

Paediatric traumatic cardiac arrest in England and Wales a 10 year epidemiological study.

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Introduction

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

Methods

Using the Trauma Audit and Research Network (TARN) database, we conducted a population-based analysis of all paediatric (<18 years) trauma patients presenting to hospitals in England and Wales between 2006-2015. Patients with TCA in the pre-hospital setting and/or in the Emergency Department were included. Those without a GCS entry were excluded. Basic demographics are reported as number (%) and median (interquartile range), as appropriate. Survival odds ratios (95%CI) and Chi Square tests were used 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 (1.3%). The majority had a pre-hospital traumatic cardiac arrest (103 (79.8%)). Overall, 62.8% were male, aged 11.7 years (3.4-16.6), ISS 34 (25-45) and 110 (85.3%) had blunt injuries with road-traffic collision the most common mechanism (56.6%). 123 (95.3%) had severe haemorrhage and/or traumatic brain injury.

Overall survival was 5.4% (95%CI 2.6-10.8) with 7 cases surviving to 30 days. 'Pre-hospital only' traumatic cardiac arrest (13.0%) had a significantly higher survival than 'pre-hospital and Emergency Department' traumatic cardiac arrest (1.8%), (p=0.04). Those with injuries to the thorax predominated the severe haemorrhage group (67.6%). There were no survivors from 'Emergency Department only' traumatic cardiac arrest. Treatment at a major trauma centre was associated with a statistically significant increase in survival (p=0.02). There was no difference in survival between different times of day of presentation. Of those with Glasgow Outcome Scale recorded at discharge (n=6), four (66.7%) had either a moderate disability or good functional outcome.

Conclusion

Although a rare event, this study has demonstrated that resuscitation of children in traumatic cardiac arrest is not futile with overall outcomes comparable to survival rates seen in adults. Survival from pre-hospital traumatic cardiac arrest is possible and the early identification and aggressive management of these patients is advocated.