Asymptomatic Bacteriuria in Pregnancy: Rapid answers using the Cochrane Library

During a busy practice day, we are frequently asked by patients to provide evidence to justify our diagnostic and treatment decisions. In the case example below, we demonstrate how the Cochrane Library can sometimes provide the necessary evidence quickly and painlessly.

**Case**

You are seeing a 32-year-old woman who is 3 months pregnant for her second prenatal visit. During the first prenatal visit, no abnormalities were detected but your partner ordered a screening urine culture. This is not a standard procedure in your practice; however, in reviewing the patient’s chart, you note that the culture is positive for E. coli >100,000 colonies/ml. You mention this to the patient and also confirm that she has no urinary symptoms. You remember that she should probably be treated with an antibiotic, but when you suggest this, she says she does not want to expose her fetus to any drugs unless it is absolutely necessary. In fact, she asks you, "Why do I need to take an antibiotic and what is the potential harm?" She also asks if cranberry juice would suffice. In order to buy some time, you suggest she repeat the urine culture and arrange to see her in one week at which time you promise to have the information.

Six days pass and you still haven’t had time to look anything up. You have a 15-minute break and remember that in a previous Therapeutics Letter, the Cochrane Library (www.cochrane.org) was recommended as a reputable source of the best available evidence.1

**The Cochrane Library**

The most up-to-date information is available from the latest Cochrane Library CD-ROM. A less complete version is also available through OVID (UBC Library). When you do a search for bacteriuria using the CD-ROM, you get 14 hits in the Cochrane Database of Systematic Reviews, 9 complete reviews and 5 protocols (reviews in progress). When you double click on the reviews, you find 5 titles that are possibly relevant to this case: 1) Antibiotics for asymptomatic bacteriuria in pregnancy, 2) Duration of treatment for asymptomatic bacteriuria in pregnancy, 3) Treatment for symptomatic urinary tract infections during pregnancy, 4) Cranberries for treating urinary tract infections, and 5) Cranberries for preventing urinary tract infections.2-6

Double clicking on the first relevant review brings you to the abstract and full review. This review, updated on Dec. 28 2000, includes 14 randomized placebo controlled trials. The review concludes that antibiotic treatment is effective in clearing bacteriuria, reducing the incidence of pyelonephritis, and reducing the incidence of preterm delivery or low birth weight infants. The reviewer advises caution in interpreting the last outcome.

**Quantitative evidence**

Knowing that the patient will likely want some quantitative estimate of benefit, you need to look at the meta-analysis (quantitative summary of evidence). This can be done most quickly by clicking on "Find", typing in "Metaview" and clicking on "Find Next". Double clicking on the hypertext "Metaview, Tables and Figures" takes you to the meta-analysis figures. Double clicking on "Development of pyelonephritis" reveals that 13 trials included this outcome and that 9 of the 13 trials showed a significant reduction in pyelonephritis with antibiotics. The odds ratio (OR) is the summary statistic shown and is most useful when event rates are low. OR closely approximates the relative risk (RR) which is the better summary statistic in this case.7 An RR of 0.25 [0.19, 0.33] is found by clicking on "Statistic" and choosing "Relative Risk". This means that the incidence of pyelonephritis is reduced by 75% (relative risk reduction) with antibiotic treatment. The bracketed numbers indicate the 95% confidence interval. This is narrow, demonstrating that the RR estimate is precise.
Clicking again on "Statistic" and on "Risk Difference" gives a summary statistic of \(-0.146\). Multiplying this number by 100 gives an absolute risk reduction (ARR) of 14.6%. From this, it is possible to calculate the number needed to treat by taking \(100/ARR = 7\). This means that 7 women with asymptomatic bacteriuria during pregnancy need to be treated with an antibiotic to prevent one case of pyelonephritis (see Table).

The rest of the meta-analysis shows that short-course antibiotic therapy (3-7 days) has similar effectiveness to continuous antibiotics until the end of pregnancy. The review highlights the fact that none of the included studies document the adverse effects of the antibiotics. A reassuring fact is that one potential adverse consequence, low birth weight or prematurity, was less in the antibiotic treated group.

You are now running short of time so you quickly double-click on the other 4 reviews. You learn from the abstract of the Duration of treatment for asymptomatic bacteriuria review (Jan 2000) that there is insufficient evidence to conclude whether single dose antibiotic therapy is as good as 4-7 days of antibiotic therapy.  

From the Treatment of symptomatic UTI abstract (Mar 2000), you learn there are insufficient data to recommend any one specific antibiotic regimen. The Cranberries for treatment of UTI abstract (Aug. 1998) indicates that no randomized controlled trials met their inclusion criteria (scanning the review’s text, you note that asymptomatic bacteriuria was included). The Cranberries for prevention of UTI abstract (Aug. 1998) states that "The small number of poor quality trials gives no reliable evidence of the effectiveness of cranberry juice and other cranberry products".

**Back to the case**

On chart review, you see that the patient’s repeat urine culture is positive for E. coli with sensitivity to amoxicillin and sulfonamides. You check the Motherisk website, a source of evidence-based information on the potential risks of therapeutic drugs during pregnancy (www.motherisk.org). This confirms that penicillins are considered to have a wide margin of safety during pregnancy. You now feel prepared to see the patient the next day.

When you see the patient, you tell her that you would not recommend taking cranberry juice, as evidence for its effectiveness is lacking. You tell her there is good evidence that a short course of antibiotics reduces the incidence of an infection of the kidneys during pregnancy and that for every 7 women like her who take a course of antibiotics, one case of kidney infection is prevented. After checking for a history of allergy to penicillins, you recommend a course of amoxicillin 500 mg TID for 7 days. You tell her that this is based on your confirmation of the safety of penicillins using the Motherisk website. The patient can then choose whether to take the antibiotic.

**Asymptomatic bacteriuria in perspective**

The evidence in this case provides an answer for a woman with a positive culture, but does not answer the question whether all pregnant women should be screened. Asymptomatic bacteriuria occurs in about 6% of pregnant women.  

Given a 14.6% ARR with an antibiotic, \(1/(0.06 \times 0.146) = 114\) women would have to be screened to prevent one case of pyelonephritis.

**CONCLUSIONS:**

- Reliable sources of best available evidence are an aid to practice.
- The Cochrane Library is a recognizably incomplete but expanding source of best available evidence.
- Familiarity with the Cochrane Database of Systematic Reviews is necessary in order to be able to extract information effectively and efficiently.

**References**