



## Pathology Biology Section - 2012

### G21 Postmortem Artifactual Perimacular Retinal Fold

*Stephen Lenfest, MD\**, Wake Forest University, Medical Center Boulevard, Winston-Salem, NC 27157; and *Patrick E. Lantz, MD*, Wake Forest University, Department of Pathology, School of Medicine, Medical Center Boulevard, Winston-Salem, NC 27157-1072

After attending this presentation, attendees will learn that perimacular retinal folds can develop as a postmortem artifact and should not be viewed as pathognomonic or highly specific for abusive head trauma.

This presentation will impact the forensic science community by emphasizing how ocular abnormalities found at the autopsy must be interpreted with caution and never as an isolated finding without appropriate clinical correlation and thorough death investigation.

The classical triad associated with abusive head trauma (AHT) includes subdural hemorrhage, retinal hemorrhages (RHs), and encephalopathy. Several other ocular findings have been described as virtually pathognomonic or highly specific for AHT. These findings include perimacular retinal folds (PRFs), traumatic retinoschisis, optic nerve sheath hemorrhages, and peripheral RHs abutting the ora serrata. There have been numerous cases reports in the last decade of accidental head injuries that have produced these ocular abnormalities. In particular, perimacular retinal folds and traumatic retinoschisis have been increasingly identified in case reports of accidental head injury. However, these cases are considered by many to be rare outliers and the ocular findings continue to be treated as highly specific for AHT. We present a case of accidental head injury with the development of an artifactual PRF during the postmortem interval that could potentially be interpreted as an antemortem PRF.

**Case Description:** The decedent was an 11-year-old girl who was crossing the road to get the mail when she was struck by an oncoming automobile. Emergency Medical Services responded, secured an airway, and transported her to the nearest trauma center. Upon arrival in the emergency department the patient's Glasgow Coma Scale was 3 and CT scan showed subdural hemorrhage, intraventricular hemorrhage, and diffuse cerebral edema with herniation. She was ultimately declared brain dead and life support was withdrawn.

At autopsy, multiple blunt force injuries of the head included subscalpular hemorrhage, subdural hemorrhage, subarachnoid hemorrhage, intraventricular hemorrhage, Duret hemorrhages, bilateral multilayered RHs, and bilateral optic nerve sheath hemorrhages. Other injuries included a fracture between C7 and T1, a sternal fracture, a splenic laceration, and multiple scattered abrasions and contusions. The left posterior leg had the greatest concentration of subcutaneous hemorrhage 13-17 inches above the left heel, consistent with a site of impact.

Indirect ophthalmoscopy was initially performed four hours after death. The autopsy was done the next day, at which time indirect ophthalmoscopy was repeated and the globes were removed and placed in 10% neutral buffered formalin. The first exam found numerous bilateral multilayered retinal hemorrhages over the posterior pole in all four quadrants extending to and past the equator but no retinal folds. The second exam 22 hours after death revealed artifactual retinal folds. The right eye had an artifactual perimacular fold extending to the fovea and then continuing temporally from the fovea as a linear papillomacular fold, and the left globe had an artifactual papillomacular fold.

These folds are not Lange folds, which are well-known artifacts of fixation in the eyes of infants and children. Lange's folds are described as an inward fold of the neural retina present at the very periphery of the retina and extending to the ora serrata. The folds in this case were perimacular and papillomacular. The folds in the right eye surround the macula in a circumferential pattern that is not consistent with the description of Lange's folds. The folds in both eyes were located primarily between the optic disc and the fovea and did not extend to the periphery.

If the first retinal exam had not been performed and the perimacular retinal fold was identified following ocular enucleation, it may have been interpreted as sequelae of her head trauma. The more concerning aspect would be if the PRF was identified in an infant or young child, in which case, it might be viewed as highly specific for AHT instead of a postmortem artifact. This case further illustrates that ocular findings identified at autopsy cannot be viewed as pathognomonic or even highly specific of AHT without appropriate clinical correlation, a thorough death investigation, and routine postmortem ocular examinations in all infants and young children.

**Forensic Science, Perimacular Retinal Fold, Postmortem Artifact**