TXA May Reduce Mortality in Severe TBI in a Resource-Constrained, High Trauma Volume, Military-relevant International Setting

Abhishek Mogili, MD, MPH[1]; Adane Wogu, PhD[2]; Mengli Xiao, PhD[2]; Sophia Centi, MPH, MS[1]; Steven G. Schauer, DO, MS[3,4]; Hendrick J. Lategan, MBChB, MMed[5]; George Oosthuizen, MBChB, PhD[5]; Janette Verster, MBChB, MMed[6]; Shaheem de Vries, MBChB, MPhil[7]; Craig Wylie, MPhil[8]; EpiC Study Site Collaborators[9]; Julia Dixon, MD, MPH[1]; Nee-Kofi Mould-Millman, MD, PhD, MSCS[1].

1. **University of Colorado School of Medicine, Anschutz Medical Campus, Aurora, CO;** 2. Colorado School of Public Health, Anschutz Medical Campus, Aurora, CO; 3. Brooke Army Medical Center, Joint Base San Antonia, TX; 4. US Army Institute of Surgical Research, Ft. Sam Houston, TX; 5. Stellenbosch University, Cape Town, South Africa; 6. Stellenbosch University and Tygerberg Forensic Pathology Service, Cape Town, South Africa; 7. Collaborative for Emergency Care in Africa, Cape Town, South Africa; 8. Western Cape Emergency Medical Services, Cape Town, South Africa; 9. Western Cape Government Department of Health and Wellness, Cape Town, South Africa

BACKGROUND

- Tranexamic acid (TXA) reduces mortality in trauma patients with hemorrhage.
- TXA's role in traumatic brain injury (TBI), however, is less certain.
- Trials have demonstrated a mortality benefit in mild to moderate TBI, but minimal benefit in severe TBI.
- In prolonged care, TXA administered in Role 1 settings when evacuation is delayed may be particularly advantageous to survival.

OBJECTIVE

How does TXA affect mortality and neurological outcomes in patients with isolated TBI?

METHODS

Design:
- Secondary analysis of prospective observational data from EpiC study in Western Cape, South Africa (15 MAR 2021 – 18 FEB 2026)

Inclusion criteria:
- TBI patient: abbreviated injury score (AIS) head severity ≥ 2
- First medical contact (EMS or fixed facility) within 3 hours of injury

Exclusion criteria:
- Severe hemorrhage, or significant non-head injuries AIS body ≥ 3
- Receipt of blood products

Treatment:
- Received TXA within 3 hours of injury

Outcomes:
- Primary outcome: 7-day mortality
- Secondary outcomes: 72-hour mortality, 30-day mortality, discharge neurologic status

Analysis:
- Inverse probability of treatment weighting (IPTW)
- Modified odds ratios (mORs)
- Subgroup analysis by TBI severity

RESULTS

Primary Outcome

TBI Patients
N = 1,794

8% received TXA within 3 hours
n = 144

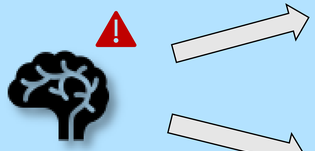
7-day mortality
mOR 0.75 (0.44,1.26)
P-value: 0.276

Secondary Outcomes

Treated vs. Untreated	mOR (95% CI)	p-value
72-hour mortality	0.75 (0.43, 1.32)	0.323
30-day mortality	0.81 (0.51, 1.28)	0.364
Poor discharge neurologic status (GCS<15 or death)	0.87 (0.70, 1.08)	0.209

Subgroup Analysis: TBI Severity

Among patients with severe TBI (GCS ≤8), treated vs. untreated



Severe TBI Patients
n=368

46% reduced odds of death within 72 hours
mOR 0.54(0.31,0.94), p=0.029

53% reduced odds of death within 7 days
mOR 0.47(0.26,0.83), p=0.009

RESULTS

Patient Characteristics by Treatment Group

Characteristic	No TXA N = 1,650	TXA within 3 hrs N = 144
Sex = Male	1,454 (88.1)	134 (93.1)
Age, years	32.1[25.8, 39.4]	31.0 [25.2, 37.5]
Injury force type		
Penetrating	261 (15.8)	51 (35.4)
Blunt	1,194 (72.4)	77 (53.5)
Blunt + Penetrating	195 (11.8)	16 (11.1)
TBI severity		
Mild	650 (39.4)	51 (35.4)
Moderate	688 (41.7)	37 (25.7)
Severe	312 (18.9)	56 (38.9)
Anatomic severity (NISS)	17.0 [9.0, 27.0]	25.0 [11.0, 33.2]
Shock Index	0.7 [0.5, 0.8]	0.7 [0.6, 0.9]

Categorical variables are reported as n (%) and continuous variables as median [IQR]

LIMITATIONS

- Observational study may introduce selection bias
- Small sample size of TXA treated patients

CONCLUSIONS

- Mortality and poor neurologic outcomes were non-significantly reduced for all patients who received TXA.
- **Severe TBI patients have improved mortality at 72-hours and 7 days** but no improvement in neurological outcomes on discharge.

Funding Information:
This effort was awarded through W81XWH-20-2-0042/BA190049, HT9425-23-1-1025/PR220453, HT9425-24-3-0003/BA230022 and is funded by Combat Casualty Care Research Portfolio (CCCRP) through the Defense Health Agency.

Questions?
C3.Lab@CUAnschutz.edu