



G104 Laryngeal and Hyoid Bone Trauma Resulting From Forces Other Than Compression of the Neck

Carlos F. Chavez-Arias, MD, Puerto Rico Institute of Forensic Sciences, PO Box 11878, Caparra Heights Station, San Juan, PR 00922- 1878; Dario Sanabria, MD, Puerto Rico Institute of Forensic Sciences, Department of Pathology, PO Box 11878, Caparra Heights Station, San Juan, PR 00922-1878; and Javier Serrano, MD, Puerto Rico Institute of Forensic Sciences, Calle Maga Esquina Casia #9, Urb. Reparto Metropol, San Juan, PR 00921*

The goal of this presentation is to describe and discuss ten cases associated with laryngeal and hyoid bone blunt trauma.

This presentation will impact the forensic science community by demonstrating the pathological features of this infrequently discussed entity in the non-homicidal setting.

Hyoid bone fractures are usually the result of direct trauma to the neck through manual strangulation or hanging. These fractures secondary to blunt trauma other than strangulation are rarely reported and discussed. This report discusses ten cases with hyoid bone or laryngeal fractures associated to blunt trauma.

Ten head and neck trauma cases in which the autopsy disclosed the presence of hyoid bone or laryngeal fractures were reviewed. These cases occurred within the period 2008-2009 and examined at the Puerto Rico Institute of Forensic Sciences. Cases with a diagnosis of strangulation or hanging were excluded.

The ten cases are summarized in Table 1.

Eight of ten cases were male and two were women. All cases corresponded to adults between 24 to 80 years. Half of the cases were older than 50 years. Eight out of ten cases corresponded to motor vehicle accidents; one case was a small plane crash accident and one case was a homicidal blunt trauma to the head with a concrete block. The motor vehicle accident cases included three motorcyclists, three pedestrians and two car drivers.

Common autopsy findings for all cases included the presence of hyoid bone and or laryngeal fractures associated with craneofacial trauma with maxilla and mandible fractures.

The most common fractured site was the joint between the left greater cornu with the left side of the body of the hyoid bone. Five cases had only one fracture at the left side and two cases had bilateral fractures. One case had a unilateral fracture at the right side. Fractures of the hyoid body were found in two cases, including one case with multiple fractures of the hyoid bone. Cases with thyroid cartilage fractures included one left superior cornu fracture and two cases with fractures of the right and left laminae. The cause of death for each of the ten cases was Blunt Force Injuries and the manner of death for nine of the cases was accident and one case was homicide.

Hyoid bone fractures secondary to trauma due to strangulation or hanging are rare. In the forensic literature, little information of laryngo-hyoid trauma in victims other than compression of the neck is available. Forensic pathologists look for a fractured hyoid bone as evidence of strangulation. There are several reasons contributing to the rarity of this fracture. The first is that the hyoid bone is well protected by the mandible. Most trauma to the face results in fracture of the mandible without hyoid bone fracture. The second is that hyoid bone is protected by its mobility in all directions, so the pressure may be cushioned. The third is that it is not completely ossified in younger patients allowing for more flexibility and decreased rigidity.

In laryngo-hyoid fractures, three mechanisms could be involved. The first involves a direct impact of the neck structures. The second involves an indirect muscle strain on the hyoid bone or thyroid cartilage resulting from hyperextension or hyperflexion of the neck or secondary to associated local trauma such as mandible fractures. The third is a combination of direct and indirect mechanisms.

These cases could represent similar mechanisms involved during a blunt trauma in which hyoid bone and laryngeal fractures are the result of high energy forces applied to the mandible strong enough to be transmitted by its anatomical contiguity. Strong muscle strains on the mylohyoid muscle could lead to hyoid bone lesions in case of mandible fracture where this muscle is inserted. This could explain the common association of hyoid bone fractures with mandible fractures in this report.



Pathology Biology Section – 2010

Table 1: Ten Laryngeal and Hyoid Bone Trauma Cases

Case #	Sex	Age (years)	Circumstances	Hyoid/Bony Trauma	Laryngeal Trauma	Facial Injuries	Classification of Death
1	M	81	Struck head with concrete block	Hyoid bone (post body)		Mandible	IPP (blunt)
2	M	28	MVA Motorcycle	Left joint body and greater horn	Left larynx	Mandible	IPP (blunt)
3	M	61	MVA Driver	Left joint body and greater horn		Mandible	IPP (blunt)
4	M	21	MVA Suburban	Hyoid body	Right and Left joint/body components	Mandible	IPP (blunt)
5	M	65	MVA Suburban	Right joint/body and greater horn	Right larynx	Mandible	IPP (blunt)
6	M	31	MVA Motorcycle	Left joint/body and greater horn		Mandible	IPP (blunt)
7	F	43	MVA Motorcycle	Left anterior horn of hyoid		Mandible	IPP (blunt)
8	F	31	MVA Driver	Left joint/body and greater horn		Mandible	IPP (blunt)
9	M	24	MVA Motorcycle	Right and Left joint/body and greater horn		Mandible	IPP (blunt)
10	M	50	Trunk strike from tree	Left joint/body and greater horn		Mandible	IPP (blunt)

Hyoid Bone Fracture, Laryngeal Fracture, Mandible Fracture