Sunday Bloody Sunday - Transfusions in the Prehospital Setting

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Figure 4. Age-adjusted death rates for the 10 leading causes of death in 2016: United States, 2015 and 2016

Unintentional injuries

1Statistically significant decrease in age-adjusted death rate from 2015 to 2016 (p < 0.05).
2Statistically significant increase in age-adjusted death rate from 2015 to 2016 (p < 0.05).
NOTES: A total of 2,744,248 resident deaths were registered in the United States in 2016. The 10 leading causes accounted for 74.1% of all deaths in the United States in 2016. Rankings for 2015 data are not shown. Causes of death are ranked according to number of deaths. Access data table for Figure 4 at: https://www.cdc.gov/nchs/data/databriefs/db293_table.pdf#4.
Trauma Deaths
Lethal Triad

TRAUMA

Hemorrhage

Coagulopathy

DEATH TRIAD

Acidosis

Hypothermia
What is blood?

Blood

- Plasma 55%
- WBC and PLT 1%
- RBC 45%

Clotting

Oxygen delivery
Trauma Induced Coagulopathy

Initial Trauma
Related to the ISS itself and maybe most responsible

Hypoperfusion
Augments the coagulopathy

Crystalloid infusion
Effect is perhaps not immediate. IT’S NOT JUST THE SALINE
Association of Prehospital Blood Product Transfusion During Medical Evacuation of Combat Casualties in Afghanistan With Acute and 30-Day Survival

• 2012 expansion of blood products to MEDEVAC
• Retrospective Study
• Mortality at 24 hours and 30 days.
• 6/55 (11%) recipients died by day 30
• 102/447 (23%) non-recipients died by day 30
• $P = 0.04$
• 95 CI, -21% to -2%
“Articles that May Change Your Practice”

“Eval. Of prehospital blood products to attenuate acute coagulopathy of trauma in a model of severe injury and shock in...pigs”

- Compared PRBC, Plasma, and saline.
- Outcomes coagulopathy assessed by TEG
- Controlled soft tissue injury and 35% blood loss
- Coagulopathy seen in saline group that was significantly worse than either PRBC or Plasma
“Articles that May Change Your Practice”

• “Pre-trauma Center Red blood Cell Transfusion Is Associated with Improved Early Outcomes in Air Medical Trauma Patients”
  • Retrospective cohort of trauma patients between 2007 and 2012
  • Received PTC RBC vs. no RBC
  • PTC RBCs increased odds of 24 hour survival (OR 4.92 (1.51-16.04)
Prehospital Transfusion of Plasma and Red Blood Cells in Trauma Patients

- All patients that received blood products in hospital or prehospital.
- Compared one HEMS system with PRBS and Plasma to other HEMS and ground systems.

1667 patients

- 792 ground
- 716 by LF
- 169 OA

137 received blood
Prehospital Transfusion of Plasma and Red Blood Cells in Trauma Patients

- Improved acid base status on admission
- Decreased use of blood products in hospital
- Reduction if risk of death over first 6 hours
- NO DIFFERENCE IN 24 hour of 30 DAY MORTALITY
“Transfusion of red blood cells in patients with prehospital GC <8 and no evidence of shock is associated with worse outcomes”

- Treatment aimed at preventing secondary injury
- Retrospectively looked 1,158 patients from ROC
- Mean GCS 5.
- Mean SBP 134.
- When the first Hg > 10 mg/dl
  - Decreased 28 day survival (OR 0.83) p <0.01
  - Decreased ARDS-free survival (OR 0.82 per unit) p <0.01
  - Each unit increased multiorgan dysfunction score by 0.45.
Blood Transfusion: In the Air Tonight?

• Retrospective Cohort 2007-2013
• Outcomes: 24 hours and overall in-hospital mortality
• 5,581 patients transported from scene by HEMS
• NO EFFECT ON OVERALL OR IN-HOSPITAL MORTALITY
Prehospital Blood Product Resuscitation for Trauma: A Systematic Review

- Smith, IM et al., Shock, July 1, 2016.
- NO prospective or randomized trials
- 25/27 studies only provided very low level evidence
- NO association between PHBP and survival found.
- “While PHBP seems logical, the clinical literature is limited, provides only poor quality evidence, and does not demonstrate improved outcomes.”
Whole Blood in EMS May Save Lives
Barriers

• Cost
• Training to crews
• What is your current transport time
• What is your patient population
• Supply vs. Demand vs. Benefit
Don’t Tell My Wife
Conclusion

• It is unclear whether PHBP will be beneficial in reducing mortality from trauma.
• We should focus on stopping the bleed!
  • Direct Pressure
  • Tourniquets
  • Pelvic Binders
• Balanced Resuscitation
• Damage Control Resuscitation