H21 A Complete Transection of the Aorta During Resuscitative Efforts

Amanda Ho, Southwestern Institute of Forensic Sciences, Dallas, TX 75207; Grant W. Herndon, DO, Southwestern Institute of Forensic Sciences, Dallas, TX 75207*

Learning Overview: The goal of this presentation is to present an unusual injury sustained during resuscitative efforts and explain the rationale behind the classification of the injury.

Impact on the Forensic Science Community: This presentation will impact the forensic science community by educating attendees about the characteristics of resuscitative injuries, which will allow scientists to classify injuries appropriately, even when atypical.

A variety of resuscitation injuries and their frequencies have been reported in the literature, including contusion and thermal injury of the chest, sternum and rib fractures, lacerations to underlying organs, and laryngeal and tracheal contusions.[1-3] They are accepted as a risk of potentially life-preserving measures of last resort. On occasion, though, these injuries may be so severe that they would likely prove fatal were the patient to regain a pulse. They also may cause confusion for investigators performing an examination after death.

This report presents a case of a complete transection of the aorta in a decedent who received in-hospital resuscitation, an occurrence that has not previously been reported as a consequence of vigorous resuscitation efforts. In this case, a 56-year-old woman was found unconscious but alive in a vehicle along a roadway with no signs of injury, according to the report by first responders. She was transported to a hospital, where she was admitted to intensive care for ten hours with a differential diagnosis of sepsis or hyperthermia with dehydration before she lost a pulse. Over the course of the next three hours, Cardiopulmonary Resuscitation (CPR) was performed five times before resuscitation efforts were halted and death was pronounced. At autopsy, she had a contusion over the midline of the chest, a sternal fracture, fractures of the first through eighth ribs bilaterally, lacerations of the epicardium and myocardium, and complete transversely oriented transection of the descending aorta posterior to the heart. The surrounding mediastinal soft tissue contained a mild to moderate amount of hemorrhage without dissection planes and without hemothoraces.

Such an injury would not be compatible with life were she to have survived with return of spontaneous circulation, raising questions about the futility of resuscitative efforts for the medical community. For medical examiners, this or similar injury may be incorrectly attributed to forceful deceleration in a different circumstance, especially since the decedent was found in a vehicle. However, the decedent would not have survived 13 hours in the hospital (in addition to the unknown amount of time at the scene) if the injury had occurred around the time that she was found. Additionally, the mild to moderate amount of hemorrhage present in the mediastinum without significant blood in the pleural cavities indicates the injury occurred shortly prior to death, before development of significant bleeding under arterial pressure. Correlation of the autopsy findings with hospital records also provides a way to attribute the injury to resuscitative efforts. While CPR may vary greatly in efficacy and force among those performing it, the reports of prolonged, repeated resuscitation performed by trained health care providers in this case offers a plausible mechanism of injury.

Reference(s):

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3. Buschmann, C.T., and M. Tsokos. Frequent and Rare Complications of Resuscitation Attempts. *Intensive Care Med* 35, no. 3 (Mar 2009): 397-404. https://doi.org/10.1007/s00134-008-1255-9.

Autopsy, Resuscitation, Artifacts

*Presenting Author