

**Timing and volume of crystalloid and blood products in pediatric trauma:
An Eastern Association for the Surgery of Trauma (EAST) multicenter prospective
observational study. Trauma Acute Care Surg. 2018 Jul;85(1):108-112.**

Background and Aim:

- Trauma patients with shock require prompt volume resuscitation, but giving large amounts of crystalloids may cause harm.
- Early blood transfusion may be advantageous, but after how much crystalloid should one consider blood is debatable.
- The study aims to determine the relationship between timing and volume of crystalloid before blood products and mortality.

Methods: Multi-institutional prospective observational study of pediatric trauma patients (< 18 years) transported from the scene of injury with elevated age-adjusted shock index on arrival conducted from April 2018 to September 2019. Volume and timing of prehospital, emergency department, and initial admission resuscitation were assessed including calculation of 20 ± 10 mL/kg crystalloid boluses overall and before transfusion. Multivariable Cox proportional hazards and logistic regression models identified factors associated with mortality and extended intensive care, ventilator, and hospital days.

ACADEMIC P.E.A.R.L.S

Pediatric Evidence And Research Learning Snippet



Pediatric trauma: crystalloid boluses vs blood: When and what is better?

Results:

- 712 children at 24 trauma centers were studied, mean age 7.6 years, median (interquartile range) Injury Severity Score was 9 (2-20), and in-hospital mortality was 5.3% (n = 38).
- 311 patients (43.7%) received at least one crystalloid bolus and 149 (20.9%) received blood including 65 (9.6%) with massive transfusion activation. Half (53.3%) of patients who received greater than one crystalloid bolus required transfusion.
- Patients who received blood first (n = 41) had shorter median time to transfusion (19.8 vs. 78.0 minutes, p = 0.005) and less total fluid volume (50.4 vs. 86.6 mL/kg, p = 0.033) than those who received crystalloid first despite similar Injury Severity Score (median, 22 vs. 27, p = 0.40).
- On multivariable analysis, there was no association with mortality (p = 0.51); however, each crystalloid bolus after the first was incrementally associated with increased odds of extended ventilator, intensive care unit, and hospital days (all p < 0.05). Longer time to transfusion was associated with extended ventilator duration (odds ratio, 1.11; p = 0.04).

Conclusions: Resuscitation with greater than one crystalloid bolus was associated with increased need for transfusion and worse outcomes including extended duration of mechanical ventilation and hospitalization.

Key message: Volume resuscitation in pediatric trauma patients with shock should consist of a crystalloid-sparing, early transfusion approach

EXPERT COMMENT

“In pediatric trauma patients with shock, it is prudent to consider early blood transfusion after initial crystalloid bolus for volume resuscitation.”

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With warm regards,

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Reference

Polites SF, Moody S, Williams RF, Kayton ML, Alberto EC et al. Timing and volume of crystalloid and blood products in pediatric trauma: An Eastern Association for the Surgery of Trauma multicenter prospective observational study. J Trauma Acute Care Surg. 2020 Jul;89(1):36-42.doi: 10.1097/TA.0000000000002702.