G52 Ocular Study in Pediatric Deaths Under Two Years of Age With Novel Findings in the Retina of Children Who Died of Sudden Infant Death Syndrome (1994 – 2004)

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After attending this presentation, attendees will learn of novel findings of the retina of children who die with the diagnosis of SIDS.

This presentation will impact the forensic community and/or humanity by presenting novel findings which are easily demonstrated on routine histologic processing will aid in the understanding of a component of the pathophysiological process in children who die of SIDS.

Pediatric autopsies are considered one of the most difficult areas in Forensic Pathology, due to the small stature, different physiology, and the increased vulnerability of children to abuse.

Sudden infant death syndrome (SIDS) is defined as the sudden death of an infant less than one year of age that remains unexplained after a thorough case investigation, including performance of a complete autopsy with negative results, examination of the death scene, and review of the clinical history. SIDS is the leading cause of infant death beyond the neonatal period, mostly between one month and four months. Although the etiology largely remains unknown, many factors have been associated including metabolic, cardiac, and prone sleep position.

Differential diagnosis includes Shaken baby syndrome (SBS), subtle accidents, asphyxias, and inflicted trauma. The retinal findings are a key part of the investigation specifically identifying areas of retinal hemorrhage.

The purpose of the study was to describe ocular findings in children under two years of age who died suddenly.

One hundred two forensic pediatric cases of deaths under two years old were selected from the Regional Forensic Pathology Unit of Hamilton Ontario, over a period of 11 years (1994 – 2004).

Forensic reports were analyzed and data such as age, sex, cause of death, and postmortem intervals were obtained.

A grossing and microscopic protocol for eyes was created including description with measurements, fixation, sectioning, photography, and systematic histology.

Pigs' eyes were processed with same protocol at different postmortem intervals, as a control for postmortem tissue changes.

The majority of the cases (55%) were between one month and six months of age. The most common diagnosis was SIDS (59/102).

Seventy-two (70.5%) cases showed the presence of cytoid bodies in the retina. Cytoid bodies are smooth, rounded, eosinophilic balls that measure from 7-15 µm and can mimic red blood cells. They were located predominantly (90%) at the anterior part of retina involving the internal limiting membrane and nerve fiber layer of retina. Cytoid bodies were positive for S100, Synuclein, CD 56, and negative for Glycophorin A (an RBC marker).

Extramedullary hematopoiesis (EMH) was identified in 35 (34%) cases. The most frequent location of EMH was the choroid 29/35 (82%). Myeloid and erythroid precursors were confirmed by immunohistochemistry (myeloperoxidase and glycophorin A respectively). Electron microscopy verified the presence of neural filaments.

The changes were not seen with control samples, excluding postmortem artifact as the cause for the findings.

This study is the first to demonstrate the presence of extramedullary hematopoiesis and cytoid bodies in the retinas of SIDS children. The findings suggest a subtle hypoxic component in the natural process in SIDS. The two cases of victims of Shaken Baby Syndrome did not demonstrate EMH or cytoid bodies. Other causes of asphyxia show a 60% incidence of cytoid bodies and 30% incidence of EMH. SIDS cases did not show retinal hemorrhage.

The forensic community may benefit from these observations further aiding in the understanding of the pathogenesis of SIDS.

SIDS, Ocular Findings, Cytoid Bodies

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