



Pathology Biology Section - 2012

G25 Traumatic Pericardial Rupture

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After attending this presentation, attendees will understand the frequency, spectrum, and associated injuries occurring with traumatic rupture of the pericardial sac caused by blunt impact.

This presentation will impact the forensic science community by expanding knowledge base of blunt impact thoracic injuries and help autopsy pathologists recognize traumatic rupture of the pericardial sac as a marker for energy loading of the heart by presenting data from a series of autopsies in which pericardial laceration was associated with high velocity impact trauma.

A retrospective review was conducted of 145 consecutive blunt injury autopsies performed by one pathologist from 2007 through the first quarter of 2011, comprising all traffic fatalities and suicides who leaped from high structures. One-hundred-fourty were traffic accidents and five were suicides by leaping from a height. The age range of the study cases was 17-80 years with a median age of 29 years and a mean of 37.4 years. Thirty-eight cases were selected for review because they had lacerations or contusion of the heart or laceration of the pericardial sac; 17 were motor vehicle operators, six were motor vehicle passengers, six were pedestrians, five were motorcycle operators, and four were suicides who leaped from a height. Of the 38 study cases, 28 had laceration of the pericardial sac, of which 24 had associated cardiac contusion or laceration. A single pericardial laceration was present in 22 of the cases. In five of 13 pericardial lacerations involving the left side of the sac, the heart was statically herniated through the defect. In three of eight pericardial lacerations on the right side of the sac, the heart was statically herniated through the defect. One case has a single pericardial laceration on the anterior sac without herniation. Multiple pericardial lacerations were present in six cases, one with static herniation of the heart. Fractures of the ribs, sternum or ribs and sternum were associated with pericardial laceration in six cases.

The most likely mechanism causing lacerations of the pericardial sac involves the heart being forced through the sac when the space between the sternum and the vertebral column is reduced by impact. Pericardial lacerations are frequently associated with wounds of the heart, great vessels, lungs and skeletal structures; lacerations of the pericardium infrequently occur in isolation and most subjects with pericardial lacerations died rapidly; only five of the 22 cases with pericardial lacerations were transported to the hospital. Isolated surgical case reports have described this type of injury; however, no case series were found in a search of the relevant literature.

Pericardial Sac, Traumatic Herniation, Laceration