G108 The Likelihood of Inflicted Injury Is Better Evaluated by the Use of Inconsistent Histories With the Constellation of the Triad of Findings: Subdural Hemorrhage, Brain Swelling, and Retinal Hemorrhages

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After attending this presentation, attendees will learn the value of the use of inconsistent histories obtained by investigation as well as autopsy findings in determining the likelihood of inflicted injury in children.

This presentation will impact the forensic community and/or humanity by confirming that evaluating histories and autopsy findings is a reliable method of ruling in and ruling out many possibly inflicted injuries in children.

Hypothesis: The reliability of the methods used to identify inflicted injury deaths in children has been called into question in the global community. Reviewing a series of child deaths can test the use of the constellation of inconsistent histories with autopsy findings to diagnose such deaths.

Synopsis: Correctly distinguishing inflicted from inadvertent injury and from natural disease is critical to the criminal justice system. Certain patterns of injuries found clinically or at autopsy have been proposed to identify injuries inflicted on children. An observational study of the neuropathology of inflicted head injury in infants and children by Geddes et al in 2001 reported the frequent finding of: subdural hemorrhage, increased intracranial pressure, and retinal hemorrhages. Others have advocated use of this triad of findings to make the diagnosis of inflicted injury. A nursing education website asserts, “The triad of subdural hematoma, cerebral edema, and retinal hemorrhage represents a diagnosis of SBS (Shaken Baby Syndrome)”.

Histories have been important in identifying inflicted injury. Inquiry into the phenomenon of absent or fluid histories in the presence of subdural hemorrhages and extremity fractures led to the original recognition of battered children.

A study of 169 child deaths compared the patterns of ocular and systemic findings in children dying as the result of inflicted injury with those found in injuries from motor vehicle collisions, falls, and various asphyxial deaths and in natural disease. Inflicted injury was distinguished from accidental injury, undetermined causes, and natural disease by investigation of medical and social history, and circumstances surrounding collapse as well as autopsy findings.

The validity of using a limited subset of histories and a limited subset of autopsy findings (the triad) to identify inflicted injury was assessed using data from the study. The immediate causes of death included: 76 (45%) intentional injuries, 36 (21%) inadvertent injuries, 47 (28%) natural causes, and 10 (6%) undetermined causes.

The triad of findings of subdural hemorrhage, brain edema, and retinal hemorrhages was seen in 47 of the total 76 (62%) inflicted injury deaths and in eight accidental deaths of the total 36 (22%). The triad was not seen in any of the 46 natural deaths or any of the 10 classified as undetermined deaths.

The sensitivity of finding inconsistent histories with the presence of the triad was 80%. The negative predictive value of finding a consistent history when the triad was absent was 88%. The relative risk of the triad being found with an inconsistent history was 4.56 with confidence limits of 2.53-8.20 and a P-value << 0.01.

Finding the triad with more than one injury history showed good sensitivity (85%). The negative predictive value of the finding was 87%. The relative risk of the presence of the triad with more than one injury history was 3.49 with confidence limits of 1.77-6.90 and a P-value << 0.01.

In these subsets, consistent histories included confessions as well as impartial information about events preceding injury. Specificity in these cases was 69% and the positive predictive value was 56%.

Similarly, certain unusual “multiple histories” became clear when further investigated. Since “more than one history” was used in defining the subset, these unusual cases yielded a calculated specificity of only 48% and positive predictive value of 44%.

Summary: Subsets of histories and autopsy findings can be reliably used to identify deaths which are more likely to be the result of inflicted injury - deaths with an inconsistent history and the autopsy findings include the triad of subdural hemorrhage, brain edema, and retinal hemorrhages. With a consistent history and no triad, inflicted injury is unlikely. With an inconsistent history, or multiple histories, and the presence of the triad, inflicted injury is likely. Thorough investigation and complete autopsy findings must be used to establish whether or not a particular child’s death was caused by inflicted injuries.

 ** Presenting Author*

Triad (SDH, Brain Edema, RH), Inflicted Injury, Retinal Hemorrhages

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