Meta-analysis of antibiotic prophylaxis in endoscopic retrograde cholangiopancreatography (ERCP)

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Authors' objectives
To determine whether antibiotic prophylaxis reduces the rate of occurrence of bacteremia and/or the rate of sepsis/cholangitis among patients undergoing endoscopic retrograde cholangiopancreatography (ERCP).

Searching
The authors searched MEDLINE (and repeated the search using PubMED, which found one additional trial) using the subject terms and textwords: 'ERCP', 'antibiotic', and 'antibiotic prophylaxis'. Search dates were January 1980 to July 1999. There were no language restrictions. The authors searched the bibliographies of retrieved articles for additional relevant studies and also contacted experts in the fields of gastroenterology and infectious disease.

Study selection
Study designs of evaluations included in the review
Randomised placebo-controlled trials (RCTs) were included in the review.

Specific interventions included in the review
Antibiotic prophylaxis (cefotaxime, piperacillin, cefonicid, cefuroxime, minocycline) versus placebo.

Only trials where oral or intravenous antibiotics were used were included. Trials in which patients received other antibiotics in addition to the prophylactic regime were excluded.

Participants included in the review
Adult patients undergoing endoscopic retrograde cholangiopancreatography (ERCP). Trials in which patients were diagnosed with sepsis or cholangitis prior to ECRP were excluded.

Outcomes assessed in the review
Assessed end points were the rate of occurrence of bacteremia, sepsis or cholangitis.

How were decisions on the relevance of primary studies made?
Two authors independently reviewed the studies for inclusion. If there was disagreement between the two reviewers, an assessment was made by a third investigator.

Assessment of study quality
The authors did not use a formal assessment for validity but did evaluate the trials with respect to study design (including randomisation, blinding and control groups), patient inclusion and exclusion criteria, patient characteristics, antibiotic type, dose, route and timing of administration, and the definition of study outcomes and their monitoring methods.

Data extraction
The authors do not state how the data were extracted for the review, or how many of the authors performed the data extraction.

Data were extracted for the categories of: study identification and year of publication, number of participants, study design characteristics, treatment details, and inclusion criteria and exclusion criteria used in the original studies.

Estimates were also made of the sample size that would be required to provide sufficient power to show a statistically
significant effect in any future study of antibiotic prophylaxis in ECRP.

Methods of synthesis
How were the studies combined?
Pooled estimates of the relative risk ratios (RRs) were calculated with 95% confidence intervals (CIs) using the DerSimonian and Laird random-effects model (see Other Publications of Related Interest no.1).

How were differences between studies investigated?
A statistical test for heterogeneity between studies was performed using the DerSimonian and Laird Q statistic.

Results of the review
Seven RCTs were selected with 1,293 participants but only 5 studies were included in the review.

All of the seven studies were randomised, but only two of the studies were blinded.

Four studies reported on bacteremia: the combined RR for these studies was 0.39 (95% CI: 0.12, 1.29; P= 0.12) which was not statistically significant. Heterogeneity for these studies was 4.3 (P = 0.23) suggesting little heterogeneity among the results.

Five studies reported on the combined outcomes of sepsis/cholangitis: the combined RR for these studies was 0.91 (95% CI: 0.39, 2.15; P= 0.83) which was not statistically significant. Heterogeneity for these studies was 5.7 (P = 0.29) suggesting little heterogeneity among the results.

Authors’ conclusions
The authors state that because of the small number of studies done and the different antibiotic regimens used, it is not possible to state any conclusions about the relative efficacy of the different regimens.

The authors also state that the meta-analysis suggests that antibiotic prophylaxis prior to ERCP may reduce the incidence of bacteremia, but this result was not statistically significant and has little clinical relevance. The treatment also does not substantially reduce the incidence of sepsis/cholangitis, therefore the routine use of antibiotic prophylaxis cannot be recommended.

CRD commentary
The authors have stated their research question and inclusion an exclusion criteria. The literature search was limited by searching only the PubMED/MEDLINE databases. It is possible that additional relevant studies may have been missed although the authors state they believe publication bias was not likely in the review. The authors do report how, and which of the authors, performed the selection of studies, but not the data extraction. There is a validity assessment of the included studies based on a discussion of randomisation, blinding, withdrawals and other study and participant characteristics.

The review used statistical pooling which appears to be appropriate since heterogeneity was not found.

The authors’ conclusions appear to follow from the results but these should be viewed with some caution because of the lack of details about how the review was performed.

Implications of the review for practice and research
Practice: The authors state that since the treatment does not substantially reduce the incidence of sepsis/cholangitis, the routine use of antibiotic prophylaxis cannot be recommended.

Research: The authors state that in a future study 21,836 participants would be needed to detect a 9% reduction in cholangitis.
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