



Pathology/Biology Section - 2015

H86 Micro-Computed Tomography (Micro-CT) Features of Laryngeal Fractures in a Case of Fatal Manual Strangulation

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After attending this presentation, attendees will be aware of a new application of micro-Computed Tomography (CT) for dealing with the identification of the signs of pressure of the neck in cases of subtle manual strangulation.

This presentation will impact the forensic science community by suggesting a novel approach for the identification of laryngeal fractures by means of micro-CT analysis.

It is widely accepted that there are no specific or fully determinate signs of asphyxia. In cases of subtle fatal neck compression, postmortem findings on external examination of a body as well as on autopsy may vary considerably depending on the type of violent trauma, the strength of the resistance exerted by the victim, and on the intensity and duration of neck compression. Based on the detection of a combination of morphological hallmarks such as external injuries to the skin, hyoid or laryngeal fractures, hemorrhages of the overlying soft tissues, and subconjunctival petechiae, the diagnosis of homicidal neck compression is generally accepted.

A case is presented of a 45-year-old schizophrenic patient found on the floor of the bedroom of a psychiatric ward in cardiopulmonary arrest. The patient was successfully resuscitated; nevertheless, brain death was declared after two days in a vegetative state. The roommate of the deceased, who was also schizophrenic, stated that “the voice of God told me to kill my roommate” and death occurred after a prolonged scuffle. The body showed only vague signs of violence at external inspection (i.e., a subtle bruise on the forehead and a minute scratch on the left arm).

At autopsy, the identification of subepicardial petechiae and moderate pulmonary emphysema were not useful for the diagnosis of asphyxial death because these signs might be related to resuscitative maneuvers with prolonged artificial ventilation. Since focal hemorrhagic infiltration of the tracheal mucosa and the superior horns of the thyroid cartilage were observed, a CT scan of the entire larynx was performed, with the goal of identifying laryngeal fractures. Moreover, both superior horns of the thyroid cartilage were analyzed thorough a micro-CT, a radiological technique for tissue analysis with a spatial resolution of a few microns. The 3D reconstruction allowed for identification of multiple cartilage fragments of the larynx. Consequently, the cause of death was identified as asphyxia due to manual strangulation.

Considering that micro-CT analysis is able to generate images with a high level of detail compared to conventional radiological techniques, in cases of subtle fatal neck compression this type of investigation could be useful for the morphological identification of comminuted bilateral fractures. This may be particularly useful in cases involving children and young adults where fractures or cartilage damages may be minimal or absent as a consequence of the elasticity of the ligaments around the larynx and hyoid bone as well as the early stage of ossification.

Manual Strangulation, Laryngeal Fracture, Micro-CT