Paediatric Traumatic Cardiac Arrest in England and Wales: A 10-Year Epidemiological Study

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Objective: Traumatic cardiac arrest in children has traditionally been described as having a poor outcome. Survival rates vary widely between studies with higher rates observed from mechanisms leading to a respiratory cause of traumatic cardiac arrest (e.g., drowning and hanging). However, there is little evidence regarding outcomes following traumatic cardiac arrest in children. The primary aim of our study was to describe 30-day survival following traumatic cardiac arrest. Secondary aims were to provide an analysis of injury patterns, describe the functional outcome at discharge and to report the association between survival and interventions performed.

Design and Method: We conducted a population-based analysis for all children (<18 years) on the Trauma Audit Research Network database from 2006-2015. Patients with traumatic cardiac arrest in the pre-hospital setting and/or in the emergency department (ED) were included. Data are described as number (%) and median (interquartile range) as appropriate. We used survival odds ratios (95% confidence intervals [CI]) and chi-square tests during statistical analysis.

Results: During the study period, 21,710 paediatric patients were included in the database with 129 (0.6%) sustaining traumatic cardiac arrest and meeting study inclusion criteria. The majority had a prehospital traumatic cardiac arrest (103 [79.8%]). Overall, 62.8% were male, aged 11.7 years (3.4-16.6), and with Injury Severity Score 34 (25-45); 110 (85.3%) had blunt injuries, with road-traffic collision the most common mechanism (56.6%). Of these 129 patients, 123 (95.3%) had severe haemorrhage and/or traumatic brain injury.

Overall 30-day survival was 5.4% (95% [CI 2.6-10.8]). “Prehospital only” traumatic cardiac arrest (13.0%) had a significantly higher survival than “prehospital and ED” traumatic cardiac arrest (1.8%), (p=0.0430). There were no survivors from “ED only” traumatic cardiac arrest. Treatment at a major trauma centre was associated with a statistically significant increase in survival (p=0.0186).

Conclusion: This study has demonstrated that resuscitation of children in the rare event of traumatic cardiac arrest is not futile, with overall outcomes comparable to survival rates seen in adults. Survival from prehospital traumatic cardiac arrest is possible, and the early identification and aggressive management of these patients is advocated.