FPIN's Clinical Inquiries

Antibiotic Prophylaxis to Prevent Recurrent UTI in Children

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Clinical Inquiries provides answers to questions submitted by practicing family physicians to the Family Physicians Inquiries Network (FPIN). Members of the network select questions based on their relevance to family medicine. Answers are drawn from an approved set of evidence-based resources and undergo peer review. The strength of recommendations and the level of evidence for individual studies are rated using criteria developed by the Evidence-Based Medicine Working Group (http://www.cebm.net/?o=1025).

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Clinical Question

Does antibiotic prophylaxis prevent recurrent urinary tract infection (UTI) in infants and children?

Evidence-Based Answer

Antibiotic prophylaxis to prevent recurrent UTI may be considered in infants and children with or without vesicoureteral reflux (VUR) after a first UTI. (Strength of Recommendation [SOR]: B, based on inconsistent evidence from systematic reviews and one large randomized controlled trial [RCT]) The potential benefit of preventing recurrent UTI by antibiotic prophylaxis should be weighed against the risk of antimicrobial resistance with future infections. (SOR: B, based on inconsistent evidence from one systematic review and two RCTs) Accurate diagnosis of UTI followed by prompt treatment is recommended. (SOR: C, based on expert opinion)

Evidence Summary

There is no clear association between recurrent UTI and VUR, and renal damage, renal scarring, hypertension, and end-stage renal disease. A 2007 Cochrane review combined the results of two randomized studies (n = 142; median age = three years) comparing antibiotic use with no treatment in prevention of recurrent UTI in children.[1] The results showed no difference in the risk of recurrent UTI (relative risk [RR] = 0.75; 95% confidence interval [CI], 0.15 to 3.84) or renal damage (RR = 1.70; 95% CI, 0.36 to 8.07).

In an updated Cochrane review, six studies of children from birth to 18 years of age (n = 1,069) with initial or recurrent UTI compared the effectiveness of prophylactic antibiotic treatment (ranging from 10 weeks to 12 months) with placebo or no treatment.[2] Antibiotic use did not reduce the risk of symptomatic UTI compared with placebo or no treatment (RR = 0.75; 95% CI, 0.36 to 1.53). However, when only studies with a low risk of bias were analyzed, there was a statistically significant reduction in the risk of symptomatic UTI (RR = 0.68; 95% CI, 0.48 to 0.95). The absolute risk reduction was estimated to be 8 percent (number needed to treat = 13). The authors also found a nonsignificant increased risk of resistance to the antibiotic in the active treatment groups (RR = 2.4; 95% CI, 0.62 to 9.26).

A multicenter RCT randomized 100 children younger than 30 months with VUR (grade II to IV) diagnosed after a first episode of acute pyelonephritis to receive trimethoprim/sulfamethoxazole (Bactrim, Septra) or no treatment for two years.[3] There was no reduction in the rate of recurrent pyelonephritis in the treatment group after one year (RR = 1.42; 95% CI, 0.76 to 2.65) or after two years (RR = 1.25; 95% CI, 0.54 to 2.90). There was no reduction in the incidence of renal damage after two years (RR = 1.22; 95% CI, 0.75 to 1.98). Children in the treatment group had recurrent infections caused by multidrug-resistant bacteria: *Escherichia coli* in 37 cases, *Pseudomonas aeruginosa* in three cases, *Enterococcus faecalis* in two cases, and *Morganella morganii* in one case. In the control group, all recurrent infections were caused by *E. coli,* which was 100 percent sensitive to all antibiotics tested.

Another prospective multicenter RCT

compared the use of prophylactic trimethoprim/sulfamethoxazole with no treatment in 225 children from one month to three years of age with VUR (grade I to III) diagnosed after a first episode of febrile UTI.[4] The study concluded that there was no statistically significant reduction of the overall incidence of recurrent UTI with antibiotic prophylaxis in children with low-grade VUR (17 versus 26 percent; $P = .2$).

A double-blind RCT randomized 576 children with VUR (median age = 14 months; 71 percent had first diagnosed episode of UTI) to receive daily trimethoprim/sulfamethoxazole or placebo for 12 months.[5] Children in the treatment group had a modest reduction in recurrent UTI; 13 percent of those in the treatment group developed recurrent UTI compared with 19 percent in the placebo group (hazard ratio = 0.61; 95% CI, 0.40 to 0.93; $P = .02$; number needed to treat = 16). There was a reduction in febrile UTIs in the treatment group (hazard ratio = 0.49; 95% CI, 0.28 to 0.86; $P = .01$; number needed to treat = 16). However, the study was underpowered to assess the effect of antibiotic treatment on long-term renal damage. The incidence of UTI caused by an organism resistant to trimethoprim/sulfamethoxazole was higher in the treatment group (67 versus 25 percent; $P < .001$). There was no difference between groups in the rate of adverse reactions ($P = .10$) or the rate of hospitalization for UTI ($P = .38$).

Recommendations from Others

The American Academy of Pediatrics (AAP)[6] and the American Urological Association[7] recommend antibiotic prophylaxis for infants and children (two months to two years of age) with VUR, but acknowledge that well-designed RCTs are lacking to support their recommendations. A 2004 Clinical Inquiry from the Family Physicians Inquiries Network concluded that evidence is insufficient to recommend for or against antibiotic prophylaxis to prevent recurrent UTI in children with anatomical abnormalities.[8] The National Institute for Health and Clinical Excellence (NICE) recommends against prescribing antibiotic prophylaxis routinely in infants and children following first-time UTI, although antibiotic prophylaxis may be considered in infants and children with recurrent UTI.[9] AAP and NICE guidelines endorse the importance of accurate diagnosis and prompt treatment of acute UTI in children.

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