TRANEXAMIC ACID FOR PARAMEDIC USE WITH TRAUMATIC INJURY

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March 10th, 2016

BACKGROUND

- Abbreviations: TXA
- Brand Names: Cyklokapron (Inj) Lysteda (Oral)
- Pregnancy Category: B
- Adverse Effects of IV Route:
  - Hypotension
  - Nausea/diarrhea
  - Blurred vision
  - Thrombus risk?
    - Less vascular occlusive events in CRASH 2 trial than placebo
- Contraindications:
  - Acquired defective color vision, active intravascular clot, hypersensitivity

MECHANISM OF ACTION

Panel A: Activation of fibrinolysis
- t-PA
- Plasminogen
- Fibrin degradation products

Panel B: Inhibition of fibrinolysis
- t-PA
- Plasminogen
- Transaxamic acid
- Fibrin
- Fibrin degradation products

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http://www.obgmanagement.com/home/article/a-new-to-the-us-first-line-agent-for-heavy-menstrual-bleeding/89def9489e8070e03635407caabfb88f.html
PHARMACOKINETICS

- **Protein Binding:** Plasminogen
- **Elimination half life:** 2 hours for IV route
- **Metabolism:** Minimal, site unknown. Dicarboxylic acid and acetylated metabolites: inactive
- **Excretion:** Urine (> 95% unchanged drug)


<table>
<thead>
<tr>
<th>Group</th>
<th>Loading Dose (mg/kg)</th>
<th>Infusion dose (mg/kg/hr)</th>
<th>Transfusions Given</th>
</tr>
</thead>
<tbody>
<tr>
<td>Placebo</td>
<td>0</td>
<td>0</td>
<td>19</td>
</tr>
<tr>
<td>Quarter</td>
<td>2.5</td>
<td>0.25</td>
<td>33</td>
</tr>
<tr>
<td>Half</td>
<td>5</td>
<td>0.5</td>
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<tr>
<td>Whole</td>
<td>10</td>
<td>1</td>
<td>10</td>
</tr>
<tr>
<td>Double</td>
<td>20</td>
<td>2</td>
<td>9</td>
</tr>
<tr>
<td>Fourfold</td>
<td>40</td>
<td>4</td>
<td>14.5</td>
</tr>
</tbody>
</table>

ECONOMICS

- **Pricing Estimates**
  - Tranexamic acid 1000mg/10mL vial = ~ $22
  - x2 = $44
  - 1 unit PRBC’s = ~ $200

- **CRASH-2 UK Data:**
  - Life Years Saved
    - 755 years per 1,000 patients

- **Early administration is highly cost effective**
USE AT COVENANT HEALTHCARE

- **Prevention of Blood Loss During Major Orthopedic Surgery (off label)**
  - 1g given 15 minutes prior to tourniquet inflation or incision
  - 1g given 15 minutes prior to tourniquet deflation or closure
  - Decrease in need for transfusions without any increase in VTE
    

- **Epistaxis (off label)**
  - 500mg topical soaked in pledget and inserted to affected nostril
    

ADDITIONAL USES

- Hemorrhage prophylaxis during tooth extraction in patients with hemophilia (FDA approved)

- Menorrhagia (FDA approved)

- Intracranial hemorrhage and traumatic brain injury (off label)

- Postpartum hemorrhage prophylaxis (off label)

- Postoperative hemorrhage prophylaxis for cardiac procedures (off label)


PARAMEDIC CRITERIA

- **Indications:**
  - Hemorrhagic shock from traumatic cause or severe uncontrolled bleeding
  - Hypotension (SBP < 90 mmHg) and/or tachycardia (>110), or declining BP and sustained tachy with traumatic injury

- **Contraindications:**
  - Age < 18 years
  - Spinal, cardiogenic or septic shock
  - Hemorrhagic shock from non-traumatic cause
  - Peripheral hemorrhage controlled through compression

DOSEAGE & ADMINISTRATION

- **Dose #1:** 1g over 10 minutes ≤ 3 hrs of injury
  - Draw up vial of 1000mg/10mL
  - Add to 100mL NS bag
  - Administer via IV over 10 minutes
    - 660mL/hour factoring 10mL of drug

- **Dose #2:** 1g over 8 hours, started ≤ 3 hrs of injury
  - Administered at destination facility
  - Must be trauma facility capable of continuing subsequent dose
  - Advise receiving hospital of admin time of tranexamic acid and need for 2nd dose when giving reports
**LABELING**
- Saline bag, drug vial, sticker
- Green sticker to be labeled and placed on bag after mixing

***Alert***
EMS MEDICATION ADDED
- Medication Name________
- Time Started___________
- Initials________________

**TIMING**
The importance of early treatment with tranexamic acid in bleeding trauma patients: an exploratory analysis of the CRASH-2 randomised controlled trial

- Early treatment (≤ 1 hour from injury) reduced risk of death from bleeding (5.3% TXA vs 7.7% placebo)
- Treatment 1 – 3 hours reduced risk of death from bleeding (4.8% TXA vs 6.1% placebo)
- Treatment > 3 hours INCREASED risk of death

- MUST BE STARTED ≤ 3 HOURS OF INJURY

**IV COMPATIBILITIES**
- **Compatible:**
  - D5W, Normal Saline, Heparin
- **Unknown:**
  - EVERYTHING IN EMS BOX
- **Incompatible:**
  - Penicillins

- Start 2nd IV site or wait to administer additional meds while Tranexamic acid is infusing

**TRANEXAMIC ACID CONCLUSION**
- Works to prevent clot break-down
- Cost effective
- Administer to adult trauma patients with:
  - Hemorrhagic shock, hypotension and/or tachycardia
- To improve mortality from bleeding, TXA must be started within 3 hours of injury
- Receiving hospital must be informed of the timing of the 1st dose, injury time and need to start the 2nd
- Unknown IV compatibilities with most medications
REFERENCES