Antibiotics for lower urinary tract infection in children

Cochrane review question
What are the benefits and harms of antibiotics for treating lower urinary tract infection (UTI) in children?

Nursing implications
Urinary tract infections (UTIs) remain a common condition in children. They are generally caused by bacteria and usually present as a lower UTI. Antibiotic therapy is the most common treatment.

With evidence-based practice a mainstay of nursing, it is important to identify the optimal course of treatment based upon current research.

Study characteristics
This Cochrane review included 16 randomised controlled trials (RCTs) and quasi-RCTs in which antibiotic therapy was used to treat bacteriologically proven, symptomatic, lower UTI in children aged 0-18 years in primary and community healthcare.

A total of 1,116 paediatric patients were included in the review.

The interventions of interest were:
- Standard course of antibiotic therapy versus placebo;
- Alternative non-antibiotic therapy;
- No therapy or a different antibiotic;
- Single dosing versus standard multi-dosing;
- Route of administration (oral, intramuscular or intravenous).

Outcome measures were
- Persistent symptoms at completion of treatment;
- Persistent significant bacteriuria and symptoms at completion of treatment;
- Recurrent symptomatic UTI following treatment;
- Symptomatic reinfection after treatment;
- Renal parenchymal damage on dimer-captosuccinic acid (DMSA) scan to assess the kidneys 4-6 months after UTI;
- Adherence to regimen;
- Adverse events;
- Resistant organism development;
- Antibiotic regimen alterations.

It was noted that most studies were published between 1981 and 1991 and had methodological issues and small sample sizes. Risk of bias varied and most items were considered unclear. Meta-analysis was undertaken where possible.

Two studies compared single-dose antibiotics with a short course (3-7 days) of antibiotics; six compared single-dose antibiotics with conventional 10-day courses; four compared short-duration antibiotics with conventional 10-day courses using different antibiotics; two compared different 10-day regimens; one compared single-dose regimens; and one evaluated five different antibiotics.

Summary of key evidence
The results demonstrated that the 10-day antibiotic regimen proved significantly more effective in reducing the presence of persistent bacteriuria, compared with single-dose therapy (six studies, 228 children).

Fourteen studies investigating bacteriuria persistence demonstrated that 24% of subjects receiving a single dose experienced persistent bacteriuria, compared with 10% participating in the 10-day multi-dose antibiotic therapy.

There was no statistical difference between interventions and controls regarding the following outcomes:
- Symptom persistence (14 trials),
- Recurrence (10 trials),
- Reinfection (three trials).

No studies reported renal parenchymal damage.

Three studies measured adherence to therapy, with varied results.

Ten studies reported on adverse events: five did not report any side-effects while the other five reported side-effects including rash, vomiting, diarrhoea, irritability, fatigue and local discomfort from injection sites.

Best-practice recommendations
Results from this Cochrane review suggest that 10-day antibiotic treatment is more likely to eliminate bacteria from the urine than single-dose treatments.

The authors conclude that while antibiotic therapy is effective for paediatric UTIs (versus placebo or non-treatment); currently, there is insufficient evidence to determine which antibiotic type or regimen duration is the most effective.

Further studies are required to determine the creation of bacterial resistance, the efficacy of different antibiotics, and to compare the effectiveness of dosing regimens, adherence and adverse effects.

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Reference