

Revisiting Permissive Hypotension in the Era of Blood Products Resuscitation: Blood Pressure on ED Arrival and Mortality in Casualties Receiving Prehospital Blood Product Resuscitation

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Introduction

Military trauma care has evolved from crystalloid-based resuscitation toward early blood products transfusion. However, optimal systolic blood pressure (SBP) thresholds to guide prehospital transfusion decisions, while maintaining permissive hypotension, remain unclear. This study evaluates the optimal SBP target for combat casualties who received prehospital blood products during the Swords of Iron war.

Baseline Cohort Characteristics

309

combat casualties included

Demographics

Median age: 23 years

IQR: 21–28

Male: 306 (99%)

Primary injury mechanism

Explosion / blast: 204 (66%)

Firearm: 96 (31%)

Evacuation

Airlift evacuation: 301 (97%)

Arrived to ED within 1 hour: 159 (51%)

Prehospital care

Tourniquet: 168 (54%)

Tranexamic acid (TXA): 198 (64%)

Advanced airway management: 31 (10%)

Results

1. MORTALITY BY SBP ON ED ARRIVAL

SBP <90 mm Hg

Severe hypotension

SBP 90–109 mm Hg

Moderate hypotension

SBP ≥110 mm Hg

Normotension

24-hour mortality

26%

3.6%

0.8%

P < .001

Overall mortality

37%

18%

4.1%

P < .001

2. MULTIVARIABLE REGRESSION RESULTS

Analysis subset

Major trauma

ISS ≥16

Model

Multivariable logistic regression

Adjusted analysis

Reference group

SBP <90 mm Hg

ED arrival

24-hour mortality

SBP ≥110 mm Hg vs SBP <90 mm Hg

OR 0.05

95% CI 0.01–0.19

P < .001

Overall mortality

SBP ≥110 mm Hg vs SBP <90 mm Hg

OR 0.16

95% CI 0.065–0.414

P < .001

Intermediate SBP group

SBP 90–109 mm Hg vs SBP <90 mm Hg

No statistically significant association

Spline analysis

As SBP on ED arrival increased, the log odds of both 24-hour and overall mortality decreased.

Lower SBP

Higher mortality

Higher SBP

Lower mortality

Conclusions

Among combat casualties receiving prehospital blood products, arriving to the ER with higher SBP was independently associated with reduced mortality, while lower SBP was associated with worse outcomes.

Is the concept of permissive hypotension relevant in the context of resuscitation with blood products?

Further research is needed to evaluate the ideal SBP target for trauma patients with exsanguinating injuries.

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