Impact of Deferring Prehospital Thoracostomy in Combat Casualties on mortality

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Introduction

- Civilian and military clinical practice guidelines (CPGs) advocate early thoracostomy in casualties with chest injury accompanied by hemodynamic or respiratory instability.
- Debate persists regarding the effectiveness and timing of thoracostomy.
- Given the controversial literature surrounding aggressive field chest decompression, and change to IDF Medical Corps CPGs on April 2024 advocating deferred thoracostomy, we evaluated the impact of deferring thoracostomy on mortality in combat casualties.

Methods

- We conducted a retrospective cohort analysis of soldiers injured during the Swords of Iron War between October 27, 2023 and July 31, 2025.
- Data was obtained from the IDF Military Corps Prehospital Trauma Registry and cross-referenced with the Israeli National Trauma Registry.
- For soldiers killed in action (KIA), postmortem CT data was reviewed.
- Casualties were divided into two cohorts: prehospital thoracostomy (treatment group) and emergency department (ED) deferred thoracostomy (control group).
- All-cause mortality was defined as a primary outcome.
- Multivariable logistic regression adjusted for injury mechanism, injury severity index (ISS), and prehospital interventions.

Results

- Of 5,850 casualties included, 87 underwent prehospital chest decompression and 65 had the procedure deferred to ED.
- Groups were comparable in age, evacuation characteristics, and rates of severe head, chest, and abdominal injuries.
- In the ED-deferred cohort more casualties had ISS ≥25 (71% vs 51%, p=0.02) and more casulties in this group received prehospital blood transfusions (80% vs 64.4%, p=0.03).

Table 1: The clinical characteristics of the treatment and control groups

CHARACTERISTIC	TREATMENT GROUP (N=87)	CONTROL GROUP (N=65)	ODDS RATIO (95% CI)	P-VALUE
Age, median (IQR)	23 (21-32)	22 (21-28)	-	0.4
Male gender, n (%)	87 (100.0%)	65 (100.0%)	-	1.0
Injury severity score, n (%)				
16-24	33 (37.9%)	15 (23.1%)	2.04 (0.99, 4.19)	0.06
≥25	45 (51.7%)	46 (70.8%)	0.44 (0.22, 0.87)	***0.02***
Aeromedical evacuation, n (%)*	38 (100.0%)	45 (93.8%)	-	0.25
Evacuation time, median (IQR)*	60 (47-72)	58 (44-83)	-	0.73
Prehospital blood transfusion, n (%)	56 (64.4%)	52 (80.0%)	0.45 (0.21-0.94)	***0.03***
Prehospital definitive airway, n (%)	33 (37.9%)	17 (26.2%)	1.73 (0.85, 3.48)	0.16
Vital signs suggestive of shock on emergency department admission, n (%)*	14 (36.8%)	21 (43.8%)	0.75 (0.31-1.79)	0.66
Serious head injury, n (%)	13 (14.9%)	16 (24.6%)	0.54 (0.24, 1.22)	0.15
Serious chest injury, n (%)	73 (83.9%)	61 (93.8%)	0.34 (0.11, 1.09)	0.08
Serious abdominal injury, n (%)	21 (24.1%)	19 (29.2%)	0.77 (0.37, 1.59)	0.58
24-hours mortality, n (%)	55 (63.2%)	28 (43.1%)	2.27 (1.18, 4.38)	***0.02***
30-day mortality, n (%)	57 (65.5%)	33 (50.8%)	1.84 (0.95, 3.55)	0.10

* Information on evacuation time, method, and the presence of vital signs suggestive of shock on ED admission was available for 38 casualties in the treatment group and 48 in the control group.
95% CI - 95% confidence interval; IQR - interquartile range.
Statistically significant values (p ≤0.05) are given in ***bold and italics***.

- The 24-hour mortality rate was higher in the prehospital thoracostomy group (63% vs 43%, p=0.02), while overall mortality did not differ significantly (66% vs 51%, p=0.067).
- Multivariable analysis showed no significant association between prehospital chest decompression 24-hour mortality (aOR 1.85, 95% CI 0.88-3.96, p=0.11) and 30-day mortality (aOR 1.54, 95% CI 0.71-3.36, p=0.3).

Table 2: Multivariable logistic regression analysis of factors associated with 24-hour and 30-day mortality

Factor	24-hour mortality		30-day mortality	
	aOR (95% CI)	p-value	aOR (95% CI)	p-value
Prehospital blood transfusion	0.66 (0.29-1.49)	0.30	0.48 (0.20-1.10)	0.09
Prehospital definitive AW	6.47 (2.85-16.1)	***<0.01***	9.22 (3.70-26.9)	***<0.001***
Injury severity score ≥25	1.50 (0.71-3.22)	0.30	2.21 (1.02-4.91)	***0.05***
Prehospital chest decompression	1.85 (0.88-3.96)	0.11	1.54 (0.71-3.36)	0.3

aOR - adjusted odds ratio; 95% CI - 95% confidence interval; AW - airway.
Statistically significant values (p ≤0.05) are given in ***bold and italics***.

Conclusion

- Although the ED-deferred group had higher proportion of casualties with ISS ≥25 and needed more blood products, in this group the deferral of thoracostomy to the ED was not associated with increased early or overall mortality.
- Rapid evacuation and aggressive volume resuscitation should be prioritized in patients with thoracic trauma, with prehospital chest decompression reserved for patients with a high suspicion of tension pneumothorax.

At the moment of truth,
IDF MEDICAL CORPS.