



G74 Fatal Hyponatremia, Cerebral Edema and Seizures Associated With Bilateral Peripheral Retinal Hemorrhages in a 20-Month-Old Child Following Hypotonic Fluid Administration for Dehydration: Case Report with Critical Appraisal of the Current Literature

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After attending this presentation, attendees will understand that, based on the lack of evidence base within the current medical literature, peripheral retinal hemorrhages cannot be regarded as specific for nonaccidental head injury in children.

The importance of critically reviewing the medical literature before ascertaining that certain ocular findings are specific for non-accidental head injury.

A 20-month-old child was parenterally rehydrated with 0.2% normal saline in 5% dextrose in water for mild dehydration from gastroenteritis. He received more than 750 mL of the hypotonic fluid intravenously during a four-hour period. He became severely hyponatremic and developed diffuse cerebral edema and seizures. Numerous bilateral intra-retinal hemorrhages extending to the periphery were noted and considered worrisome for nonaccidental head injury (NAHI) or Shaken Baby Syndrome (SBS). A forensic autopsy confirmed the intracerebral and intraocular findings and subsequent investigation by the medical examiner, child protective services and law enforcement uncovered no evidence of child abuse. Retinal hemorrhages have been reported in cases of hyponatremia, cerebral edema and seizures although the pathogenesis has been disputed. No previous reported cases of retinal hemorrhages in infants or young children who died following intravenous hypotonic fluid administration were found following an electronic database search, although two articles described infants with nonfatal oral water intoxication who had retinal hemorrhages. The proximate cause of these ocular findings has been disputed. In one case the peripheral retinal hemorrhages, cerebral edema and seizures with hyponatremia were presumably due to Shaken Baby Syndrome, although the history of oral water intoxication could explain the infant's low serum sodium, cerebral edema and seizures. Subsequently, a Letter to the Editor described another infant with hyponatremia and seizures with posterior retinal hemorrhages due to water intoxication. The authors concluded that the infant had not been abused and questioned published studies of retinal hemorrhages and seizures pointing out that infants with hyponatremic seizures rarely receive an ophthalmologic examination. The initial authors responded that the distinguishing feature between the cases was the location of the retinal hemorrhages. They stated that localized posterior retinal hemorrhages could be attributed to unintentional head trauma and increased intracranial pressure, whereas peripheral and multilayered retinal hemorrhages are more often associated with abusive head trauma. Therefore, the background question became: Are peripheral retinal hemorrhages diagnostic of NAHI when observed in infants and young children? Using the National Institutes of Health National Library of Medicine MEDLINE (19662002) electronic database a search was done on reported childhood deaths due to the administration of hypotonic fluids and articles discussing peripheral retinal hemorrhages and child abuse. One case-controlled study that exhibited selection bias discussed peripheral retinal hemorrhages and NAHI in children but none of the children in this study died from hyponatremia associated cerebral edema secondary to hypotonic fluid administration. The remaining articles consisted of case reports, non-comparative case series and unsystematic review articles. Based on the lack of objective scientific evidence, peripheral retinal hemorrhages cannot be regarded as diagnostic for NAHI or SBS.

Peripheral Retinal Hemorrhages, Hyponatremia, Shaken Baby Syndrome