

Prehospital Transfusion During Rapid Transport Improves Physiology and Survival for Patients with Severe Hemorrhagic Shock

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OBJECTIVE

- Hemorrhagic shock is the leading cause of preventable trauma-related mortality
- Early administration of blood products increases chances of patient survival
- Recent studies and experience suggest that civilian prehospital blood transfusion (PHBT) improves patient physiology and survival, even with short transport times
- We review the results of an EMS prehospital transfusion database

METHODS

- Retrospective data Jan 2021 – Dec 2025
- **Intervention:** LTOWB, Plasma, and/or PRBCs via rapid transfuser
 - TXA and/or calcium per agency protocol
- **Inclusion Criteria:** SBP $\leq$ 90 or SI $\geq$ 1.2; blood product recipient; age $\geq$ 14; alive upon EMS arrival
- **Primary Outcome:** Shock index, compared before and after infusion with paired t-test
- **Secondary Outcome:** Mortality at 24 hours and hospital discharge

TABLES AND FIGURES

Figure 1. Mechanism of Injury

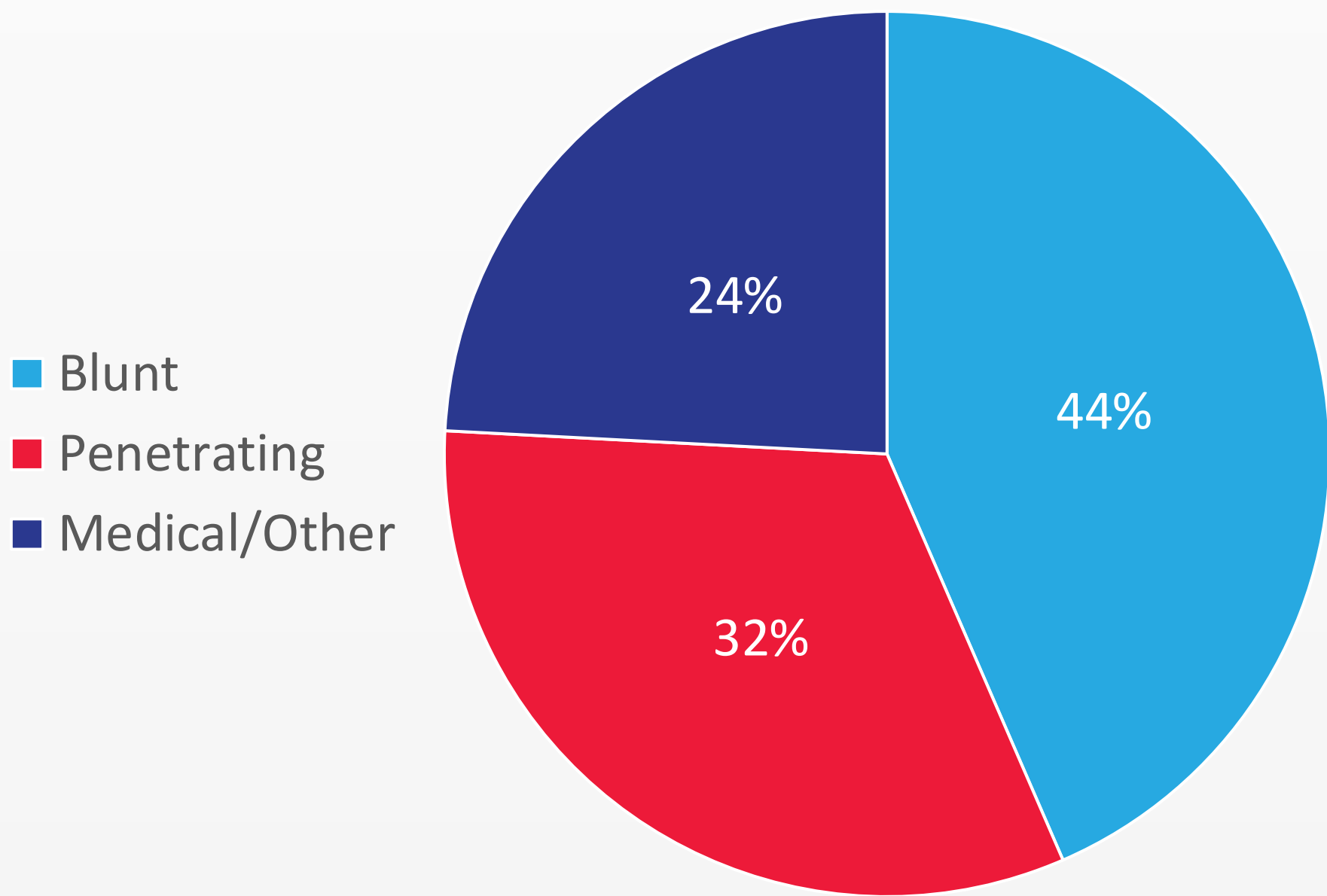
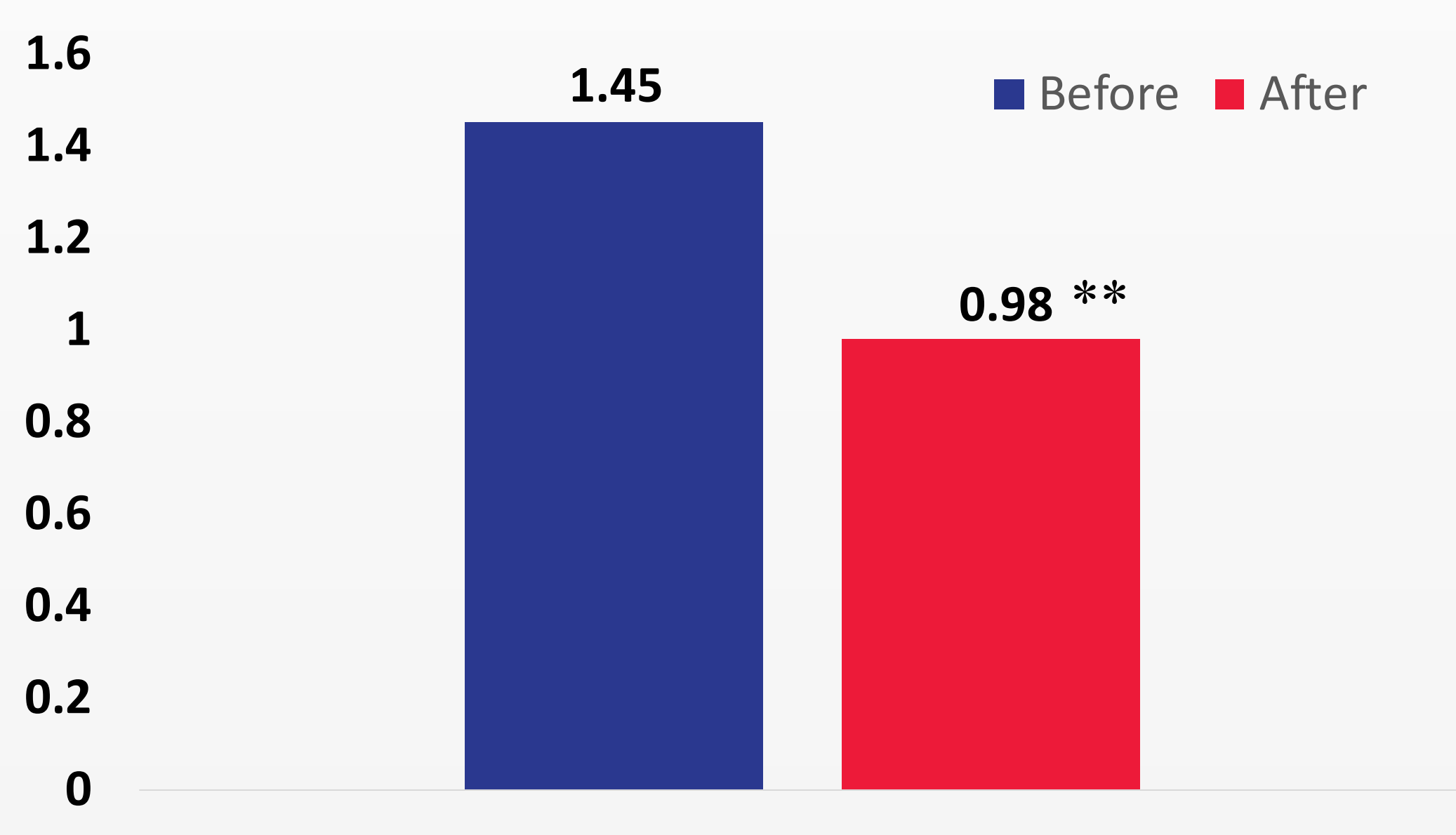


Figure 2. SI Values before and after transfusion



** statistically significant difference between values (p < 0.01)

Table 1: Patient demographics and Agency statistics

Parameter, median (IQR)	Eligible patients (n = 269)
Age, years	44 (29 - 61)
Male, n (%)	189 (70)
Whole-blood recipients, n (%)	256 (95.1)
TXA recipients, n (%)	126 (46.8)
Calcium recipients, n (%)	48 (17.8)
# of EMS Agencies, n	14
Transport Time, min	11 (8 - 17)

Table 2: Clinical outcomes

Parameter, median (IQR)	Eligible patients (n = 269)
Pre-transfusion HR	112 (90 - 128)
Post-transfusion HR	98 (84 - 118)
Pre-transfusion SBP	80 (69 - 88)
Post-transfusion SBP	110 (90 - 126)
Mortality, n (%)	36 (14.6)
Mortality Timing, n (%)	
Within 24 Hours	7 (2.8)
After 24 Hours	29 (14.5)

RESULTS

- 14 EMS agencies
- 269 patients met inclusion criteria
- 256 patients received whole blood
- Δ SBP: 31.7 mmHg increase
- Δ HR: 9.5 BPM reduction
- Δ SI: 0.47 decrease
- Mortality rate at 24 hours: 2.8%
- Mortality rate at hospital discharge: 14.6%

IMPACT

- Similar results to recent single and multi-center series demonstrating the effectiveness of PHBT in ground EMS
- Patients with traumatic injury and severe hemorrhagic shock showed statistically significant physiological improvement and lower-than-expected mortality after PHBT
- Rapid transfusion close to the point of injury or during rapid transport could be utilized for combat casualty care