H137 A Quantitative Assessment of Peri-Mortem Blunt Force Trauma of the Neck

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After attending this presentation, attendees will understand the variation in injury patterns observed in cases of blunt force trauma to the neck; in particular, the frequencies at which these injuries can occur in association with different manners of death.

This presentation will impact the forensic science community by contributing to the understanding of neck structure trauma and may provide empirical support for the differential diagnosis of various types of blunt force trauma to the neck.

Neck injuries, to both soft and hard tissues, are well known to be associated with blunt force trauma, particularly that resulting from strangulation, hanging, direct impacts, or indirect impacts to the neck region. There still exists a paucity of information regarding the location and frequency of these injuries in non-experiment-based research, particularly with respect to the hard tissue trauma. The goal of this study is to examine all cases of traumatized hard and soft tissue neck structures in order to identify distinctive patterns that may occur in relation to the mechanism of death. Associations between blunt force injury patterns and mechanisms are explored.

A retrospective review of autopsy reports completed at the Harris County Institute of Forensic Sciences during 2012-2014 that included an anthropology analysis of peri-mortem blunt force trauma was conducted. The location and types of soft and hard tissue injuries as well as cause and manner of death were recorded. The injury locations were grouped into three general areas: (1) external (cutaneous soft tissue injuries); (2) internal (subcutaneous and musculature soft tissue injuries); and, (3) hard tissue (bone and cartilage injuries). The distribution of cases by manner of death was as follows: 9 accident, 70 homicide, 13 natural, 12 suicide, and 10 undetermined.

Only 12 of the reviewed cases had no evidence of any soft or hard tissue injury. A small number of cases (7%) could not be assessed for soft tissue injuries due to the advanced stage of decomposition. Soft tissue injuries were observed in nearly all of the cases. In these cases, approximately 75% had external injuries and 73% had internal injuries. External injuries were present in all manners of death in varying numbers, with homicides and suicides having the highest percentages, 87% and 100%, respectively. Internal injuries were also present in all manners of death in varying numbers; however, no pattern was discerned.

Only half of the cases had hard tissue trauma with all accident cases being atraumatic. Nearly half of the total injuries were observed on the thyroid cartilage. With the thyroid cartilage fractures, most injuries occurred on the superior thyroid horn; specifically, along the base of the horn. Cricoid fractures were most frequently observed on the anterior arch. Most of the hyoid fractures were located on the greater horns; in particular, along the shaft/body.

As expected, external and internal injuries occurred in high frequencies with at least one area (i.e., external, internal, and/or hard tissue) represented. Unexpectedly, hard tissues injuries in the absence of external injuries were also present in cases that were ruled as homicide, natural, and undetermined. Similarly, hard tissue injuries in the absence of internal injuries were present in cases with all manners of death represented, except for accident. With respect to soft tissue injuries, bilateral anterior neck hemorrhages were found in 39% of the cases and bilateral cartilage hemorrhages were found in 18% of the cases; however, only 24% of the total cases had bilateral hard tissue injuries. The most frequent of these bilateral injuries was observed in the cricoid cartilage. These hard tissue bilateral fractures were found in homicide and suicide cases only.

The results of this study demonstrate the importance of examining both the soft and hard tissues of the neck in order to assess peri-mortem blunt force trauma. Soft tissue has a higher tendency to be injured; however, hard tissue trauma can be observed in the absence of soft tissue trauma. Interestingly, bilateral hard tissue injuries were found in high frequencies in homicide cases and lower frequencies in suicide cases, but in no other manners of death.

Blunt Force Trauma, Neck, Larynx

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