Antibiotic prophylaxis for children at risk of developing urinary tract infection: a systematic review


CRD summary
This review concluded that antibiotic prophylaxis should not be recommended for infants and children at risk of developing urinary tract infections. These conclusions seem overly strong given the paucity of large homogeneous trials in this area.

Authors’ objectives
To evaluate the effectiveness of prophylactic antibiotics in preventing further renal scarring and recurrent symptomatic urinary tract infections in children at risk of developing urinary tract infections.

Searching
MEDLINE, EMBASE, CINAHL, Cochrane Central Register of Controlled Trials (CENTRAL), Cochrane Database of Systematic Reviews and DARE were searched. Dates varied; the most recent search was in May 2009. Searches were not limited by language. Unpublished papers were neither sought nor considered for inclusion.

Study selection
Randomised controlled trials (RCTs) that compared prophylactic antibiotic use in children at risk of developing urinary tract infections (UTI), as defined by the authors, were eligible for inclusion. The population was defined as children (aged up to 18 years) who previously had a UTI with or without vesicoureteric reflux (VUR) or children who had been diagnosed with VUR in the absence of a UTI. Control groups could be placebo, no therapy or other non-antibiotic non-surgical prophylactic treatment. Outcomes were defined as incidence of new or progressive renal scarring, recurrences of pyelonephritis, incidence of symptomatic UTI or prevalence of bacteriuria. Children with pre-existing uropathies, underlying renal conditions, who received antibiotics or who were immunosuppressed were excluded.

Ages of children included in the trials ranged from one month to 17 years. Most participants were female. For trials that compared active prophylaxis with placebo or no treatment, follow-up ranged from six months to four years. Antibiotics used were co-trimoxazole, co-amoxiclav, sulphamethoxazole/trimethoprim and nitrofurantoin. Population categories were children who had symptomatic UTI without VUR and children who had symptomatic UTI with/without VUR.

Studies were selected by two independent reviewers. Disagreements were resolved by discussion with other reviewers.

Assessment of study quality
The Cochrane Renal Group validity assessment tool was used (included items on allocation concealment, blinding, intention-to-treat analysis and follow-up).

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Data extraction
All data were dichotomous and extracted as relative risks (RR) and 95% confidence intervals (CI). Authors were contacted where necessary.

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Methods of synthesis
The data were pooled using fixed-effect models to calculate pooled relative risks. Heterogeneity was tested using $X^2$ and $I^2$. $X^2$ values of 25%, 50% and 75% were equated with low, medium and high levels of heterogeneity. Subgroup
analyses were used to explore possible sources of heterogeneity, which included participants, intervention and study quality.

**Results of the review**

Eight trials were included (n=677).

There were no significant differences between active and control treatments in any of the meta-analyses: recurrence of symptomatic UTI; incidence of new or progressive renal scarring; and presence of bacteriuria or incidence of new/deteriorated VUR. Heterogeneity was low across the analyses.

**Authors’ conclusions**

Antibiotic prophylaxis should not be recommended in infants and children after first-time urinary tract infections.

**CRD commentary**

This review addressed a clear clinical question with detailed inclusion criteria. The searches were comprehensive, although papers not in English were not routinely translated and there was no attempt to search the grey literature. The review processes were described and were likely to have reduced reviewer error/bias. Quality assessment was mentioned, but the results of this process were not reported and this made it difficult to judge the reliability and validity of the primary studies. The analyses were appropriate, although there were relatively few studies with small sample sizes across a large number of comparisons. The conclusions largely followed from the evidence presented, but given the paucity of large trials further research may have been indicated.

**Implications of the review for practice and research**

**Practice:** Given the lack of evidence on benefits of using prophylactic antibiotics for children for children at risk of developing urinary tract infections, routine use of antibiotics was not recommended.

**Research:** The authors did not make any suggestions for further research.

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