

Evaluating Clinical Utilization of Tranexamic Acid (TXA) by Paramedics for Patients with Major Trauma in British Columbia



Daniel Wong, B.Sc.(Pharm).; Gloria Su, Pharm.D.; Vincent H. Mabasa, Pharm.D.; John M Tallon, M.D., M.Sc.; Sandra Jenneson, M.D.; Joe Acker, M.A.; Wilson Wan, M.D.

Background

- Up to 56% of trauma-related deaths before arrival to the hospital are due to hemorrhage.
- The CRASH-2 trial found a reduction in death due to bleeding if tranexamic acid (TXA) is given within 180 minutes of injury.
- On November 1, 2014, BC Emergency Health Services (BC EHS) added TXA to paramedics' scope of practice.
- Our study aimed to characterize the clinical utilization of TXA across British Columbia (BC) in the pre-hospital setting with paramedic crews.

Methods

Design: Quality assurance, randomized retrospective review of BC EHS charts

Sample: Convenience sample of 100

Timeline: April 1, 2016 – March 31, 2017

Inclusion Criteria: Adults with suspected or actual hemorrhage secondary to trauma with either or both of the following:

- Systolic blood pressure < 90 mm Hg
- Heart rate > 110 beats per minute

Exclusion Criteria:

- Age < 16 years
- Injuries exclusively to extremities

Primary Outcome: proportion of eligible patients who received pre-hospital TXA

Secondary Outcomes:

- If treated with TXA:
 - Dose and regimen administered
 - Time between injury and paramedic arrival, TXA administration, and hospital arrival
- Mortality at 28 days
- Adverse effects (myocardial infarction, stroke, deep vein thrombosis, pulmonary embolism)
- Proportion of eligible patients who received TXA based on highest level of paramedic in attendance
- Time between injury and TXA administration based on geographical location

Data Analysis: Descriptive statistics

Figure 1: Flow diagram.

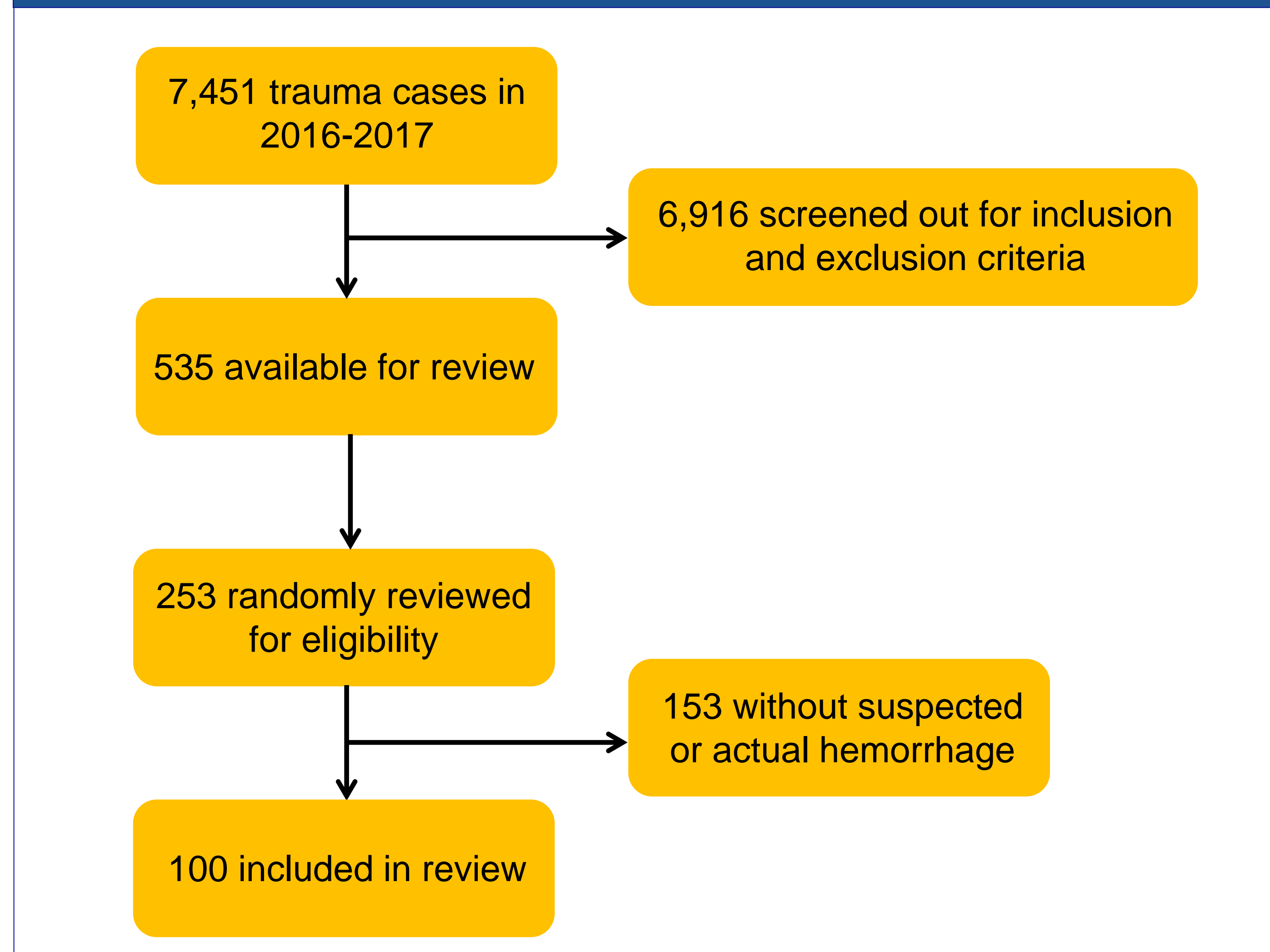


Table 1: Baseline data.

	TXA (n=35)	No TXA (n=65)
Age (years)		
Mean (range)	38.2 (17-68)	49.1 (16-91)
Sex, n (%)		
Female	6 (17%)	15 (23%)
Systolic blood pressure, n (%)		
<90 mm Hg	15 (43%)	17 (26%)
≥90 mm Hg	20 (57%)	45 (69%)
Heart rate, n (%)		
<110 beats per minute	9 (26%)	12 (18%)
≥110 beats per minute	26 (74%)	53 (82%)
Injury severity score (ISS)*		
Mean	23.4	18.5
Type of injury†, n (%)		
Blunt	26 (74%)	47 (72%)
Penetrating	9 (26%)	18 (28%)
Trauma site, n (%)		
Head	1 (3%)	17 (26%)
Thorax	1 (3%)	2 (3%)
Abdomen/Pelvis	8 (23%)	5 (8%)
Multisite	25 (71%)	41 (63%)

*Anatomical scoring system ranging from 0 to 75 that quantitatively describes patients with multiple injuries. 0 describes no injury whereas 75 describes injuries sustained with no expected survivability.

†Penetrating injuries were differentiated from blunt injuries if there was evidence of skin piercing (e.g. gunshot and stab wounds).

Figure 2: Primary outcome – proportion of eligible patients who received pre-hospital TXA.

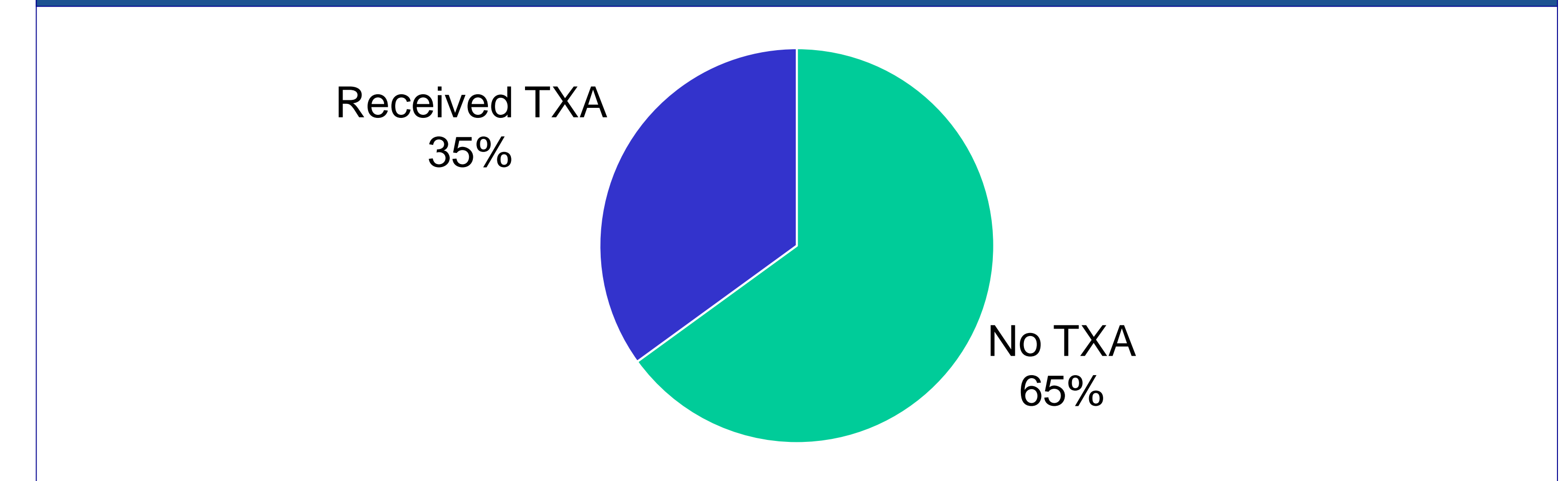


Table 2: Secondary outcomes.

	TXA (n=35)	No TXA (n=65)
Dose and regimen administered, n (%)		
1g IV over 10 minutes	28 (80%)	-
Other regimens	6 (17%)	-
Not specified	1 (3%)	-
Total mortality at 28 days, n (%)	2 (6%)	7 (11%)
Total thrombosis events, n (%)		
Deep vein thrombosis (DVT)	3 (9%)	2 (3%)
Pulmonary embolism (PE)	1 (3%)	2 (3%)
Highest level of paramedic in attendance, n (%)		
Primary Care Paramedic (PCP)	0 (0%)	1 (2%)
Primary Care Paramedic with IV endorsement (PCP IV)	5 (14%)	32 (49%)
Advanced Care Paramedic (ACP)	20 (57%)	22 (34%)
Critical Care Paramedic (CCP)	10 (29%)	10 (15%)

Table 3: Time-based secondary outcomes.

	TXA (n=35)	No TXA (n=65)
Minutes between injury and paramedic arrival, mean [range]	22 [4-97]	23 [02-165]
Minutes between injury and hospital arrival, mean [range]	78 [25-253]	64 [10-496]
Minutes between injury and TXA, mean [range]	50 [15-140]	-
Sorted by Greater Vancouver / Victoria (n=17)	33 [15-87]	-
Sorted by Vancouver Island (n=2)	71 [28-115]	-
Sorted by Interior BC (n=13)	69 [19-140]	-
Sorted by Northern BC (n=3)	49 [32-83]	-

Limitations

- Retrospective chart review design.
- Unable to evaluate potential mortality benefit of TXA
- Original time of injury is an estimation by paramedics.

Conclusions

- TXA was given to 35% of eligible patients, highlighting potential education opportunities for paramedics.
- If TXA was given, paramedics in BC are administering TXA within the recommended 180 minutes from sustaining injury.

References

- The Lancet. 2010;376(9734):23-32.
- The Lancet. 2011;377(9771):1096-1101.e2.