G25 Sudden Unexpected Infant Death: Peripheral Retinal Hemorrhages Associated With Accidental Positional Asphyxiation (Wedging)

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After attending this presentation, attendees will learn that peripheral retinal hemorrhages extending to the ora serrata are not specific for abusive head trauma (shaken baby syndrome) and can be associated with accidental positional asphyxia (wedging).

This presentation will impact the forensic science community by emphasizing the importance of routine retinal examinations (postmortem monocular indirect ophthalmoscopy) in infants dying suddenly and unexpectedly.

This presentation will inform attendees of something they do not know–multiple retinal hemorrhages, involving the peripheral retina and extending to the ora serrata in infants, are not specific for abusive head trauma (shaken baby syndrome).

Current data (1999 -2007) from the Centers for Disease Control lists accidental suffocation as the leading cause of unintentional death in infants. Of those deaths 65.7% were due to accidental asphyxiation in bed (all mechanisms). Accidental positional asphyxia from wedging often occurs when an infant becomes entrapped between the mattress and wall, headboard, or bed frame of an adult bed. Despite the number of unintentional wedging deaths in infants, to find published reports of retinal hemorrhages (RHs) associated with accidental positional asphyxia (wedging) were not found. A number of authors have asserted that multiple retinal hemorrhages (RHs) involving the peripheral retina and extending to the ora serrata occur only in abusive head trauma (AHT) or rarely with severe head injuries from motor vehicular collisions or crush head injuries. This reports two infants who died suddenly and unexpectedly from wedging who had multiple RHs including peripheral RHs extending to the ora serrata.

Case 1: A father had been sleeping in an adult bed with his previously healthy 4-month-old infant son while the mother slept in another room with one of the infant's two older siblings. During the night the father heard the 3-year-old sibling wake up; he got up to check on her, but fell asleep her room. At 8:00 a.m., the mother found the infant unresponsive, wedged head down between the mattress and headboard of the bed. Paramedics pronounced him dead at the scene. At autopsy, he had parallel lines on his forehead corresponding to the mattress edging and ticking. Postmortem monocular indirect ophthalmoscopy (PMIO) revealed multiple RHs in the right fundus mainly over the equatorial region and two RHs in the left fundus at the mid-periphery. Microscopically, the right-sided RHs extended to the ora serrata and primarily involved the nerve fiber layer with focal involvement of the inner and outer nuclear layers. The left eye had one tiny retinal hemorrhage in the inner nuclear layer. No optic nerve sheath hemorrhages were identified grossly or microscopically. The *dura mater* had remote subdural membranes over the right and left frontal and left parietal regions. The brain had no ischemic or traumatic lesions. His postmortem radiographic skeletal survey revealed no acute or healing fractures.

Case 2: A previously healthy 6-month-old infant was sleeping in bed with her mother and was last seen alive at 2:00 a.m. Her mother found her wedged between the mattress and wall, face down on a stuffed animal, at about 6:00 a.m. She immediately drove her to the local emergency department where resuscitative efforts were unsuccessful. The infant was born at term by cesarean section without complication. At autopsy no scalp or subgaleal hemorrhages, skull fractures, cerebral edema, or epidural, subdural or subarachnoid hemorrhages were present. PMIO revealed bilateral RHs. Ocular examination disclosed 30-50 flame-shaped and dot hemorrhages circumferentially located from the mid equator to the ora serrata on the right side. The left eye displayed two posterior RHs measuring approximately ¼ disc diameter in size, located inferior and nasal to the fovea at the 3:00 position and 1 disc diameter from the optic nerve head at the 5:00 position, respectively. In addition, from the mid equator to the ora serrata were 40-60 pinpoint to flame-shaped or dot hemorrhages extending to, and focally abutting, the ora serrata in all 4 quadrants. No optic nerve sheath hemorrhages were observed grossly or microscopically. Intradural extravasated blood involved the falx cerebri and the right calvarial dura. The brain had age- appropriate development with no ischemic or traumatic lesions. Her postmortem radiographic skeletal survey revealed no acute or healing fractures.

These two cases with reliable histories of positional asphyxia demonstrate the importance of routine

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postmortem ocular examination of infants to better appreciate the spectrum of RHs seen in this age group. Multiple retinal hemorrhages in an infant, involving the peripheral retina and extending to the ora serrata, are not specific for AHT.

Sudden Unexpected Infant Death, Retinal Hemorrhages, Accidental Positional Asphyxia (Wedging)

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