



### **G85 Laceration of the Inferior Vena Cava Following Blunt Abdominal Trauma in a Case of Child Abuse**

*Carlos F. Chavez-Arias, MD\*, Puerto Rico Institute of Forensic Sciences, PO BOX 11878, Caparra Heights Station, San Juan, PR 00922-1878; and Javier G. 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 a child abuse case with multiple blunt injuries that include blunt abdominal trauma with laceration of the inferior vena cava (IVC).

This presentation will impact the forensic science community by demonstrating an uncommon finding resulting from blunt trauma in a child abuse case.

The majority of injuries to the IVC are due to penetrating trauma. Only 10% of these injuries will be caused by blunt trauma. This may be due to the fact that the IVC is a retroperitoneal organ and is therefore relatively protected from injury. Injury as a result of blunt trauma would only result from a force of great magnitude.

This case involved a 22-month-old, Hispanic, male infant who arrived dead to the emergency room. The stepfather stated that he witnessed the infant falling to the ground while walking and hitting his head against the adjacent wall. The stepfather tried to resuscitate the child but he continued to lose consciousness. He waited for the infant's mother to arrive home and they took the child to the emergency room. His social history revealed that he lived with his mother and the stepfather and there was no family history of child protective services involvement. At the time of the event, he was under the stepfathers' care. The stepfather denied any physical abuse against the child.

At autopsy the body corresponded to a well-developed and well-nourished male infant. He was 33 inches tall and weighed 31 pounds. External examination of his face and head showed multiple recent contusions and abrasions over the face and scalp. Multiple foci of subgaleal hemorrhage were present over the skull. The brain had mild subarachnoid hemorrhage over the left parietal and occipital lobes. Examination of the brain disclosed no other trauma. The head had no fractures. The torso also revealed multiple recent contusions. The abdomen was moderately distended. After entering the peritoneal cavity, 150 mL of liquid blood and 35 grams of blood clots were noted. There was a laceration to the proximal suprahepatic segment of IVC with presence of blood clots adjacent to the laceration. Moderate hemorrhagic infiltrate was present in the subintimal layer of the IVC along the supradiaphragmatic segment of the vein extending to the right atrium of the heart. Gross examination of the abdominal viscera found no other source of bleeding. The right pleural space had 40 mL of liquid blood. The right and left lungs had multiple contusions. Small lacerations were present next to the hilum of the right lung. Examination

of the extremities showed multiple recent contusions and no fractures. Toxicological evaluation was negative for alcohol, cocaine, opioids, and cannabinoids. The cause of death was blunt force injuries and the manner of death was ruled a homicide.

Intra-abdominal hemorrhage is most commonly associated with a clear history of trauma. In young children, the liver and spleen are the most common abdominal viscera to sustain a traumatic injury. Lacerations of the inferior vena cava resulting from blunt trauma are relatively rare, but extremely serious with a high mortality and may be difficult to repair. The majority of injuries of the IVC are due to penetrating trauma and only a small percentage is caused by blunt trauma. Lacerations to the IVC are uncommon injuries in the pediatric population. Lacerations of this vessel indicate a force of great magnitude with a profound level of injury. The presented case has evidence of blunt trauma in multiple regions of the body. The abdomen and thorax were the most severely affected regions. The unique feature of this case is the finding of IVC laceration with no other abdominal viscera involvement. In this case intra-thoracic and intra-abdominal tensional forces produced by blunt trauma to the torso could explain the lacerations of the IVC and hilar area of the right lung.

**Laceration of Inferior Vena Cava, Blunt Trauma, Child Abuse**