Evidence for local antibiotics for preventing infection in acute trauma

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Take-home messages

• Mounting evidence to support local antibiotics in high-risk fractures
• Theoretical downsides not seen in literature
• More evidence on the way

Rationale

• Infection catastrophic
• Local antibiotics might prevent
  • Higher concentration
  • Tissues devascularized by injury
  • Less risk of resistance

Carriers

• None
  • Powder (Vanco/Tobra)
  • Liquid (Gentamicin)
• Calcium sulfate
• PMMA
• Hydrogels
**Meta-analysis**

- **Both spine and trauma studies included**
- **2665 screened**
  - 44 studies included
  - 8 RCTs

**Spine RCTs: No difference**

<table>
<thead>
<tr>
<th>Authors</th>
<th>Treatment</th>
<th>Control</th>
<th>Risk Ratio % (95% CI)</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sun et al. 2015</td>
<td>2/40</td>
<td>1/43</td>
<td>2.00 (1.19; 2.41)</td>
<td>5.15</td>
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<tr>
<td>Tublin et al. 2013</td>
<td>0/30</td>
<td>0/34</td>
<td>1.01 (0.33; 3.04)</td>
<td>33.67</td>
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<tr>
<td>Tramonti et al. 2010</td>
<td>2/16</td>
<td>2/18</td>
<td>0.68 (1.11; 0.38)</td>
<td>15.91</td>
</tr>
<tr>
<td>Ludwig et al. 2020</td>
<td>4/49</td>
<td>4/47</td>
<td>0.98 (2.29; 0.62)</td>
<td>21.08</td>
</tr>
<tr>
<td>Kurek et al. 2019</td>
<td>9/254</td>
<td>1/258</td>
<td>1.15 (0.90; 1.49)</td>
<td>23.92</td>
</tr>
<tr>
<td>Overall (I-squared = 0%)</td>
<td>1/205</td>
<td>1/211</td>
<td>1.03 (0.55; 1.94)</td>
<td>50.00</td>
</tr>
</tbody>
</table>

**Trauma RCTs: ~40% reduction infection**

- 980 patients from 36 US Trauma Centers
- High-risk fractures (plateau and pilon, staged, plated)
- Intervention: 1g intrawound vancomycin powder
- Control: Standard prevention protocol
- Outcome: Deep infection @ 6 months
• Results:

- Vanco: 29/481 (6%)
- No Vanco: 46/499 (9.2%)

P=0.06

- Reduced Gram positive infection
  - 16/481 (3.3%) vs 34/499 (6.8%)  
  P=0.02
Potential Issues

- Inhibition of bone healing
- Nephrotoxicity
- Selection of bacteria


Potential Issues

- Inhibition of bone healing
- Systemic toxicity
- Selection of bacteria

More evidence is coming

- TOBRA Trial
  - Vanco + Tobra vs. Vanco alone
  - Study Site: METRC
  - Target enrollment: 1900
  - Estimated completion: June 2024

- GO-Tibia
  - Liquid gentamicin vs placebo saline
  - Study Site: Tanzania
  - Target enrollment: 890
  - Estimated completion: 2025
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Thank you!

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