E119 Deceased Children Due to Trauma and the Evaluation of Non-Accidental Injuries: A Dutch Retrospective Level-1 Trauma Unit Study

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Learning Overview: After attending this presentation, attendees will know the incidence of child abuse and neglect in deceased children presented at a Level-I trauma center.

Impact on the Forensic Science Community: This presentation will impact the forensic science community by increasing knowledge on non-accidental trauma and causes of death in the pediatric population.

Child maltreatment is a worldwide health problem. Previous studies have, depending on the patient population, shown significant differences in the incidence of Child Abuse and Neglect (CAN) at the emergency department. There is little evidence on the incidence of CAN in children admitted to a shockroom of a Level-1 trauma center. Children admitted to the shockroom suffer from severe injuries with a possible fatal outcome. Death resulting from CAN is the most severe outcome, which should be recognized not only to identify a potential perpetrator but also to protect siblings.

The objective of the current study was to identify the extent of non-accidental trauma in deceased Dutch children who were admitted to the shockroom of a Level-1 trauma center and to determine indicators of CAN. Medical and forensic files of all deceased children admitted between January 1, 2014, and December 31, 2018, in one of six university hospitals were retrospectively reviewed. Eligible for inclusion were children aged between 0 and 17 years admitted to the shockroom and who died due to traumatic injuries, suicide, or drowning. Excluded were children who died of natural causes. Non-accidental trauma was confirmed after evaluation of the multidisciplinary team (the Suspected Child Abuse and Neglect [SCAN] team), after forensic medical evaluation (using information of postmortem images, forensic autopsy), and/or confirmation in the courtroom. The following data was collected; age (years), gender, trauma mechanism, injuries, Injury Severity Score (ISS), medical history, family composition, and cause of death as established by the forensic physician. To determine significant differences in characteristics between cases with CAN and Accidental Trauma (AT), the Mann-Whitney U test was used for a skewed distribution, the unpaired *t*-test for a normal distribution for numerical data, and the chi-square test was used for discrete data. A factor was considered statistically significant when the *p*-value did not exceed 0.05.

In all, 137 children were included, with a median age of 5 years (IQR 1–13), and 87 (64%) were boys. CAN was confirmed in 13 (9.5%) cases, 21 cases remained undetermined and accidental trauma (AT) was confirmed in 103 cases. In young children (< 5 years of age) CAN was confirmed in a number of cases. The median age of CAN cases was 0 years (Interquartile Range [IQR] 0–2.5 years) versus a median age of 8.5 years (IQR 2–15) in the AT group (p <0.001). An overview of the trauma mechanisms is shown in Table 1. In all deceased children, fractures (47/137) and Traumatic Brain Injury (TBI) (85/137) were often found, followed by injuries to the chest or abdomen due to blunt trauma (45/137). TBI was significantly associated with CAN (CAN 12/13 versus AT 64/103; p=0.031). Children in the CAN group had a median ISS of 20.5 (IQR 13.75–28.75) versus a median ISS of 34 (IQR 25–50) in the AT group (p=0.084). Postmortem investigations were performed in 11 CAN cases and 24 AT cases, total body Computed Tomography (CT) scan (CAN 1 vs. AT 12 children), autopsy (CAN 9 vs. AT 3 children). Additional injuries were found in 2 (18%) CAN children and 2 (8%) AT children (p=0.001). In the undetermined group, 11 of 21 (52%) cases were drowning cases, 4 (19%) cases were "found dead" in their home. These cases were not evaluated by the SCAN team and did not undergo postmortem investigations other than the physical exam of the forensic specialist.

The incidence of CAN in deceased children in this cohort is 9.5%, and TBI was significantly associated with CAN. Postmortem investigations usually consist of a total body physical exam by the forensic physician. Postmortem imaging studies and a forensic autopsy are seldom reported, especially in drowning cases. Therefore, the incidence of CAN may be underestimated. Based on these findings, it is recommended that a thorough work-up in all young (<5 years of age) children be conducted to detect additional injuries, as injuries in these children are easily missed during the postmortem physical exam.

Table 1. Reported trauma mechanism.

Causes of Trauma	No. of Cases	%
Traffic Incident	38	27.7
Drowning	31	22.6
Found Dead	19	13.9
Suffocation	16	11.7
Fall from Height	8	5.8
Suicide	7	5.1
Other	7	5.1
Blunt Trauma	6	4.4
Sharp Trauma	2	1.5
Shooting Incident	2	1.5
Burn Incident	1	0.7

Child Abuse and Neglect, Trauma, Death

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