

TEN YEARS RETROSPECTIVE AUTOPSY STUDY OF THROTTLING AND TRAUMATIC ASPHYXIA

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ABSTRACT

Objectives: The objectives of the study were to assess the characteristics of wounds on the body if present and to study the effect of constriction externally as well as internally on the underlying structures of the neck in throttling and traumatic asphyxia.

Methods: Collection of data was done from the record of the autopsies conducted of cases of traumatic asphyxia and throttling among the violent asphyxial deaths in the mortuary associated with the Department of Forensic Medicine and Toxicology, Government Medical College, Amritsar, during the past 10 years from January 1, 2006, to December 31, 2015.

Results: Among the violent asphyxial deaths studied, 5 (1.23%) cases studied were of throttling, 4 (0.98%) cases were of suffocation, and the least common was traumatic asphyxia for which only 3 (0.74%) cases were studied. Out of 5 cases of throttling, mechanical injuries were present in 4 (80%) cases, out of which bruises were seen in 1 (20%) case, while abrasions in combination with bruises were seen in 3 (60%) cases. Among the 3 (100%) cases of traumatic asphyxia, contusion of strap muscles, contusion of sternocleidomastoid, and contusion of subcutaneous tissue of the neck were present in all 3 (100%) cases. Regarding the time since death, the majority of cases of throttling and traumatic asphyxia 4 (50%) cases have 12 to 24 h, followed by two each (25%) have 24 to 36 h and 3 to 7 days.

Conclusion: Knowledge of these structures is necessary for the consistent diagnostic challenges associated with throttling, strangulation, and other forms of neck compression.

Keywords: Violent asphyxial deaths, Throttling, Traumatic asphyxia.

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INTRODUCTION

In violent asphyxial deaths, the process of respiration, i.e., the exchange of air between the atmosphere and the lungs beds, is prevented by some violent mechanical means. Violent asphyxia can be caused by constriction of the neck, closure of the nose and mouth, occlusion of the lumen of the air passages by some materials, and restricting the movement of respiratory muscles. Violent asphyxial deaths are very common and occur through hanging, strangulation, suffocation, traumatic asphyxia, and drowning [1] since the body lacks oxygen. Because of any violent mechanical interference, the body lacks oxygen as there occurs interference with the process of breathing, thus are called violent asphyxial deaths [2].

Throttling is asphyxia as a result of compression of the neck by human hands. Death occurs due to occlusion of carotid arteries. Occlusion of the airway plays a minor role. Postmortem appearances: External: Bruises on the neck: The situation and extent of the bruised areas on the neck will depend on the relative positions of the assailant and victim, the manner of grasping the neck, and the degree of pressure exerted upon the throat. Rarely, in throttling, there are no external or internal injuries. This occurs if the victim is unconscious and the amount of pressure on the neck is minimal. Fingernail abrasions: If the fingertips are pressed deeply, the pressure of the nails produces crescentic marks on the skin. The marks are more likely to be seen at the site of the thumb than the fingers because when the throat is gripped, the thumb exerts more localized pressure and is less likely to move than the fingers during the struggle of the victim.

Marks of struggle and external appearances of asphyxia are similar to those found in strangulation. The tongue may or may not be bitten but is usually protruded. Congestive-asphyxial signs appear in 15–30 s of pressure on the neck, but if a change in grip occurs, and fingers impinge on carotid structures, reflex cardiac arrest occurs so that the intensity of congestive changes may be of any degree in any given death [3].

Traumatic asphyxia results due to the mechanical fixation of the chest by an object or an unyielding substance preventing normal respiratory movement, thus leading to respiratory. The prominent features include cyanosis, deep purple, or purple-red in the color of the face, neck, head, and chest above the level of compression, confluent and petechial hemorrhages, and intense hemorrhages [4].

Aims and objectives

Aim of study

The present retrospective observational study was conducted to study the incidence and various epidemiological and postmortem findings in the autopsy cases of throttling and traumatic asphyxia.

Objectives

1. To assess the characteristics of wounds on the body if present
2. To study the effect of constriction externally as well as internally on the underlying structures of the neck in throttling and traumatic asphyxia.

METHODS

Collection of data was done, after taking permission from the institutional ethical committee, from the record of the autopsies conducted, of cases of traumatic asphyxia and throttling among the violent asphyxial deaths in the mortuary associated with the Department of Forensic Medicine and Toxicology, Government Medical College, Amritsar, during the past 10 years from January 01, 2006, to December 31, 2015. Four hundred and seven cases of violent asphyxial deaths were studied, and among that, a total of 8 cases of traumatic asphyxia and throttling were reported and were studied using a pre-tested structured schedule. The cases were studied with reference to their prevalence, distribution in relation to gender, area of residence, manner of death, associated injuries, and various internal and external findings.

Inclusion criteria

1. The autopsy on all cases of throttling and traumatic asphyxia among the violent asphyxial deaths during 10 years.

Exclusion criteria

1. All cases other than the cases of violent asphyxial deaths.

RESULTS

Among the violent asphyxial deaths studied, 5 (1.23%) cases studied were of throttling, 4 (0.98%) cases were of suffocation, and the least common was traumatic asphyxia, for which only 3 (0.74%) cases were studied. The other violent asphyxial deaths contributed to 399 (98.03%) cases (Table 1).

In throttling, 3 (37.5%) cases recorded were females, while only 2 (25%) were males, out of a total of 5 (62.5%) cases. In traumatic asphyxia, only 2 (25%) male cases were reported as compared to 1 (12.5%) female case out of a total of 3 (37.5%) cases (Table 2).

In the present study, the majority of cases are from the urban population (50%), followed by the rural population (37.5%), while 1 (12.5%) case was unknown. Males were more in urban (50%) areas as compared to no females present in urban populations, while females were more common in the rural population (25%) compared to males (12.5%) in the rural population (Table 3).

In throttling, all 5 (100%) cases were reported, and the manner of all cases was homicidal, while in traumatic asphyxia, 2 (25%) cases were accidental, and only one (12.5%) case was homicidal (Table 4).

Out of 5 cases of throttling, mechanical injuries were present in 4 (80%) cases, out of which bruises were seen in 1 (20%) case, while abrasions

in combination with bruises were seen in 3 (60%) cases. Out of 3 cases of traumatic asphyxia, mechanical injuries were present in all cases, out of which bruises were seen in 1 (33.33%) case, lacerated wounds in 1 (33.33%) case, and abrasions in combination with bruises and lacerated wounds were present in the rest of 1 (33.33%) case (Table 5).

In the present study, among the 5 (100%) cases of throttling, cyanosis was present in 4 (80%) cases, the tongue protruded in 4 (80%) cases, and inside the mouth in 1 (20%) cases, bleeding from the mouth was present in one (20%) case, and froth from nostrils was present in 2 (40%) cases. Among the 3 (100%) cases of traumatic asphyxia, cyanosis and bleeding from nostrils were present in all 3 (100%) cases, while froth from nostrils was present in only one (33.3%) case (Table 6).

In the present study, among the 5 (100%) cases, the internal findings in throttling, contusion of sternocleidomastoid, and contusion of subcutaneous tissue of the neck were present in all 5 (100%) cases of throttling, contusion of strap muscles was present in 4 (80%) cases while fractures were present in 2 (40%) cases. Among the 3 (100%) cases of traumatic asphyxia, contusion of strap muscles, contusion of sternocleidomastoid, and contusion of subcutaneous tissue of the neck were present in all 3 (100%) cases. Fractures were present in 2 (66.6%) cases, and only 1 (33.3%) case was present in a laceration of the vital organ (Table 7).

Regarding the time since death, the majority of cases of throttling and traumatic asphyxia 4 (50%) cases have 12 to 24 h, followed by two each (25%) have 24–36 h and 3 to 7 days (Table 8).

DISCUSSION

In India, violent asphyxial deaths are very common and increasing in number. A deeper understanding of the causation and demographic profile of these cases will help in formulating remedial measures to prevent untimely mortality. The major issue is the persistent challenge in conducting the autopsy of the neck and interpreting the observation for the final diagnosis of throttling which is much similar to those raised by Pollanen [5].

In the present study, among the throttling cases, the majority are females (37.5%) than males (25%), while in traumatic asphyxia, more males (25%) are present as compared to females (12.5%). Overall, among both throttling and traumatic asphyxia, the males and females cases are equal (50%). This finding of the present study differs from the study conducted by studies by various authors Gargi *et al.* [6], Singh and Singh [7], Srinivasareddy *et al.* [8], Patel *et al.* [9], Kumar *et al.* [10], Sharma *et al.* [11], Uzün *et al.* [12], Gurudut *et al.* [13], and Momonchand *et al.* [14] where male preponderance may be because of males, being the breadwinner of the family are more exposed to stress, strain, and occupational hazards compared to females, which is similar to the observations reported in different above cited studies.

Table 1: Profile of throttling and traumatic asphyxia among the total violent asphyxial deaths

Type of asphyxial death	Number of cases (%)
Throttling	5 (1.23)
Traumatic asphyxia	3 (0.74)
Other asphyxial death	399 (98.03)
Total	407 (100.0)

Table 2: Sex-wise distribution of the cases of throttling and traumatic asphyxia

Type of asphyxial death	Sex		Total, n (%)
	Male, n (%)	Female, n (%)	
Throttling	2 (25)	3 (37.5)	5 (62.5)
Traumatic asphyxia	2 (25)	1 (12.5)	3 (37.5)
Total	4 (50)	4 (50)	8 (100.00)

Table 3: Area-wise distribution of cases of throttling and traumatic asphyxia

Type of asphyxial death	Rural		Urban		Unknown		Total, n (%)
	Male, n (%)	Female, n (%)	Male, n (%)	Female, n (%)	Male, n (%)	Female, n (%)	
Throttling	0	1 (12.5)	3 (37.5)	0	1 (12.5)	0	5 (62.5)
Traumatic asphyxia	1 (12.5)	1 (12.5)	1 (12.5)	0	0	0	3 (37.5)
Total	1 (37.10)	2 (25)	4 (50)	0	1 (12.5)	0	8 (100.00)

Table 4: Distribution of throttling and traumatic asphyxia cases based on the manner of death

Type of asphyxial deaths	Suicidal, n (%)	Accidental, n (%)	Homicidal, n (%)	Unascertained, n (%)	Total, n (%)
Throttling	0	0	5 (62.5)	0	5 (62.5)
Traumatic asphyxia	0	2 (25)	1 (12.5)	0	3 (37.5)
Total	0	2 (25)	6 (75)	0	8 (100.00)

Table 5: Injuries pattern in cases of throttling and traumatic asphyxia

External injury pattern	Throttling (n=5), n (%)	Traumatic asphyxia (n=3), n (%)
AB	0	0
B	1 (20)	1 (33.33)
IW	0	0
LW	0	1 (33.33)
AB, B	3 (60)	0
AB, LW	0	0
B, LW	0	0
AB, B, IW	0	0
AB, B, LW	0	1 (33.33)
Total	4 (80)	3 (100)

B: Bruise, AB: Abraded B, IW: Incised wound, LW: Lacerated wound

Table 6: External findings in throttling and traumatic asphyxia

Findings	Throttling, n (%)	Traumatic asphyxia, n (%)	Total, n (%)
Cyanosis			
-	1 (20.00)	0	1 (12.5)
+	4 (80.00)	3 (100.00)	7 (87.5)
Seminal fluid discharge			
-	5 (100.00)	3 (100.00)	8 (100)
+	0	0	0
Froth from nostrils			
-	3 (60.00)	2 (66.66)	5 (62.5)
+	2 (40.00)	1 (33.33)	3 (37.5)
Tongue			
PRO	4 (80.00)	1 (33.33)	5 (62.5)
CBT	0	1 (33.33)	1 (12.5)
IM	1 (20.00)	1 (33.33)	2 (25)
Bleeding from nostrils			
-	4 (80.00)	0	4 (50)
+	1 (20)	3 (100)	4 (50)

PRO: Protruded, CBT: Clenched between teeth, IM: Inside mouth

Table 7: Internal findings in throttling and traumatic asphyxia

Findings	Throttling, n (%)	Traumatic asphyxia, n (%)	Total, n (%)
Contusion of strap muscles			
-	1 (20.00)	0	1 (12.5)
+	4 (80.00)	3 (100.00)	7 (87.5)
Contusion of sternocleidomastoid			
-	0	0	0
+	5 (100)	3 (100)	8 (100)
Contusion of subcutaneous tissue of the neck			
-	0	0	0
+	5 (100)	3 (100)	8 (100)
Fractures			
-	3 (60)	1 (33.3)	4 (50)
+	2 (40)	2 (66.66)	4 (50)
Laceration of vital organ			
-	5 (100)	2 (66.6)	7 (87.5)
+	0	1 (33.33)	1 (12.5)

In the present study, the majority of cases are from the urban population (50%), followed by the rural population (37.5%), while one (12.5%) case was unknown. Males were more in urban (50%) areas as compared to no females present in urban populations, while females were more common in the rural population (25%) compared to males (12.5%) in the rural population. This finding of the study differs from

Table 8: Time since death in throttling and traumatic asphyxia

Time since death	Throttling, n (%)	Traumatic asphyxia, n (%)	Total, n (%)
6-12 h	0	0	0
12-24 h	3 (37.5)	1 (12.5)	4 (50)
24-36 h	1 (12.5)	1 (12.5)	2 (25)
36-72 h	0	0	0
3-7 days	1 (12.5)	1 (12.5)	2 (25)
>7 days	0	0	0
Total	5 (62.5)	3 (37.5)	8 (100)

the study of Singh and Singh [7], in which they found that more cases of violent asphyxial deaths were reported from rural areas (51.60%) as compared to urban (48.40%).

In the present study, the most common manner of asphyxial deaths was homicidal in nature (75%), followed by accidental (25%) manner. This correlates with studies of Gargi *et al.* [6], Meel [15], Maxeiner *et al.* [16], Tirmizi *et al.* [17], and Kumar *et al.* [10]. In throttling cases, external findings such as cyanosis were observed in 80% of cases, seminal fluid discharge in 60% of cases, external injuries in 80% of cases, froth from nostrils in 40% of cases, and tongue protruding out in 80% cases. Internal findings observed were contusions of strap muscles in 100% of cases. The results differ from those observed by Sharma *et al.* [11], who observed contusions of neck muscles in 25% of cases. However, they observed more hyoid and thyroid cartilage fractures which were not observed in the encountered throttling cases in our study. The hyoid fractures can be related to studies conducted by Olmstead [18], Guernsey [19], Bagnoli *et al.* [20], and Kaufman *et al.* [21].

Pertaining to traumatic asphyxial deaths encountered, there was cyanosis in 100% of cases, froth from nostrils in 33.33% of cases, and external injuries in 100% of cases. Bruises in 33.33% of cases, lacerated wounds in 33.33% of cases, and a combination of abrasions, bruises, and lacerated wounds in 33.33% of cases were observed in the majority of the cases. These results coincide with the findings of Kumar *et al.* [22], who reported 4 cases of traumatic asphyxial deaths during a study period from 2000 to 2005 and observed cyanosis, petechiae, bleeding from nostrils, and external injuries such as abrasions over the chest and abdomen in 100% of cases. The present study coincides with the findings of the study conducted by Gargi *et al.* [6].

CONCLUSION

In throttling cases, external findings such as cyanosis were observed in 80% of cases, seminal fluid discharge in 0% cases, external injuries in 80% of cases, froth from nostrils in 40% of cases, and tongue protruding out in 80% cases. Rigor mortis was present in 80% of cases. Internal findings observed were contusions of strap muscles in 100% of cases. Pertaining to traumatic asphyxial deaths encountered, there was cyanosis in 100% of cases, froth from nostrils in 33.33% of cases, and external injuries in 100% of cases. Bruises in 33.33% of cases, lacerated wounds in 33.33% of cases, and a combination of abrasions, bruises, and lacerated wounds in 33.33% of cases were seen in the majority of the cases. Awareness of anatomical variations and artifacts in the neck structures is much important for a forensic pathologist as critically important structures are represented in the neck. Thus, the knowledge of these structures is necessary for the consistent diagnostic challenges which are associated with throttling, strangulation, and other forms of neck compression.

AUTHORS CONTRIBUTION

Dr. Jaspinder Pratap Singh: data collection applying statistics, rechecking data and validation, and helping in preparing the manuscript.

Dr. Kuldip Kumar: literature search and help in preparing the manuscript.

CONFLICTS OF INTERESTS

None.

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