



H151 Severe Hemorrhagic Retinopathy and Retinoschisis Associated With Hypoxic Ischemic Brain Injury and Coagulopathy Due to Aspiration of Popcorn Kernels

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Learning Overview: After attending this presentation, attendees will learn that extensive Retinal Hemorrhages (RHs) and retinoschisis can occur in young children who have non-traumatic hypoxic ischemic brain, cerebral edema, and coagulopathy due to aspiration.

Impact on the Forensic Science Community: This presentation will impact the forensic science community by reinforcing the necessity for routine postmortem ocular examinations of children with non-traumatic, hypoxic ischemic brain injury, cerebral edema, and coagulopathy.

Some authors suggest that non-traumatic hypoxic-ischemic brain injury with cerebral edema and coagulopathy does not cause severe extensive RHs or retinoschisis. Presented here is a case of a toddler who aspirated unpopped popcorn kernels and experienced a cardiopulmonary arrest. Return of spontaneous circulation occurred after >60 minutes of Cardiopulmonary Resuscitation (CPR) after which she developed hypoxic ischemic brain injury and coagulopathy. The autopsy findings of this case refute the purported specificity of extensive RHs and retinoschisis in young children for abusive head trauma (shaken baby syndrome).

Case Report: A 19-month-old toddler experienced a choking episode at home. Her father gave back blows while her mother called 911. When paramedics arrived, she was unresponsive and in pulseless electrical activity. She received over 30 minutes of CPR with intermittent return of spontaneous circulation. During intubation in the emergency department, food debris and unpopped popcorn kernels were removed from her airway. After an additional 30 minutes of CPR, a return of spontaneous circulation was achieved. Following admission to the Pediatric Intensive Care Unit, she developed coagulopathy with a prothrombin time (>90 seconds), partial thromboplastin time of 174.2 seconds, a fibrinogen of 50mg/dL, and a platelet count of $171 \times 10^3/\mu\text{L}$. Given the extent of neurological injury from prolonged cardiac arrest, her family decided to withdraw medical care. She died 15 hours after the choking episode. No clinical fundal examination was recorded in the medical record.

Postmortem indirect ophthalmoscopy revealed bilateral extensive RHs extending past the equators with a large subinternal limiting membrane hemorrhagic cyst (schisis cavity) adjacent to the right inferior temporal vascular arcade. Both fundi had numerous splinter, flame-shaped, dot, and blot RHs plus small wisps of vitreous hemorrhage. An unpopped popcorn kernel occluded her right mainstem bronchus and another popcorn kernel was removed from her oropharynx. Her brain was markedly edematous and contained scattered hypoxic-ischemic neurons. Her retinae exhibited numerous RHs involving the nerve fiber, ganglion cell, inner plexiform, inner nuclear, outer plexiform, and outer nuclear layers; the RHs extended to the ora serrata. The large hemorrhagic cyst over the right fundus consisted of separation of the internal limiting membrane (retinoschisis) with subjacent extravasated blood. Focal intraneural hemorrhage involved the lower cervical spinal cord nerve roots.

This case describes extensive hemorrhagic retinopathy extending to the ora serrata and retinoschisis associated with hypoxic-ischemic brain injury, cerebral edema, and coagulopathy following prolonged resuscitation due to a cardiopulmonary arrest from aspirated popcorn kernels. This study urges caution in interpreting ocular findings out of context since extensive RHs and retinoschisis have been considered diagnostically specific for abusive head trauma (shaken baby syndrome). This case highlights that these ocular findings are not diagnostically specific for abusive head trauma and emphasizes the importance of consistent and thorough postmortem ocular examination in young children with non-traumatic cerebral edema and coagulopathy.

Retinal Hemorrhages, Retinoschisis, Hypoxic Ischemic Brain Injury