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R2 Block 3 CAT 2016-2017

**Reference:**
Evans, C. D., Petersen, A., Meier, E. N., Buick, J. E., Schreiber, M., Kannas, D., & ... Resuscitation Outcomes Consortium, I. (2016). Prehospital traumatic cardiac arrest: Management and outcomes from the resuscitation outcomes consortium epistry-trauma and PROPHET registries. Journal Of Trauma & Acute Care Surgery, 81(2), 285. doi:10.1097/TA.0000000000001070

**Question:**
Describe the management and outcomes of prehospital traumatic arrest, determine regional variation in survival, and identify ALS procedures associated with survival.

**Introduction:**
Traumatic arrest survival has been historically reported at 2%. A minority of these pts are considered salvageable depending on mechanism of arrest, and rapidity/type of treatment. This is complicated by variations in prehospital care throughout different regions.

**Methods:**
Prospective study. Data was collected from 2 registries: the Epistry Trauma and Prospective Observational Prehospital and Hospital Registry for Trauma (PROPHET). Pts were selected from 2005-2007 from Epistry Trauma and 2010-2011 from PROPHET. Inclusion criteria varied slightly for pt to be entered in the registries. For Epistry Trauma, pts had to meet one of the following: SBP <90, RR <10/>29, GCS <12, intubated in the field, died in the field. For PROPHET, pts had to meet one of the following: SBP <90, or GCS <8. PROPHET pts could be excluded from registry per EMS provider discretion of non-survivable injury. When reviewing the registries, the only exclusion criteria for this study was if pts did not have blunt or penetrating injury, or if unknown survival to discharge. Primary outcome was survival to discharge. Secondary outcome was neurologic status at discharge based on documented GCS only, and this only included PROPHET pts, as Epistry Trauma did not record GCS at discharge. Mean and standard deviation were used for continuous variables. Chi squared and Fisher were used for categorical. Logistical regression was used with the independent variable being prehospital intervention, and the dependent variable being survival to discharge. Likelihood ratios were used to evaluate survival differences between regions. Confounding variables included sex, age, initial set of vitals, type of injury, mechanism of injury.

**Results:**
13,291 pts from Epistry Trauma, and 6,258 pts from PROPHET. Of these, 10% and 16% received prehospital CPR, respectively. 85 pts were excluded due to no blunt or penetrating injury, and 35 pts were excluded due to unknown survivability. Final study population included 2300 pts with most commons being age 40, blunt trauma, MVC, GSW, Falls. 145 pts survived to hospital discharge. Survival rates similar between registries: Epistry 7.1% and PROPHET 5.3%. Survival with pulse present on arrival to ED was 26% Epistry and 22% PROPHET, compared to no pulse present on arrival to ED was 7.0% Epistry and 1.7% PROPHET. Survival to discharge when presence or absence of vital signs on arrival of EMS was 23% and 1.8%. Blunt injury survival 8.3% Epistry 6.5% PROPHET compared to penetrating injury 4.6% Epistry and 2.7% PROPHET. Although, neurologic outcome was 41% blunt and 89% penetrating. Pts requiring an advanced airway compared to BVM had decreased survival with OR of 0.27

**Discussion:**

This studies rate of survival from traumatic arrest at 6% is slightly higher than historically found around 2%.This could be due to the criteria of "arrest." Pts received CPR in this study for SBP <90, rather than "absence of all signs of life," or a specific cardiac dysrhythmia. The majority of pts 80% had initial vitals on arrival by EMS, so these were witnessed arrest. 95% of these pts were cared for by ALS trained paramedics. Unexpectedly pts with blunt trauma had higher survivability than penetrating. Regional variations exist with regard to criteria for calling field termination, criteria for prehospital intervention, and staffing of ALS vs BLS crews, which subsequently affect ALS procedures. Overall, with appropriate field triaging and with ALS crews, traumatic arrest survival is higher than previously reported.

**Conclusion:**

The authors call it a prospective study, but it really is not. The outcomes of the data may not have been known at the "start" of the study, but the data was reviewed retrospectively from these 2 large registries. There was no "enrolling patients" based on certain criteria. They didn't even have the same inclusion/exclusion criteria between the 2 registries. The lack of randomization leads to imbalance of confounding variables depending on the regions infrastructure and demographics. The confounding variables in this prehospital setting alter the management of the EMS providers based on their previous experience with pts in these categories. I.E. older people compared to younger are more likely to be non-survivable, or motorcycle accident compared to motor vehicle accident are more likely to be non-survivable. These preconceived perceptions may be true, but in the prehospital setting allows for more subjectivity in decision making, and subsequently outcome. Overall, this study demonstrates that if you are in an area of the US with an infrastructure that allows for more ALS paramedics to provide care in a more timely fashion with a faster transport time to a large trauma center, then pts will have a better outcome. However, this scenario of a well-developed EMS system with a large Level 1 Trauma center nearby is probably not generalizable to the majority of the US, and I'm guessing that the historical survivability rate of 2% is more accurate if we want to generalize to the entire US. If anything, this study should be used a tool to push for better EMS infrastructure.