



Pathology/Biology Section - 2015

H38 Deaths Due to Child Abuse: A Five-Year Review of Cases in the Cook County Medical Examiner's Office

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After attending this presentation, attendees will have a better understanding of the incidence and the significance of the injuries observed in fatal child abuse cases.

This presentation will impact the forensic science community by providing a review of the pattern of injuries in deaths due to child abuse.

Deliberately inflicted pediatric injuries are a significant issue in forensic pathology, with special regard to head injuries. Often questions arise regarding the plausibility of possible mechanisms of injury. This study reviewed case files from the Cook County Medical Examiner's Office from 2007 to 2012 to study the characteristics of homicides due to child abuse in children less than three years of age. The manner of death was determined to be homicide based on the autopsy findings and the investigation.

The cases were divided into the following age ranges: 0-11 months (group A); 12-23 months (group B); and, 24-35 months (group C). Data regarding age; race; sex; facial injuries; scalp injuries; presence and types of skull fractures; suture diastasis; extradural, intradural, subdural, and subarachnoid hemorrhages; cerebral edema; intracranial pressure; intracerebral findings; retinal and optic nerve hemorrhages; spinal cord findings; and extracranial injuries were collected using an electronic spreadsheet. Clinical details and information concerning the traumatic mechanism, where available, were also considered.

Fifty-one cases (25 females and 26 males) were identified. Most of the cases fell into the group A (26 cases; 51%), followed by group B (17 cases; 33%), and by group C (8 cases; 16%). Females were more numerous than males in group A (15 cases; 57%); in group B, males were more numerous (11 cases; 65%); in group C, children of both sexes were present in equal number.

External signs of impact to the head, that is to the face and/or scalp, were present in 42 cases (82%). Most of the examples of impact to the head consisted of bruises and abrasions of the skin and/or lacerations of the oral mucosa. Skull fractures were reported in 9 cases (18%), and showed a predominately linear appearance. Diastasis of the sutures was reported in 14 cases (27%). As might be expected, most of these examples were found in the youngest age range. Epidural hemorrhage was found in 10 cases (20%). Subdural hemorrhage was seen in 42 cases (82%). Subdural hemorrhage represented the most common intracranial pathology encountered, apart from cerebral edema, which was found in each case. Subdural hemorrhage was described as remote or recent, and/or with a thin film or layer of blood or a larger collection of blood. Subarachnoid hemorrhages were present in 27 cases (53%).

In 24 cases (47%), there were intracerebral findings, such as hemorrhages, contusions, herniations, and areas of infarction. In eight cases (16%), brain evaluation was affected by marked non-perfusion changes (so-called "respirator brain"). Retinal hemorrhages were a very common finding in head trauma (38 cases, 75%). Most were bilateral and sometimes involved multiple layers of the retina (preretinal, intraretinal, subretinal). Optic nerve hemorrhages were present in 37 cases (73%). Intravitreal hemorrhages and macular folds were rare. In 19 cases (37%) there were spinal cord injuries, such as hemorrhages, but no spinal fractures were observed.

This study reveals that in the cases surveyed, the majority of children who sustained abusive injuries fell into the 0-11 months of age range. Head injuries were the leading cause of death. Signs of impact to the head defined by the presence of skull fractures and/or bruises/abrasions to the head, often together with intracranial injuries, were present in 73% of the cases (19 out of 26) in group A, 94% (16 out of 17) of the cases in group B, and 88% (7 out of 8) of the cases in group C. As expected, epidural hemorrhages were rare and spinal fractures were not observed at all.

Death due to extracranial injuries was an uncommon finding and it occurred when internal organs were damaged. Among these, blunt force abdominal injuries were the most commonly encountered (10 cases; 19%).

These findings agree with other researchers who have found that head injuries are the leading cause of death in children less than three years of age. Moreover, in the cases reviewed for this study, retinal hemorrhages seemed to be strictly associated with head injuries.

Child Abuse, Head Injury, Homicide