G27 Are Peripapillary Intrascleral Hemorrhages Pathognomonic for Abusive Head Trauma?

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After attending this presentation, attendees will learn that peripapillary intrascleral hemorrhages are not diagnostically specific for abusive head trauma (shaken baby syndrome).

The presentation will impact the forensic science community by stressing the necessity for consistent postmortem ocular examinations of infants and young children to identify all conditions associated with certain ocular findings such as peripapillary intrascleral hemorrhages.

This presentation will inform attendees of something they do not know–that peripapillary intrascleral hemorrhages are not diagnostically specific for abusive head trauma (shaken baby syndrome) and exemplify the need for unbiased consistent ocular examinations, both clinically and at autopsy.

The American Academy of Pediatrics' Committee on Child Abuse and Neglect, Section on Ophthalmology, has acknowledged that searching for retinal hemorrhages (RHs) only in infants suspected of abuse creates a selection bias. However, they have also stated that postmortem eye removal might not be indicated "in children who have clearly died from witnessed severe accidental head trauma or otherwise readily diagnosed systemic medical conditions." Although infrequently described in the child abuse literature, peripapillary intrascleral hemorrhages have been considered "probably pathognomonic" for abusive head trauma (shaken baby syndrome) due to severe repetitive acceleration-deceleration forces with or without blunt head trauma.

Case 1: A 2-day-old male neonate had significant blunt force head trauma including bilateral subgaleal hemorrhages, right subscalpular hemorrhage, bilateral parietal skull fractures, diastatic separation of the sutures, subdural and subarachnoid hemorrhages, cerebral edema, and hypoxic ischemic brain injury. Indirect ophthalmoscopy revealed 30-50 flame-shaped and dot RHs involving all four quadrants of the left globe, extending anteriorly from the posterior pole past the equator to the ora serrata. Peripapillary intrascleral hemorrhages were in the left eye in addition to bilateral optic nerve sheath hemorrhages and bilateral periorbital soft tissue hemorrhage. The right globe had an artifactual papillomacular fold but no RHs. Neither eye exhibited papilledema. Hemothoraces and bilateral rib fractures were present. He had been delivered by cesarean section at 36-weeks estimated gestational age.

Case 2: A 3-day-old female neonate had severe blunt force head trauma. She had a small contusion on the right side of her forehead plus faint abrasions and ecchymoses overlying the right mastoid process. She had bilateral subgaleal hemorrhages, bilateral parietal skull fractures, and a diastatic fracture of the left lambdoid suture. Subdural and subarachnoid hemorrhages, cerebral cortical contusions, cerebral edema and diffuse hypoxic-ischemic brain injury were identified. Indirect ophthalmoscopy revealed multiple bilateral RHs. Subsequent examination of the orbital structures demonstrated bilateral preretinal, intraretinal, and subretinal hemorrhages, optic nerve sheath hemorrhages, peripapillary intrascleral hemorrhages and perineural extravasated blood. The right fundus had 15-20 flame-shaped RHs radiating from the optic nerve head for a distance of two to four disc

diameters. The largest of these measured approximately three disc diameters and was nearly confluent between the fovea and the superior temporal vascular arcade. No hemorrhages were evident past the equator on the right. On the left, the fundus had 10-15 flame-shaped RHs in all four quadrants, located mainly posteriorly, measuring approximately ¼ disc diameter in size. Two faint RHs at the 7:00 and 8:00 positions were flame-shaped and located 3-4 disc diameters from the ora serrata. Papilledema was not evident on either side. She had been delivered by cesarean section at 38-weeks estimated gestation age.

Both neonates had been delivered by emergency cesarean section following the involvement of their respective mothers in motor vehicle collisions. Both had Apgar scores of 0 at 1, 5, and 10 minutes and required prolonged resuscitation lasting 20 minutes and 14 minutes, respectively, before a heart rate was established. In the first case, the mother, a passenger in the vehicle, was ejected in a single vehicle rollover accident. She suffered only minor injuries. In the second case, the mother was the restrained driver of a van that crossed over the midline and hit an oncoming car. Extraction was prolonged and the mother suffered multiple pelvic fractures but no other serious injuries. In both cases the babies' heads were engaged in the pelvis at the time of the accidents. No uterine or placental injuries were found in either case and the mothers were not in labor at the time of the accidents. Neither neonate had a documented clinical fundal

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examination while hospitalized in the intensive care unit.

In-utero skull fractures with severe brain injury are uncommon but well documented. It is believed, RHs with peripapillary intrascleral hemorrhages have not been previously reported in neonates sustaining *in-utero* skull fractures and traumatic brain injuries. These cases demonstrate that peripapillary intrascleral hemorrhages are not diagnostically specific for abusive head trauma and exemplify the need for consistent, unbiased ocular examinations, both clinically and at autopsy.

Peripapillary Intrascleral Hemorrhages, Accident, Intrauterine Traumatic Brain Injury

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