The Incidence of VTE in Trauma Patients after TXA administration: A Multicenter Retrospective Study

Background & Significance

In recent years, the use of intravenous tranexamic acid (TXA) has become integrated into the resuscitation protocol at trauma centers across the United States as treatment for the patient at risk for or acutely bleeding. Whereas a large randomized, controlled trials and some retrospective studies demonstrated a reduction in all-cause mortality following TXA administration, there are no studies specifically evaluating the risk of venous thromboembolism (VTE) following TXA administration. It is possible that acutely shutting down the fibrinolysis pathway may result in an increased risk of VTE. Studying this possible side-effect requires a large sample size due to the low incidence of VTE reported in studies evaluating the efficacy of the drug. By understanding the true risk: benefit ratio of TXA administration, clinicians can better determine the utility. In order to make the findings of the study generalizable and clinically useful, we intend to only capture VTE events that are symptomatic and documented using objective radiographic imaging.

Specific Aims of Multicenter Study

Primary aim

Determine the rate of VTE events in patients who received TXA controlling for known risk factors for VTE in the trauma patients.

Secondary aims

1. To identify risk factors for the development of VTE in trauma patients that received TXA.
2. To measure arterial thromboembolic events in patients who received TXA including myocardial infarction (MI) and stroke/CVA.

Experimental Design/Methods

Inclusion Criteria

All adult trauma patients 18 years of age or older who received TXA.

Exclusion Criteria.

Patients routinely screened for DVT, pre-injury use of anticoagulant medication including antiplatelet agents, patients who received TXA > 3 hours post injury, interhospital transfer, death within 24 hour of injury, chronic hypercoagulable disorder, pregnancy.

Therapeutic Interventions

There are no therapeutic interventions. We intend to carry out a retrospective study to identify VTE events in patients who did/did not receive TXA.

Outcomes Measures

Primary Outcome

Symptomatic DVT and PE rates confirmed by extremity duplex or CT venography and CTA of the chest, respectively.

Secondary Outcomes
In-hospital mortality
Other vascular occlusive events: MI, stroke/CVA

Variables
List specific variables to be collected & analyzed

- Demographics: Age, Gender
- Comorbidities: Diabetes, Hypertension, Chronic Obstructive Pulmonary Disease, Coronary Artery Disease, Stroke, Hypercoagulable Disorder, history of VTE, congestive heart failure, Atrial fibrillation.
- Arrival blood pressure and heart rate
- Mechanism of Injury
- ISS
- AIS of head/chest/abdomen
- Arrival Date and Time
- Arrival lab results: TEG results (if available), conventional coagulation lab results, platelet count, lactate, base deficit (if available)
- TXA dose date and time
- Units of PRBC/platelets/FFP transfused
- VTE chemoprophylaxis date and time of administration
- Date and time of diagnosis of VTE event (PE or DVT) as documented on ultrasound or CT scan
- Date and time of MI and stroke (see definition in data dictionary)
- In-hospital mortality

Data Collection and Statistical Analysis
After IRB and data use agreement approval, data will be collected from each participating hospitals' trauma registry and via a retrospective chart review. A data collection tool that includes the variables of interest (as listed above) will be provided for all participating hospitals. Data will be aggregated and analyzed by our institution's statisticians. 1:1 propensity match cohort based on ISS, Mechanism of Injury, age. Univariate analyses will be perform using appropriate tests to investigate the relationship between TXA administration and DVT or PE rates. A multivariable logistic regression will be perform controlling for possible confounders and other variables of interest that were found to be significant in the univariate analyses (p-value ≤ 0.1). Variables associated with DVT and PE will be identified and considered statistically significant in our final multivariable logistic model if the corresponding p-value is less than $\alpha = 0.05$.

All data will be entered into RedCap by each individual site. The investigators will only be able to see their own data. All analysis will be done in an anonymized fashion.

Power analysis
DVT and PE incidences from MATTERs study were 2.4% vs 0.2% and 2.7% vs 0.3% in the TXA and no TXA groups, respectively. Based on this, we estimate that a total of 830 patients are needed to find a statistical significant difference with a minimum power of 80%.

Consent Procedures

This is a retrospective observational study, designed to collect existing data on patients' medical records. Thus, a waiver of informed consent is requested. Data will be collected and stored in a de-identified manner, under password encryption, with access limited to study participants only. All data will be destroyed once the study is completed.

Risk/ Benefit Analysis

The incidence of VTE and MI/CVA after TXA use are unknown. This study will allow clinicians to better understand the drug's risk profile and delineate the correct cohort of trauma patients who would most benefit from the use of this drug.

References

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