Antibiotics for Preventing Recurrent Urinary Tract Infection: A Meta-Analysis

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Background

- Urinary tract infections (UTI) are a common healthcare problem
- Recurrent UTI (RUTI) in healthy non-pregnant women is defined as ≥3 UTI episodes during one year
- The scientific literature on randomized trials for prophylaxis of RUTI has not been screened systematically in >10 years
- Providers may choose from a wide range of options, including antibiotic and non-antibiotic preparations
- Long-term antibiotics have been proposed as optimal prevention strategy for RUTI
- Preferable antibiotic choices are poorly characterized

Methods

- Search terms: "recurrent", "UTI", "prophylaxis", "antibiotic", and "RCT"
- Screening of: MEDLINE, EMBASE, the Cochrane Library, clinicaltrials.gov and reference lists of retrieved articles
- We considered any published RCT in adults where antibiotics were used as RUTI prophylaxis
- Data on RUTI episodes in both comparators (antibiotic vs. antibiotic or placebo) were extracted from the selected articles
- Statistical analyses: random effects model, with the results expressed as risk ratio (RR) with 95% confidence intervals (CI)

Flow Chart

- Total hits in Pubmed, MEDLINE, EMBASE, the Cochrane Library, clinicaltrials.gov and reference lists of retrieved articles (101)
- No antibiotic prophylaxis (56)
- Complicated UTI (6)
- Study design not meeting inclusion criteria (12)
- Other (2)
- Controlled trials (21)

Placebo-controlled (14 *)

- A. Placebo-controlled excluding cinoxacin?
  - No antibiotic prophylaxis (56)
  - Complicated UTI (6)
  - Study design not meeting inclusion criteria (12)
  - Other (2)

- B. Head-to-head
  - B1. Nitrofurantoin vs others
  - B2. Trimethoprim vs others
  - B3. Norfloxacin vs others

- C. Post-coital vs continuous
  - C2. Post-coital vs nothing

- Total number of comparisons: 26* from 24 distinct RCTs.

Table 1: Selection of studies for the meta-analysis

<table>
<thead>
<tr>
<th>Type of comparison</th>
<th>Number of studies</th>
<th>Risk ratio (RR)</th>
<th>95% CI</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Placebo-controlled excluding cinoxacin?</td>
<td>14</td>
<td>0.18</td>
<td>(0.11, 0.29)</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>B. Head-to-head</td>
<td>10</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B1. Nitrofurantoin vs others</td>
<td>9</td>
<td>1.10</td>
<td>(0.83, 1.44)</td>
<td>0.49</td>
</tr>
<tr>
<td>B2. Trimethoprim vs others</td>
<td>5**</td>
<td>0.77</td>
<td>(0.52, 1.15)</td>
<td>0.21</td>
</tr>
<tr>
<td>B3. Norfloxacin vs others</td>
<td>3</td>
<td>1.17</td>
<td>(0.59, 2.33)</td>
<td>0.66</td>
</tr>
<tr>
<td>C. Post-coital vs continuous</td>
<td>1</td>
<td>1.39</td>
<td>(0.24, 8.07)</td>
<td>0.71</td>
</tr>
<tr>
<td>D. Post-coital vs nothing</td>
<td>1</td>
<td>0.004</td>
<td>(0.0006, 0.03)</td>
<td>&lt; 0.001</td>
</tr>
</tbody>
</table>

Conclusions

- Over the last decade, only very few RCTs have been added to the scientific literature
- Antibiotic prophylaxis for the prevention of recurrent UTI confers a 50% risk reduction (NNT=2)
- Head-to-head trials were mainly published for nitrofurantoin vs. comparators and show no difference in RUTI rates
- Nitrofurantoin, norfloxacin and TMP/SMZ appear to be interchangeable options (in terms of efficacy)

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