



G70 Perimacular Retinal Folds Associated With Fatal Intra-Cranial Injuries in Adults From Same Height and Near Same Height Falls

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After attending this presentation, attendees will learn that Perimacular Retinal Folds (PRFs) can occur in adults who have fatal traumatic brain injuries from same height or near same height falls.

This presentation will impact the forensic science community by emphasizing the utility of postmortem monocular indirect ophthalmoscopy and highlighting the need for caution in attributing the mechanism of PRF formation to vitreo-retinal traction occurring during cycles of cranial and ocular acceleration-deceleration.

Perimacular retinal folds are considered virtually pathognomonic for Shaken Baby Syndrome (abusive head trauma). However, PRFs have not only been identified in accidental infant head trauma, but have been identified in adults with Terson syndrome. The proposed mechanism of the intra-ocular hemorrhage is a rapid increase in intracranial pressure. Four decedents presenting with perimacular retinal folds at autopsy associated with fatal intracranial injuries are described. They all had blunt force head trauma secondary to same height/near same height falls.

Case 1: A 55-year-old woman was found dead lying at the bottom of a staircase. An area of blood was on the staircase. She reportedly had consumed alcohol the night prior to her death.

Autopsy findings included a 130gm left acute subdural hematoma (SDH) with flattening of the left cerebral hemisphere and a left-to-right shift with transfalcal herniation, a 4th rib fracture, and a right temporal scalp hematoma. She had bilateral optic nerve sheath nerve hemorrhages (left greater than right) and an 8 x 5mm, well-demarcated, premacular pre-retinal hemorrhage circumscribed by a PRF.

Case 2: A 54-year-old man with a past medical history of alcoholism and esophageal cancer fell off a porch while drinking. Family witnessed the fall and called emergency services. On arrival at the hospital he was comatose. Cranial imaging showed florid cerebral edema with generalized ischemic injury and brain stem herniation. Four days later he was pronounced dead. No clinical fundal examination was documented.

Autopsy findings included facial abrasions, hemorrhage involving the temporalis muscles, bilateral SDH, bilateral subarachnoid hemorrhage, marked cerebral edema, and microscopic findings consistent with hypoxic ischemic brain injury. Postmortem ocular examination revealed bilateral optic nerve sheath hemorrhages, multiple retinal RHs in the right globe, and peripapillary hemorrhage associated with subretinal hemorrhage in the left globe.

Case 3: A 37-year-old man was transported to the emergency room. He had been in a physical altercation and fell striking the back of his head. A cranial CT revealed a SDH with significant rightsided cerebral swelling. His brain injury was considered non-survivable and life support was discontinued. No clinical fundal examination was documented in the medical record.

Autopsy findings included trauma to the left inferior occipital region with complex basilar skull fractures, bilateral frontal SDHs, subarachnoid hemorrhages, transtentorial herniation, and intraparenchymal hemorrhages in the cortex and brainstem. Bilateral optic nerve sheath hemorrhages were identified, PRFs, multiple retinal hemorrhages (including premacular hemorrhages in both globes), rupture of hemorrhages into subhyaloid space and vitreous, shearing of outer segments of photoreceptors by dissecting retinal hemorrhages, and subretinal hemorrhage with retinal detachment.

Case 4: A 60-year-old woman had a past medical history of repeated altered mental status and polysubstance abuse. She was found unresponsive at home and transferred to the nearest medical center. Cranial computed tomography revealed bilateral SDHs. No clinical fundal examination was documented in the medical record.

Autopsy findings included a laceration of the posterior scalp, bilateral SDHs, cerebral edema, right parafalcine and uncus herniation, midbrain/pons Duret hemorrhages, bilateral optic nerve sheath hemorrhages, scattered RHs over the right posterior fundus, and a premacular hemorrhagic cyst with a PRF in the left eye.

These four adults with retinal hemorrhages and PRFs died from traumatic brain injuries due to same height/near same height falls and expands the number of conditions associated PRFs. Three of four decedents died following hospitalization; however, no clinical fundal examinations were documented in their medical records. The hemorrhagic retinopathy and PRFs were identified by postmortem monocular indirect ophthalmoscopy emphasizing the need for uniform and consistent ocular examination of decedents with fatal traumatic brain injuries.

Retinal Folds, Accident, Brain Injury