup>[9]</sup>.

Involuntary discharge of faeces and semen was seen in 25 cases. Fracture of great cornu of hyoid bone on right was observed in 5 cases and on the left side was observed in 4 cases. With the reason being the fracture increases with age, the high level of ligature mark on the neck, increased duration of suspension and with a thin hard ligature material. Similar findings were observed in the studies conducted by Feign<sup>[10]</sup>; Green<sup>[11]</sup> and Charoonnate<sup>[5]</sup>. It is in contrast to the findings observed by Sharma and Uzun<sup>[12]</sup>. The fracture of superior horn of thyroid cartilage was observed in 11 cases, with the reasons being pressure over the horns exerted due to traction and complete suspension of the victim. Similar findings were observed in the studies conducted by Feign<sup>[10]</sup> and Charoonnate<sup>[5]</sup>. It is in contrast to the findings observed by Sharma<sup>[6]</sup> and Green<sup>[11]</sup>.

## CONCLUSION

Dried salivary stains over the angle of mouth were observed in 65 cases. Knot was present on the right side of neck in half of cases. Parchementisation was present in many cases. Peri-ligature injuries were seen in 33 cases. Involuntary discharge of faeces and semen was seen in 25 cases. Fracture of great cornu of hyoid bone was observed in 9 cases. The fracture of superior horn of thyroid cartilage was observed in 11 cases.

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