G44 Death by INR: A Case of Vitamin K Deficiency Bleeding Masquerading as Shaken Baby Syndrome

O.C.
O.D. Smith, MD, Conscience and Science in Medicine, LLC 9639 Rosemark Road, Atoka, TN 38004; and Jennifer Griffith, MS, Lani Collins, MS, and Linda Williford, PhD, The University of Tennessee Clinical Laboratory Sciences, 930 Madison Avenue, Memphis, TN 38163*

After attending this presentation, attendees will understand the need for a deconstruction oriented approach when evaluating Shaken Baby Syndrome cases; realize that differential diagnoses exist for most any medical finding and that superficial observations and failure to develop

the differential can lead to diagnostic errors and wrongful process.

This presentation will impact the forensic community by giving a better understanding of the value of integrated investigations and their ability to serve justice.

A 7-month-old child died at a pediatric hospital of "non-accidental trauma." The chart was given to the pathologist, and conversation from the treating physician indicated intracranial and retinal hemorrhaging. The pathologist recorded a cryptic entry: "INR=1.1." An extensive medical chart dating back to the decedent's third day of life was not disclosed.

The decedent was the twin B of twins born at 35 1/2 weeks, discordant from his twin sister by a birth weight 20% less. Severe reflux disease was present since birth. He required a fundoplication and a feeding tube through the abdomen. At birth he was in the 25th percentile, until his sixth month when it was in the 15th and terminally, had fallen to the 5th. Despite adequate nutritional intake, he no longer absorbed the nutrients and was diagnosed with failure to thrive. Shortly before death, he had the gastrostomy site cauterized for continual bleeding.

The medical examiner ruled Shaken Baby Syndrome. The father was arrested subsequent to his statement that after seeing his son on the floor with his aggressive 13-month-old daughter kneeling on the infant's stomach and her hands at his neck; he separated them and found the infant struggling to breathe. To revive the child, he "shook" it. He was charged with first degree murder. The defense desired a medical review.

Deconstruction revealed two different autopsy protocols, the absence of an adequate neck dissection, the missed presence of prior retinal hemorrhages, and the failure to observe a tongue tumor. The presence of the gastrostomy and fundoplicaton went unexplained, as did contusions the hospital reported, on the back. Significant hospital laboratory values included coagulation studies with a prolonged prothrombin time (PT) and a normal activated partial thromboplastin time (aPTT). The International Normalized Ratio (INR) was 1.1, within normal range. The timeline revealed an initial retinal examination with hemorrhage in the left eye, hours later both retinas were hemorrhagic. Iron stains of the eyes by the defense were positive, indicating remote hemorrhage. Records of the organ procurement organization indicated the use of vasopressors and anticoagulants, increasing the hemorrhages.

The differential diagnosis when the PT is long and the aPTT is normal is divided between liver disease or a deficiency of vitamin K an essential vitamin that enables the liver to produce coagulation factors. Vitamin K Deficiency Bleeding (VKDB) is a third world disease. The clinician relied upon the INR that no coagulopathy was present because the INR was normal. This is an inappropriate practice as the INR is intended *only* for those patients on coumadin therapy for periods greater than two weeks.

Studies from the University of Tennessee confirm clinicians rely upon the INR as an indicator of normal coagulation status. This practice obscures the initial stages of coagulopathies. Ironically, other studies ordered were not followed up, or were cancelled after death, thus preventing a definitive answer. The pediatricians remained adamant the child was murdered. The defense presented this finding to the prosecution, and settled via diversion.

Shaken Baby Syndrome, Deconstruction, Coagulopathy

 ** Presenting Author*