Effects of TXA on ICH Progression, Morbidity, Mortality, & Disability post-TBI in Adults

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**Background:**
- Traumatic brain injury (TBI) can cause intracranial hemorrhage (ICH) disabilities & / or death.
- ICH post-injury expansion causes primary brain injury by compressing & stretching brain structures.
- ICH secondary brain injuries result from ↑ ICP & ↓ CPP.
- Tranexamic Acid (TXA) stabilizes formed thrombi by preventing degradation & ↓ hemorrhage progression.
- The WHO lists TXA as a cost-effective essential medication for hemorrhage control.
- The target populations: Pts w/ TBI & healthcare providers managing pts w/ TBI.

**Purpose:**
Evaluate the effects of post injury administration of TXA on change in ICH, mortality, disability, and adverse events.

**Current practice:**
- Limited to physiological management of ICH, surgical hemorrhage repair, & removal of thrombi.
- Gap: Prevent hemorrhagic progression independent of, or prior to surgery to ↓ primary & secondary brain injury.
- Importance: ↓ in ICH growth should result in ↓ in primary & secondary brain injury, mortality & disability.
- Guidelines: No EB-guideline addresses nonsurgical interventions for direct prevention of ICH progression post-TBI.

**Method: Focused Literature Search:**

<table>
<thead>
<tr>
<th>Study</th>
<th>JH LOE</th>
<th>Intervention</th>
<th>ICH Progress</th>
<th>Mortality</th>
<th>Disability</th>
<th>Adverse Events</th>
</tr>
</thead>
<tbody>
<tr>
<td>CRASH-3 Trial (2019)</td>
<td>1B RCT</td>
<td>TXA 1Gm/10 min → 1Gm/8 hrs w/ 3 hrs</td>
<td>Ø</td>
<td>↓ when ↓</td>
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<td>Alhelaly et al. (2019)</td>
<td>2C MA*</td>
<td>Variability in protocols</td>
<td>↓ growth</td>
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<td>Chan et al. (2019)</td>
<td>2B QE</td>
<td>TXA admin not defined</td>
<td>Ø</td>
<td>↓</td>
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<tr>
<td>Fakharian, et al., (2018)</td>
<td>1B RCT</td>
<td>TXA 1Gm/10 min → 1Gm/ 8 hrs ASAP; No defined time frame</td>
<td>↓ Δ in volume</td>
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<tr>
<td>July &amp; Pranata (2020)</td>
<td>2C MA*</td>
<td>Variable protocols</td>
<td>↓ Δ expansion</td>
<td>↓</td>
<td>Ø</td>
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<tr>
<td>Weng et al. (2019)</td>
<td>1B MA</td>
<td>Variable protocols w/ ↑ effect in early TXA admin</td>
<td>↓Δ rate &amp; total growth</td>
<td>↓</td>
<td>Improved neuro not defined</td>
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<tr>
<td>Yokobori et al. (2020)</td>
<td>2C MA*</td>
<td>Variable protocols</td>
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</tbody>
</table>

--- = Not Significant; ø = Not Measured; * = Level Of Evidence downgraded due to inclusion of poor quality, high biased study; ↓ = Significance w/ baseline GCS >3 & no bilateral unresponsive pupils, greatest effect w/ GCS ≥9; […] = Results significant w/ exclusion of poor quality, high bias study

**Proposed EBP Change:**
For adults w/ TBI & known or suspected ICH, w/o bilateral unresponsive pupils & baseline GCS ≥9:
- Within 3-hrs of injury, give TXA 1Gm over 10-mins, followed by TXA 1Gm over 8-hrs.
- May be reasonable for pts w/o bilateral unresponsive pupils & baseline GCS >3 & ≤ 8.

**Conclusion:**
- TXA administration resulted in significant ↓ in ICH growth & mortality.
- TXA administration is most effective when given < 3 hrs post TBI.
- Pts w/ GCS ≥ 9 & bilateral or unilateral responsive pupillary reflex showed most benefit from TXA administration.
- No ↓ in thrombotic adverse events was reported.
- More research on long-term neurological outcomes needed.

CINAHL & PubMed: “Tranexamic acid” OR “TXA” AND “Intracranial hemorrhage”.