



H126 Dorsal Root Ganglia and Nerve Root Hemorrhage in Resuscitated Respiratory Syncytial Virus (RSV) Bronchiolitis

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Learning Overview: The goal of this presentation is to show the ischemia-reperfusion injuries of the central nervous system in resuscitated RSV bronchiolitis.

Impact on the Forensic Science Community: This presentation will impact the forensic science community by furthering the understanding of ischemia-reperfusion injury once thought to be specific for trauma.

Autopsy findings in pediatric deaths can be challenging due to the complex, evolving, and occasionally conflicting body of literature that obfuscates the distinction between pathologic findings and artifacts of resuscitation. This presentation reports two autopsy cases of RSV in children with secondary bronchopneumonia and cardiopulmonary arrest that highlight the importance of autopsy, including fundal, brain, spinal cord, spinal nerve root, and dorsal root ganglia examination.

Case 1: A 5-month-old girl without significant past medical history was brought by her mother to the Emergency Department (ED) with a one-day history of fever (measured at home at 101°F), cough, and congestion. She was diagnosed with a viral upper respiratory illness, advised to take acetaminophen, and sent home. The girl was brought to the ED later the same evening with decreased intake and multiple episodes of emesis with continued fever (recorded in ED at 103.2°F). She was given ondansetron and discharged home. Two days later, at approximately 4:30 a.m., the father found the infant unresponsive and facedown on the couch. She was brought to the ED pulseless and apneic. Despite maximal cardiopulmonary resuscitative efforts, there was no return of spontaneous circulation.

Case 2: A 9-month-old girl with a history of sickle cell trait was brought to the ED for congestion, cough, and fever. A RSV rapid antigen test was negative. A chest radiograph showed clear lung fields throughout. She was diagnosed with an upper respiratory tract infection and discharged home with prednisolone and amoxicillin. The following day, the infant was being transported to the ED by her father when she suffered cardiopulmonary arrest in the father's vehicle. Emergency services were contacted and transported the infant to the ED. She arrived apneic and without palpable pulses. She eventually had return of circulation after approximately 30 to 40 minutes of downtime. A chest X-ray showed a suspicion for multi lobe airspace disease. She was subsequently transferred to Wake Forest Baptist Medical Center Emergency Department where her pupils were noted to be fixed and dilated on arrival. That evening, the decision was made to transfer her care to comfort measures. Late that evening, she had loss of pulses for approximately two minutes with return of circulation. Ophthalmology noted bilateral retinal hemorrhages at this time. Her clinical status deteriorated, and she was pronounced approximately 12 hours after admission.

Autopsy findings for both cases identified RSV genetic material on postmortem nasopharyngeal swab, as well as lungs with bronchiolitis and necrosis of respiratory epithelium. Secondary bacterial bronchopneumonia was also present on microscopic sections in both cases with *Lactococcus lactis* isolates recovered from lung and blood cultures in Case 1. Postmortem indirect ophthalmologic examination confirmed bilateral retinal hemorrhages in Case 2. Spinal cord and dorsal root ganglia were examined in both cases. Case 1 showed no ischemic neurons in the brain sections examined as well as spinal cord and dorsal root ganglia without significant hemorrhage, necrosis, or inflammation. In contrast, examination of the cord in Case 2 showed diffuse hypoxic-ischemic changes of the neurons within the anterior and posterior horns. Dorsal root ganglia from C6/7 showed hemorrhage along the fascicles of the nerve roots with superficial extension into the dorsal root ganglia. Intradural hemorrhage was prominent around lumbar nerve roots. Additionally, Case 2 showed an enlarged spleen with diffusely enlarged red pulp. Sickled red blood cells were identified throughout microscopically examined tissue. These findings suggest an element of red cell sequestration due to sickling in the setting of hypoxic stress of RSV bronchiolitis and secondary bronchopneumonia.

Diffuse hypoxic-ischemic injury of the brain and spinal cord is a non-specific finding in pediatric deaths. Dorsal root ganglial hemorrhage has previously been reported to be mechanistically associated with hyperextension/hyperflexion neck injury in young children. This study proposes that the dorsal root ganglia and spinal cord hemorrhage may reflect ischemia-reperfusion injury in the setting of prolonged resuscitation with return of circulation. These cases highlight the importance of routine spinal cord examination in the pediatric autopsy to further our understanding of reperfusion injury in the central nervous system previously thought to be specific for trauma.

Resuscitation, Ganglia, Hemorrhage