

An Audit of Hyoid Bone Fractures in cases of Strangulation of Neck at tertiary care hospital

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ABSTRACT

Aim: To assess the fractures of hyoid bone in cases of strangulation of neck at tertiary care hospital

Methods: This cross sectional study was conducted at Department of Forensic Medicine, Jinnah Medical College, Peshawar from January 2019 to December 2019. Total 100 cases of neck strangulation either male or female having age 15 to 60 years were selected. Fracture of hyoid bone was assessed.

Results: Total 100 cases with strangulation of neck were selected for this study. Average age was 27.8±14.33 years. Out of 100 cases of strangulation of neck, hyoid bone was fractured in 14 (14%) cases while no fracture was found in 86 (86%) cases. Modalities of strangulation of neck as follows: garroting, hanging throttling was noted in 78 (78%) cases, 13 (13%) cases and 9 (9%) cases respectively.

Conclusion: Results of present study showed that hanging is the most common modality of strangulation of neck. Most of the cases belonged to urban areas. Higher number of cases found with poverty. Males were predominant and most of the cases belonged to 2nd and 3rd decade of life.

Keywords: Strangulation of neck, Garroting, Throttling, Fracture of hyoid bone.

INTRODUCTION

A bone between thyroid cartilage and tongue root is known as hyoid bone.¹ It contains two greater horns and two lesser horns (cornua).² The bone does not articulate like any other, but is bound by the stylohyoid ligaments to the styloid process of temporal bone.² Injury of this bone is uncommon because it floats freely by nature.³ However, detection of fracture during autopsy, it is of great significance in forensic pathology. The strangulation is a form asphyxia which is characterized by the closure of passage of air and vessels of neck due to neck external pressure. Various modalities of strangulation are hanging, ligature strangulation (garroting) and manual manipulation (Throttling).³

Hyoid bone fracture is a recognized finding and indication of strangulation (more common in manual strangulation/throttling than by ligature). Detection of hyoid bone fracture is related to findings of modality of strangulation.⁴ Hyoid bone fractures occurred due to direct trauma (road accidents), trauma to neck (strangulation), pathological destructions due to tumors and muscular pressure. Hyoid fractures originate most commonly from strangulation. These may involve hanging (suicidal, judicial and accidental), ligature and manual strangulation.⁴

The exact mechanism of fracture is not clear, however two mechanisms have been suggested in which the hyoid bone may be fractured: from direct lateral neck compression and from indirect violence.⁵ These fractures occur on both sides equally and existence of predominance of male is insignificant.⁶ In cases of hyoid bone fractures and neck injuries, old age groups are more vulnerable, possibly due to cartilaginous structure and increasing bone brittleness⁷⁻⁸.

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MATERIAL AND METHODS

This cross sectional study was conducted at Department of Forensic Medicine, Jinnah Medical College, Peshawar from January 2019 to December 2019. Prior permission from institutional review committee was taken. Total 100 cases of neck strangulation either male or female having age 15 to 60 years were selected. Cases of burn and drowning were excluded from the study. Standard autopsy procedure was done and hyoid bone was dissected out for the detection of fracture. All the information like hyoid bone fracture, modality of strangulation of neck (Hanging/Garroting/ Throttling), age, gender, area of residence (rural/urban), economic status (poor/average/good) and educational status (educated/ uneducated) were recorded on pre-designed performa.

All the collected data was entered in SPSS version 20. Mean and SD was calculated variables like age. Frequencies were calculated for hyoid bone fracture (Yes/No), gender (Male/Female), area of residence (rural/urban), economic status (poor/average/good), modality of strangulation of neck, (Hanging/ garroting/ throttling) and educational status (educated/uneducated). Stratification in relation to age and gender was done and post stratification chi-square test was applied to see the association of these with hyoid bone fracture. P value ≤ 0.05 was considered as significant.

RESULTS

Total 100 cases with strangulation of neck were selected for this study. Average age was 27.8±14.33 years. Out of 100 cases of strangulation of neck, hyoid bone was fractured in 14(14%) cases while no fracture was found in 86 (86%) cases. (Fig. 1) Modalities of strangulation of neck as follows: Hanging, garroting and throttling was noted in 78(78%) cases, 13(13%) cases and 9(9%) cases respectively. (Fig. 2) Total 35 (35%) cases belonged to

rural area and 65 (65%) cases belonged urban area. (Table 1) Total 65(65%) cases were poor, average cases and good cases were 20 (20%) and 15(15%) respectively. (Table 2) Out of 100 cases, educated were 75(75%) while 25 (25%) cases were un-educated. (Table 3) Four age groups were made i.e. age group 15-30 years, age group 31-45 years, age group 46-60 years and age group >60 years. Total 55 (55%) cases belonged to age group 15-30 years followed by 20(20%) cases to age group 31-45 years, 15 (15%) cases to age group 46-60 years and 10 (10%) cases belonged to age group >60 years. Hyoid bone fracture was found in 9 (16.36%) cases of age group 15-30 years, 2 (10%) cases of age group 31-45 years, 2 (13.33%) cases of age group 46-60 years and 1 (10%) case of age group >60 years. Association of hyoid bone fracture with age group was not statistically significant (P = 0.882). (Table 4) Male cases were 62 (62%) while female cases were 38 (38%). Hyoid bone was fractured in 10 (16.13%) male cases and 4 (10.53%) female cases. Association of hyoid bone fracture with gender was not statistically significant (P = (0.624). (Table 5)

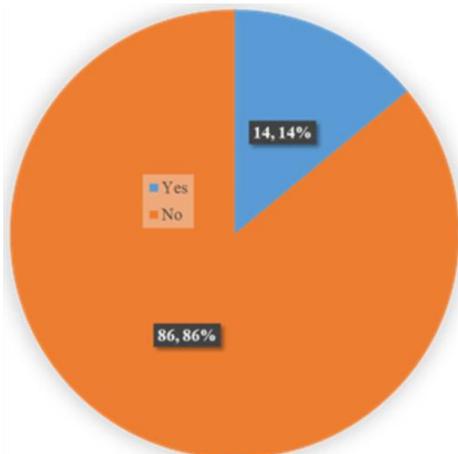


Fig. 1: Frequency of hyoid bone fracture

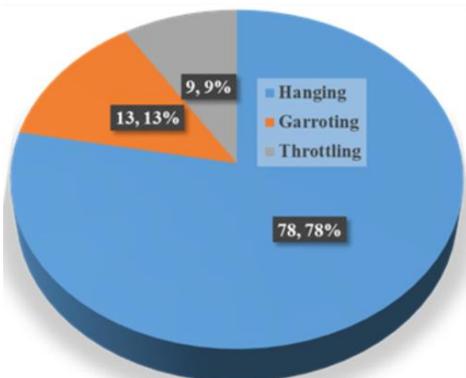


Fig.2: Different modalities of strangulation of neck

Table 1: Area of residence

Area of residence	Number	Percentage
Rural	35	35
Urban	65	65
Total	100	100.0

Table 2: Economic status

Economic status	Number	Percentage
Poor	65	65
Average	20	20
Good	15	15
Total	100	100.0

Table 3: Educational status

Educational status	Number	Percentage
Educated	75	75
Un-educated	25	25
Total	110	100.0

Table 4: Stratification for age

Age Group	Hyoid bone fracture		Total	P value
	Yes	No		
15-30	9 (16.36%)	46 (83.64%)	55 (55%)	0.882
31-45	2 (10%)	18 (90%)	20 (20%)	
46-60	2 (13.33%)	13 (86.87%)	15 (15%)	
>60	1 (10%)	9 (90%)	10 (10%)	
Total	14 (14%)	86 (86%)	100	

Table 5: Stratification for gender

Gender	Hyoid bone fracture		Total	P value
	Yes	No		
Male	10 (16.13%)	52 (83.87%)	62 (62%)	0.624
Female	4 (10.53%)	34 (89.47%)	38 (38%)	
Total	14 (14%)	86 (86%)	100	

DISCUSSION

Objective of present study was to evaluate the hyoid bone fracture in cases of strangulation of neck. Total 100 cases with strangulation of neck were selected for this study. Average age was 27.8±14.33 years. Out of 100 cases of strangulation of neck, hyoid bone was fractured in 14 (14%) cases while no fracture was found in 86 (86%) cases. In one study by Azher et al,⁹ total 135 cases with strangulation of neck was selected. Average age of the cases was 25.5±15.9 years which is comparable with our study. Another study by Paparo et al¹⁰ out of 167 cases, hyoid bone fracture was found in 6% cases followed by thyroids 11% hyoid and thyroid combined 3% and cricoids 0.6%. In another study by Ali et al,¹¹ mean age of the cases was 24.16±15.23 years. In same study total 87 cases of strangulation of neck was selected and fracture of hyoid bone was found in 20.7% cases which is comparable with our findings.

In a study by Kaheri et al,⁷ among 34 cases of strangulation of neck, hyoid bone fracture was noted in 14.7% cases. Nikolic et al¹² reported hyoid bone fracture in 68% cases. Charoonate et al⁸ reviewed 20 male cases of hanging and hyoid bone fracture was noted in 25% cases. Üzün et al⁶ reviewed 761 cases and found hyoid bone fracture in 177 cases. There is a variation of hyoid bone fractures in literature. In one study,¹³ out of 83 cases, no case was found with hyoid bone fracture and 11% cases found with fractured thyroids. Simonsen et al¹⁴ found fracture of hyoid bone in 9% cases while thyroid cartilages were found fractured in 28% cases and combined fractures occurred in 9% cases. In study of Luke et al¹⁵ hyoid bone fracture was occurred in 23% cases, no case of cricoid fracture was reported while thyroid was found fractured in 13% cases. In present study, modalities of strangulation of neck as follows: Hanging, garroting and

throttling was noted in 78 (78%) cases, 13 (13%) cases and 9 (9%) cases respectively. Studies of Singh et al¹⁶ and Rahman et al¹⁷ validated these findings.

Azher et al⁹ reported 80.7% cases of hanging, 10.3% cases of garroting and 9.0% cases of throttling. In present study male cases were 62 (62%) while female cases were 38 (38%). Hyoid bone was fractured in 10 (16.13%) male cases and 4 (10.53%) female cases. Association of hyoid bone fracture with gender was not statistically significant ($P = 0.624$). These findings are comparable with the findings by Uzun et al.⁶ In study of Ali et al,¹¹ Out of 53 male cases and 36 female cases, hyoid bone fracture was found in 8 male cases and 10 female cases. Vadgama et al¹⁸ reported male cases of hanging as 64% as compared to female hanging cases as 34%. Suicide by hanging was committed by 60% male cases and in 85.71% female cases reported by Qasim et al¹⁹ and Afridi et al²⁰. In study of Uzun et al⁶ male cases were 70.56% while female cases were 29.44%. In study of Feigin et al²¹. male cases were 275 and female cases were 42 and hyoid bone fracture was occurred in 25 male cases and in 4 female cases. In present study total 55(55%) cases belonged to age group 15-30 years followed by 20(20%) cases to age group 31-45 years, 15(15%) cases to age group 46-60 years and 10(10%) cases belonged to age group >60 years. Hyoid bone fracture was found in 9 (16.36%) cases of age group 15-30 years, 2 (10%) cases of age group 31-45 years, 2(13.33%) cases of age group 46-60 years and 1 (10%) case of age group >60 years. Association of hyoid bone fracture with age group was not statistically significant ($P = 0.882$). In study of Ali et al,¹¹ 80% cases of hanging were <20 years and 93.8% cases were between 20-30 years.

CONCLUSION

Results of present study showed that hanging is the most common modality of strangulation of neck. Most of the cases belonged to urban areas. Higher number of cases found with poverty. Males were predominant and most of the cases belonged to 2nd and 3rd decade of life.

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