

# TXA-The Pros

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# TXA History

- Tranexamic acid was developed in the early 60's in Japan to treat postpartum hemorrhage
- Usage has expanded over the years
  - Tooth extractions in hemophiliacs
  - Cardiothoracic surgery
  - Orthopedic surgery
  - Trauma
- **Indication:** *For the reduction of peri- and post-operative blood loss and the need for blood transfusion in patients undergoing cardiac surgery or total knee arthroplasty or total hip arthroplasty*

# TXA Current Guidelines

- Prehospital TXA recommendations from European guidelines
  - We recommend that tranexamic acid be administered as early as possible to the trauma patient who is bleeding or at risk of significant hemorrhage at a loading dose of 1 g infused over 10 min, followed by an intravenous infusion of 1 g over 8 hours. (Grade 1A)
  - We recommend that tranexamic acid be administered to the bleeding trauma patient within 3 hours after injury. (Grade 1B)
  - We suggest that protocols for the management of bleeding patients consider administration of the first dose of tranexamic acid en route to the hospital. (Grade 2C)

# TXA Current Guidelines

- Prehospital TXA recommendations from US guidelines
- *TXA administration to bleeding patients*
  - Objective measurements should be used to guide prehospital TXA administration protocols. The focus for management of compressible, external bleeding should be on direct pressure, tourniquets, hemostatic agents, and/or wound packing. Evidence of injury consistent with non-compressible hemorrhage (eg, penetrating thoracoabdominal trauma or unstable pelvis fractures) along with heart rate >120 bpm and SBP <90 mm Hg are suggested criteria. Agencies may consider vital sign adjustments for the geriatric population.
- *Don't forget the basics*
  - In the bleeding patient, hemorrhage control and appropriate resuscitation remain the priority. Prehospital TXA use should never supersede field bleeding control techniques, rapid transport to a trauma center, or the administration of blood or plasma.

# TXA Current Guidelines

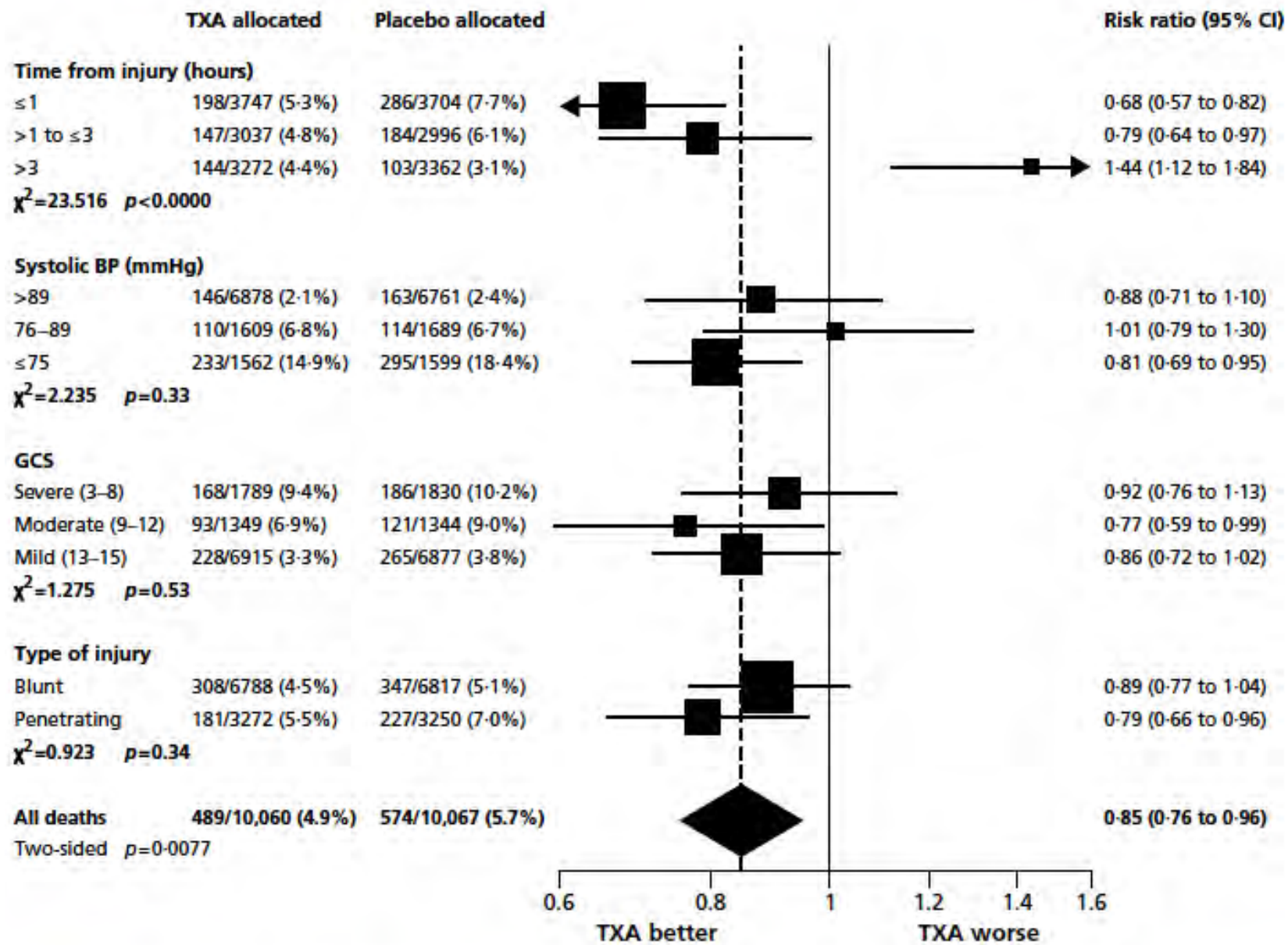
- Joint Trauma System Damage Control Resuscitation Clinical Practice Guideline
  - “The early use of TXA (ie, as soon as possible after injury but ideally not later than 3 hours postinjury) should be strongly considered for any patient requiring blood products in the treatment of combat-related hemorrhage and is most strongly advocated in patients judged likely to require massive transfusion (eg, significant injury and risk factors for massive transfusion)”

# TXA Current Guidelines

- International Trauma Life Support (ITLS)
  - “ITLS believes that there is sufficient evidence to support the use of TXA in the management of traumatic hemorrhage, pursuant to system medical control approval. Following initial resuscitation including control of external bleeding and stabilization of airway, consideration should be given to administration of TXA during early stages of transport. TXA should be considered in those patients who show signs of hemorrhagic shock, including tachycardia (>110 bpm) and hypotension (SBP<100) and are less than 3 hours from injury.”

# CRASH-2

- Clinical Randomisation of an Antifibrinolytic in Significant Haemorrhage 2
- All cause mortality reduced
  - 16.0% to 14.5% (1.5% absolute reduction, RR 0.91, 95% CI 0.91 (0.85 to 0.97),  $p=0.0035$ , NNT 67)
- Risk of death from bleeding reduced
  - 5.7% to 4.9% (0.8% reduction, NNT 121)
- Earlier is better
  - All cause mortality reduced if given before 3 hours
  - Risk of death from bleeding lowest if given  $\leq 1$  hour



**FIGURE 3** Mortality due to bleeding by subgroups.



# MATTERs

- Military Application of Tranexamic Acid in Trauma Emergency Resuscitation
- Mortality decreased despite higher injury severity score
  - (17.4% vs. 23.9%,  $p=0.03$ )
- TXA independently associated with survival
  - (oddsratio 7.228)
- Less coagulopathy ( $p=0.003$ )

# Prehospital Evidence

- IDF experience
- IDF humanitarian experience
- Israeli EMS experience

# Cost

- CRASH-II typical dosing is 1000mg loading dose followed by 1000mg drip over 8 hours <sup>c</sup>
- Typical cost is \$45-\$55 per gram <sup>b</sup>
  - EMS service cost: \$53.20
  - Large hospital cost: \$21.10
  - CRASH-2 cost: \$5.70
- CRASH-2 estimates cost of \$64 per year of life saved <sup>b</sup>
- One estimate predicts a cost of \$6,300 per life saved <sup>a</sup>

# Low Rate of Complications

- Prehospital aeromedical experience in Canada reports no complications
- IDF experience shows no VTE or adverse events
- IDF experience at Israeli-Syrian border, including humanitarian care, showed no early complications
- Israeli EMS experience reports only two thrombotic complications

# Bottom Line

- Strong evidence that TXA decreases mortality in trauma
- Better when given early
- Cheap

# References

- a. Cap AP, Baer DG, Orman JA, Aden J, Ryan K, Blackbourne LH. Tranexamic Acid for Trauma Patients: A Critical Review of the Literature. *The Journal of Trauma: Injury, Infection, and Critical Care*. 2011;71(supplement). doi:10.1097/ta.0b013e31822114af.
- b. “Tranexamic Acid (TXA): Drug Whys.” *EMS1*, 29 June 2015, [www.ems1.com/ems-products/Ambulance-Disposable-Supplies/articles/2206976-Tranexamic-Acid-TXA-Drug-Whys/](http://www.ems1.com/ems-products/Ambulance-Disposable-Supplies/articles/2206976-Tranexamic-Acid-TXA-Drug-Whys/).
- c. Roberts I, Shakur H, Coats T, Hunt B, Balogun E. The CRASH-2 trial: a randomised controlled trial and economic evaluation of the effects of tranexamic acid on death, vascular occlusive events and transfusion requirement in bleeding trauma patients. *Health Technol Assess* 2013;17(10)
- d. “The CRASH-2 Trial: a Randomised Controlled Trial and Economic Evaluation of the Effects of Tranexamic Acid on Death, Vascular Occlusive Events and Transfusion Requirement in Bleeding Trauma Patients.” *Clinical Governance: An International Journal*, vol. 18, no. 3, 2013, doi:10.1108/cgij.2013.24818caa.005.