

A Study of Hyoid Bone Fractures in Mechanical Asphyxial Deaths

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Abstract

Introduction: Observation of hyoid bone, which is unique structure in the body situated in the neck, in mechanical asphyxial deaths has a lot of medico legal importance. Most of the studies regarding hyoid bone are related to fractures of bone in cases of hanging, strangulation and throttling, but only very few of them have thrown light over incidence of ante mortem fractures and obscure fractures of hyoid bone. As there is much importance medico legally regarding the fractures of hyoid bone in cases of mechanical asphyxia deaths. Aim of the present study was to see the fractures of hyoid bone in mechanical asphyxia deaths related to pressure over neck.

Material and methods: A total of 126 hyoid bones in cases of mechanical asphyxia deaths were examined in the present study to detect fractures.

Results: After analysis it was found that out of 126 cases of mechanical asphyxial deaths, fracture of hyoid bone is noted in 11 cases out of which 7 were of ante mortem in nature. Out of these 7 ante mortem fractures, 5 were noted in the throttling, and 2 were associated with hanging.

Conclusions: Most of the cases of fractured bones were noted in throttling and none were reported in ligature strangulation

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I. Introduction

Observation of hyoid bone fracture is one of the most integral parts of internal examination during autopsy of hanging, ligature strangulation or throttling case. This fact has been highlighted by many workers where the observation of hyoid bone fracture ranges from 0% to 68% in hanging 1-12 and the incidence of hyoid bone fracture in hanging said to be increased with age after 40 years

Some workers also claimed a hard ligature material can cause fracture of hyoid bone depending upon the factors like level of constriction, force of constriction, distant of drop from suspension, age and sex of victims.

Besides getting hyoid bone fracture at autopsy table, it is also very important to check whether it is ante-mortem or post-mortem in nature or just an artifact of joint mobility between greater cornu and body of hyoid bone. For this difficulty some have even advised pre-autopsy X-ray of the neck structures to detect ante-mortem hyoid bone fracture. Observing the importance given to hyoid bone fracture in hanging, ligature strangulation and throttling cases by many authors at the past and present days, the present authors have taken up the study in 126 cases of hanging, 7 cases of ligature strangulation and 5 cases of throttling to notice actual percentage of hyoid bone fracture in these type of asphyxial deaths taking all the factors responsible for hyoid bone fracture into consideration.

II. Material & Method

The hyoid bones for this study were collected from the bodies whose postmortem examination was conducted at the department of forensic medicine, J.L.N Medical College, BHAGALPUR august 2015 to june 2016.

Inclusion criteria: Hyoid bones in cases of mechanical asphyxia deaths due to hanging and strangulation

Exclusion criteria: Hyoid bone in mechanical asphyxia deaths of drowning, smothering, burking.

A total of 126 hyoid bones in cases of mechanical asphyxial deaths due to hanging or strangulation were studied. the hyoid bones were examined after the dissection of the soft tissues, with the help of magnifying method, whether the hyoid bone is fractured or not and if fractured whether the fracture was ante-mortem or post-mortem in nature. The examined hyoid bones were photographed and were subjected to radiological examination for detection of obscure fractures.

Statistical Analysis

Microsoft excel 2007 was used for statistical analysis and making graphs. Descriptive statistics like mean and percentages were used for interpretation of data.

III. Result

All During detail observation and analysis the following things came out.

Table- 1		
Nos. and types of cases:		
Hanging	:	126
Strangulation	:	7
Throttling	:	5
Total	:	138

	Male	Female	Total
Hanging	40	86	126
Strangulation	2	5	7
Throttling	0	5	5
Total	42	170	138

Table-4			
Level of Constricting Force / Ligature :			
Level	Hanging	Strangulation	Throttling
Above LP	75	1	1
On LP	26	0	0
On & Above LP	15	3	4
Below LP	10	3	0
Total	126	7	5
*	LP = Laryngeal prominence		

Out of 138 cases, in most cases of hanging (76) the level of constriction was found above the laryngeal prominence where as in most cases of strangulation and throttling the level of constriction found on and above the laryngeal prominence.

Considering the information gathered from the police records and from the relatives of the deceased and taking the examination findings of the ligature material where ever it has been sent along with the dead body, it is observed that soft ligature like scarf, napkin, sari, bed sheet etc. were used in 66 cases of hanging and hard ligature like jute rope, plastic or nylon rope, electric wire etc. were used in 51 cases of hanging where as hard ligature were used in most cases of strangulation

Ligature Material in-situ:

Hanging	:	32
Strangulation	:	6
Total	:	38

Out of data available on 126 cases of hanging, 15 victims died due to partial hanging where some parts of victims were touching the ground where as 111 victims died due to complete hanging.

Out of data available on 138 cases of hanging, 58 (25%) victims had used long drop suspension i.e., greater than their body heights where as 80 (75%) victims had used short drop suspension.

Table-9: Types of hanging depending on the probable positions of the Knots:

Typical Hanging	Atypical Hanging Total	
Nos. of victims 19	119	138

Out of total 138 cases of hanging, the typical hangings were 19 where the probable knot positions were on the occiputs where as there were 119 victims died due to atypical hanging where the knot positions were other than over the occiputs. As the maximum constricting force acts diagonally just opposite the site of knot, the neck structures on the front of neck are compressed maximally in typical hanging than atypical hanging.

IV. Discussion

Out of 126 cases studied who died due to mechanical asphyxia, peak age incidence falls in the second decade (20-29 years) in both the sexes, the lowest incidence being in sixth decade of life. Major deaths were of females being 91 out of total 126 cases amounting to 56.5% with peak incidence in age group of 10-29 years, with 3 fold increased death rate as compared to males.

Incidence of fractures of hyoid bone varies in different studies from 0% to 68%, which also varies with types of mechanical asphyxia like hanging, strangulation and throttling. In the present study most of the cases of fractured hyoid bones were noted in throttling. Out of 5 cases of throttling, fracture of hyoid bone were noticed in 5 cases amounting to 83.3%. No fractures were seen in cases of ligature strangulation with zero fractures out of 9 cases of ligature strangulation and very few fractures asphyxia like hanging, strangulation and throttling. In the present study most of the cases of fractured hyoid bones were noted in throttling. Out of 5 cases of throttling, fracture of hyoid bone were noticed in 4 cases amounting to 80%. No fractures were seen in cases of ligature strangulation with zero fractures out of 9 cases of ligature strangulation and very few fractures. bone. But, sometimes hyoid bone may be fractured in hanging cases whenever the magnitude of constricting force is much greater.

In ligature strangulation, usually the level of constricting force is at the level of or below the level of thyroid cartilage, hence hyoid bone fracture does not occur commonly.

V. Conclusion

Taking the present study of "Hyoid bone fracture in cases of asphyxial deaths resulting from constricting force round the neck" it is concluded that incidence of hyoid bone fracture is almost nil or rare in cases of hanging where the constricting force act on the neck in a sliding or tangential manner. However,, increasing incidence of hyoid bone fracture after the age of 40 years can be concluded only after taking larger numbers of such cases, which need further continuous study in this regard.

Whenever a fracture of hyoid bone is observed in case of death due to hanging, then it is important to look for its ante-mortem character and site and at the same time he has to consider all the factors responsible for it otherwise should not give an opinion in haste other than hanging.

In cases of ligature strangulation, in some cases the hyoid bone got fracture as the constricting force applied here is greater in magnitude usually using hard ligature and acts in a vertical manner to the neck structures. In cases of throttling, the hyoid bone is usually fractured, as the constricting force is greater in magnitude over a larger area mostly directly acting upon the hyoid bone itself.

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