



### **G36 Laryngeal and Hyoid Bone Trauma: Unusual Injuries in a Suicide Jump Into the Water**

*Cristina Cordeiro, MSc\*, Instituto Nacional De Medicina Legal, Largo Da Se Nova, Coimbra 3000-213, PORTUGAL; Júlio Barata, MSc, Instituto Nacional de Medicina Legal, Largo da Sé Nova, Coimbra 3000-213 Coimbra, PORTUGAL; Bárbara Santa Rosa, MSc, Instituto Nacional de Medicina Legal, Largo da Sé Nova, Coimbra 3000-213 Coimbra, PORTUGAL; Rosa Gouveia, PhD, Instituto Nacional de Medicina Legal, Largo da Sé Nova, Coimbra 3000-213 Coimbra, PORTUGAL; and Duarte N. Vieira, PhD, MD, Rua Antonio Jose de Almeida, No 117, Coimbra 3000-044, PORTUGAL*

After attending this presentation, attendees will understand how important a complete autopsy is, including paying special attention to neck structures, the histological and toxicological exams, the death scene investigation, and analysis of the circumstances in cases of laryngo-hyoid trauma as a result of presumed suicide by jumping from a height into the water, especially to exclude a possible homicide.

This presentation will impact the forensic science community by showing how useful a formaldehyde fixation of the neck organs can be, prior to their dissection, allowing an easier dissection of this area and better identification of the injuries and how important the integration of all information to determine the manner of death.

In forensic contexts, falls from great heights are suicidal in most cases. However, accidents can occur as well as homicides. The presence of neck injuries, particularly laryngeal and hyoid bone trauma, are not common, especially when water impacts are involved. These findings always raise the possibility of a previous homicidal strangulation.

In the forensic literature, reports of laryngo-hyoid trauma after falls from a height are not frequent. The majority of the cases concerned impacts of the victims on the ground and little information is available for impacts on water surfaces. Even for impacts on the ground, some studies found this trauma in no more than 5% of the cases. In reviewing 65 cases of suicide by jumping from the Bosphorus Bridge in Istanbul, in only two cases were laryngo-hyoid fractures found. Another study of 169 cases involving suicide jumps from the Golden Gate Bridge in San Francisco didn't report any case of laryngo-hyoid trauma.

Even if in suicidal situations laryngo-hyoid fractures can be present, their interpretation should be taken with considerable caution, bearing in mind the possibility of a previous homicide attempt.

This study presents a case of a 56-year-old businessman with financial problems. His car was found parked on a bridge with the emergency flashers engaged. A witness saw a body floating in the river about 20 meters downstream from the bridge. The person was not signaling for help, and the body sunk after a few minutes. The height of the bridge to the river bed was about 40 to 50 meters. The body was found 24 hours later.

During the autopsy, the external examination found a large ecchymosis in the left ear, little ecchymosis in the left orbital region, nose, anterior view of the left arm and left leg, and transversal and parallel abrasions on the thigh.

The internal examination showed more significant injuries, namely blood infiltration of the frontal and temporal regions on the left side, of the muscles of the face on the same side, on the right side of the neck, and also of the proximal pre-cervical muscles. The large horns of the hyoid bone as well as the superior horns of the thyroid cartilage were fractured and also surrounded by a significant hemorrhage. Vertebral cervical fractures and fractures of the ribs and sternum were present. Small tears in the intima of the descending aorta, with blood infiltration, and contusion of the heart and pancreas complete the traumatic findings. Cerebral and pulmonary edema as well as aqueous foam in the bronchia were also found.

The neck organs were removed *en bloc* and subjected to formaldehyde fixation. A careful dissection allowed a better identification of the fractures, edema of the aryepiglottic folds, and haematomas at the pharyngeal and esophageal mucosa. Histological exams were performed as well as toxicological, which were negative for alcohol, drugs, and pesticides. The first exams confirmed the vitality of the injuries and the presence of alveolar lesions, type "*emphysema aquosum*," in the lungs and diffuse vascular congestion, consistent with drowning.

After the autopsy, a farewell note was found inside the car of the victim. As the police didn't find anything suspicious during the investigation, the case was classified as a suicide.

This study underlines how, in situations of laryngo-hyoid fractures resulting from impact on water surfaces, a careful autopsy combined with histological and toxicological exams and the information from the death scene investigation are crucial in determining the manner of death and excluding homicide.

#### **Fall, Laryngo-hyoid Fractures, Suicide**