



## TRANEXAMIC ACID (TXA)

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## TRANEXAMIC ACID (TXA)

### 1. Overview

- 1) Tranexamic acid (TXA) is a synthetic lysine analog that competitively inhibits the activation of plasminogen to plasmin. It was approved by the US Food and Drug Administration in 1986 for short-term use as an injection to reduce or prevent bleeding during tooth extraction in hemophilia patients. All other uses are off-label.
- 2) TXA has the potential benefit of decreasing fibrinolysis in the injured bleeding patient.
- 3) A subgroup analysis of the CRASH-2 study examined the timing of administration. In bleeding patients, a significant reduction in mortality resulted from TXA administration within 1 hour of injury. This benefit continued up to 3 hours post-injury, but after 3 hours, TXA administration was found to be harmful.

### 2. System Integration

- 1) TXA administration should never delay transport.
- 2) TXA administration involves a bolus dose followed by an infusion over 8 hours.
- 3) The **receiving center must endorse** the prehospital use to not only ensure the infusion is initiated but also to avoid a repeat bolus.
  - a) **EMS agencies are required to** engage with their leading regional trauma centers to agree on protocols for prehospital TXA use.
  - b) It is also encouraged that a clear hand-off of care report be given by EMS providers specifically noting that the TXA bolus has been given during transport so that the infusion is begun at the receiving center.
  - c) The **patient should have clear marking** that TXA has been administered in the prehospital setting (e.g. Tag, Wristband, etc).



### 3. Patient Presentation

#### A. Inclusion Criteria

- 1) Age  $\geq$  18
- 2) Blunt/penetrating trauma and injury within 3 hours or postpartum hemorrhage
- 3) SBP < 90 due to uncontrolled hemorrhage
- 4) Major amputation of any extremity proximal to the wrist or ankle
- 5) Significant Blood Loss (> 500 mL)/Life-threatening hemorrhage

#### B. Exclusion Criteria

- 1) Isolated head injury (blunt or penetrating)
- 2) Cervical cord injury with motor deficit
- 3) Traumatic arrest (with > 5 minutes CPR without ROSC)
- 4) Isolated drowning or hanging victims
- 5) Patient has an active (within the last 24 hours) thromboembolic event (active stroke, myocardial infarction, or pulmonary embolism)
- 6) Any patient with a known allergy to Tranexamic Acid (TXA)
- 7) Penetrating Cranial injury
- 8) Traumatic Brain Injury (TBI) with exposed brain matter

#### C. Adverse Events / Complications

- 1) Seizure (mainly in the pediatric cardiac surgery population.)
- 2) Hypotension
- 3) Allergic Reaction
- 4) Thromboembolic event

### 4. Procedure:

- 1) Initiate 2 large bore IVs
- 2) TRANEXAMIC ACID (TXA): 1\* Gram mixed into 50 or 100 mL NS over 10 minutes IV/IO
- 3) \*Dosing of TXA will be determined by Local Medical Control Physician in consultation with the Trauma Center
- 4) May be administered in conjunction with Fluid Resuscitation



- 5) May NOT use same IV Line to infuse Blood or Blood Products
- 6) Patient must be clearly identified as having received TXA and the time of administration.

## 5. Certification Requirements

- 1) Maintain knowledge of the indications, contraindications, technique, and possible complications of the procedure. Assessment of this knowledge may be accomplished via quality assurance mechanisms, classroom demonstrations, skills stations, or other mechanisms as deemed appropriate by medical control. Assessment should include direct observation at least once per certification cycle.

## 6. Certification Level

- 1) Paramedic and Higher Endorsements may perform this procedure.

## 7. Key Educational Notes

### A. Monitoring and Quality Improvement

- 1) Given the lack of data available prehospital TXA administration be monitored closely in a prehospital and/or trauma registry.
- 2) Administration should be reviewed and protocols improved to avoid unnecessary or incomplete doses, inappropriate patient selection, or lack of infusion following the initial bolus. TXA dosing, timing, blood transfusion requirements, and any adverse events should be included in the registry. I
- 3) Repeat bolus doses of TXA should be avoided.
- 4) Prehospital TXA administration should be clearly communicated with the next receiving provider.
- 5) Simple adjuncts, such as stickers or wristbands applied to patients, may be used to aid in the information transfer.
- 6) The focus for management of compressible, external bleeding should be on pressure dressings, hemostatic agents, wound packing, or tourniquets. Evidence of injury consistent with non-compressible hemorrhage (e.g. penetrating thoracoabdominal trauma, unstable pelvis fractures) along with heart rate > 120 bpm and SBP < 90 mmHg are suggested criteria.



- 7) Compressible bleeding should be managed with pressure dressings, hemostatic agents, wound packing, or tourniquets.
  - a) Prehospital TXA should be administered only to patients with non-compressible bleeding.
  - b) Definitive surgical control at a trauma center is essential.
  - c) Patients receiving prehospital TXA should be preferentially transported to a Level I or II trauma center if available.
  - d) If geographic or other factors preclude direct trauma center transport, the first receiving hospital should be capable of continuing the TXA infusion and implementing hemorrhage control procedure

## 8. Quality Improvement

### A. Key Documentation Elements

- 1) Indications for utilization of TXA
- 2) Vital Signs
- 3) Dosage of TXA Administered
- 4) How TXA is Administered
  - a) IV Infusion
  - b) Slow (>10 minutes) IV Push
- 5) Documentation of patient Identification as having received TXA
- 6) Documentation of appropriate notification of receiving facility personnel at time of hand-off that patient has received TXA.

### B. Process Improvement

- 1) Evaluation for Adverse Events/Complications
- 2) Appropriate Patient Selection
- 3) Appropriate Dosing and Administration
- 4) Appropriate physical Identification of patient as having received TXA (tag, wristband, etc.)
- 5) Documentation of appropriate notification of receiving facility personnel at time of hand-off that patient has received TXA.



## 9. Program Requirements

- A. Tranexamic Acid has been approved for the use in the prehospital setting.**
- 1) The SC EMS Advisory Council approved in September 2021 the addition of Tranexamic Acid (TXA) to the prehospital formulary for care of patients with "Life Threatening Non-Compressible Traumatic Hemorrhage". Utilization of this drug is approved for Paramedic and Higher Endorsement levels based upon Local Medical Director approval - AND - provided the EMS Service meets the following criteria:
- B. Service will need to follow the Division of EMS Training Program (as published).**
- 1) A copy of which is available on the DHEC website at: **(put location here) {MAKE SURE WE HAVE THIS POSTED}**
- C. Service must have a letter from their primary receiving Trauma Facility, stating:**
- 1) It is aware of this program,
  - 2) It is in support of utilization of TXA, and
  - 3) It can/will manage TXA patients.
  - 4) A copy of this Letter of Agreement must be sent to the Division before instituting use of TXA.
- D. Requires local sign off by the Regional Trauma Center/s**
- 1) That the Regional Trauma Center/s are willing to accept these patients and
  - 2) Agreement that the Trauma Center will provide feedback to the EMS Services post administration.
- E. Every patient who receives TXA must be clearly identified (markings, tags, or wristbands) as having received TXA.**
- F. Quality Improvement elements include:**
- 1) 100% review of TXA administration,
  - 2) Documentation of any known or reported side-effects or adverse reactions - including such reports obtained from the receiving Trauma Facility.
  - 3) Review of Trauma and/or hemorrhage runs where TXA might have been administered - but was not. This should include the



appropriate documentation for the reason/s for having withheld TXA administration.

- 4) Key documentation elements that should be present on every ePCR where TXA is utilized include:
  - a) Indications for utilization of TXA
  - b) Vital Signs
  - c) Dosage of TXA Administered
  - d) How TXA is Administered
    - (i) IV Infusion (over 10 minutes)
    - (ii) Slow (>10 minutes) IV Push
- 5) Documentation of patient Identification (markings or wristband) as having received TXA
- 6) Documentation of appropriate notification of receiving facility personnel at time of hand off that patient has received TXA.
- 7) The SC EMS Advisory Council, on advice from the Trauma Advisory Council, in June 2023 amended the TXA language to limit the dosing of TXA to 1 Gram which may be administered either as an infusion (IV drip) over 10 minutes - or a slow IV push over 10 minutes. The infusion is preferred due to the time restriction on the Paramedic to monitor and administer a slow IV push while trying to care for, by definition, a critically ill patient.

**G. Required Training Components and Performance Improvement Measures are delineated in the Training Program**



Figure 1. Tranexamic Acid (TXA) Guideline

**TXA ADMINISTRATION GUIDELINES**

Date \_\_\_\_\_ ePCR # \_\_\_\_\_

Patient Name \_\_\_\_\_

**ALL** of the following criteria must be met for TXA administration:

- Age  $\geq$  18 years
- Traumatic mechanism
- Life-threatening hemorrhage
- Unresponsive to standard treatment

**AND** the addition of one or more of the following:

- SBP < 90 mmHg
- HR > 120 bpm (sustained)
- Bleeding not controlled with other measures
- Major amputation proximal to wrist or ankle
- Significant estimated blood loss of > 500 ml

**The following are EXCLUSION criteria.**  
**For ANY YES ANSWER – WITHHOLD TXA ADMINISTRATION.**

<u>Yes</u>	<u>No</u>	
<input type="checkbox"/>	<input type="checkbox"/>	Time of injury with duration > 3 hours
<input type="checkbox"/>	<input type="checkbox"/>	Traumatic arrest duration > 5 minutes
<input type="checkbox"/>	<input type="checkbox"/>	Active thromboembolic event in last 24 hours
<input type="checkbox"/>	<input type="checkbox"/>	Known allergy or hypersensitivity to TXA
<input type="checkbox"/>	<input type="checkbox"/>	Penetrating cranial injury
<input type="checkbox"/>	<input type="checkbox"/>	Blunt TBI with exposed brain matter
<input type="checkbox"/>	<input type="checkbox"/>	Isolated hanging or drowning victims
<input type="checkbox"/>	<input type="checkbox"/>	Cervical cord injury with motor deficits

Time of Administration: \_\_\_\_\_