Meta-analysis: antibiotic prophylaxis in elective laparoscopic cholecystectomy


CRD summary
This review concluded that antibiotic prophylaxis was unnecessary in patients undergoing elective laparoscopic cholecystectomy and should not be used routinely in low-risk patients. Although review methods were not described in full, the review was generally well conducted and the authors’ conclusions are likely to be reliable.

Authors' objectives
To assess the routine use of antibiotic prophylaxis during elective laparoscopic cholecystectomy.

Searching
An updated search was carried out up to April 2008 in the following databases, without language restrictions: MEDLINE, EMBASE, the Cochrane Register of Controlled Trials (CENTRAL), and the Chinese Biological Medicine (CMB-disc). Search terms were reported. In addition, references of original articles and reviews were handsearched.

Study selection
Randomised controlled trials (RCTs) comparing the use of antibiotics with placebo or no treatment during elective laparoscopic cholecystectomy, and reporting rates of infectious complications, were eligible for inclusion. RCTs using topical antibiotic prophylaxis were excluded.

Included trials were of patients with a mean age ranging between 42 and 54 years. The antibiotics used differed between trials; some were administered before laparoscopic cholecystectomy, while others were administered before and after the procedure. The majority of included trials excluded patients with acute cholecystitis, pancreatitis, jaundice, pregnancy, known-allergies to antibiotics, concurrent antibiotic therapy, immunosuppression, and use of prosthetic devices. However, other exclusion criteria differed between trials.

The reviewers did not state how many reviewers selected relevant papers for screening.

Assessment of study quality
Two reviewers independently assessed the quality of the included trials using criteria applied by the 5-point Jadad scale including methods of randomisation, blinding, withdrawal and drop-outs. A score of 2 or less indicated low quality and a score of 3 or more indicated high quality. Disagreements were resolved through consensus.

Data extraction
Two reviewers independently extracted the rates of wound infection, major infection, distant infection, and overall infection (according to definitions specified in the review), to calculate odds ratios (ORs) and their 95% confidence intervals (CIs).

Methods of synthesis
A fixed-effect model was used to combine odds ratios and their confidence intervals, unless there was evidence of statistical heterogeneity, in which case a random-effects model was used. Statistical heterogeneity was assessed using the Cochran Q statistic and I² test, with p<0.05 indicating significant heterogeneity. Trials with no events in either treatment arm were excluded from statistical analyses. The number of patients needed-to-treat (NNT) to benefit one patient was calculated for some outcomes.

Sensitivity analyses were conducted by excluding low quality trials, including trials using placebo as control, and including trials with large sample sizes (more than 100 patients per treatment arm). Subgroup analysis was also performed by timing of treatment administration (used only before the procedure versus used before and after). Publication bias was assessed using a funnel plot and the Egger’s test.
Results of the review
Fifteen RCTs (n=2961 patients) were included in the review; six placebo controlled trials and nine untreated controlled trials. Sample sizes ranged from 53 to 635 patients. Mean follow-up duration ranged between 30 and 60 days. Five RCTs scored 3 or more on the Jadad scale, indicating high quality.

There were no statistically significant differences in any of the outcomes between patients receiving antibiotic prophylaxis and controls; wound infections (OR 0.79, 95% CI 0.44 to 1.41; NNT 333; 14 RCTs), major infections (OR 2.51, 95% CI 0.35 to 17.84; four RCTs), distant infections (OR 0.53, 95% CI 0.19 to 1.50; five RCTs), and overall infectious complications (OR 0.77, 95% CI 0.47 to 1.27; NNT 526; 14 RCTs). There was no evidence of statistical heterogeneity for any comparison.

Sensitivity and subgroup analyses supported the findings. There was no evidence of publication bias.

Authors' conclusions
The evidence suggested that routine antibiotic prophylaxis was unnecessary in patients undergoing elective laparoscopic cholecystectomy and should not be used routinely in low-risk patients.

CRD commentary
The review question and supporting inclusion criteria were clear. Several databases and one other appropriate source were searched for articles without language restrictions, reducing the potential for language bias. There was no attempt to search for unpublished articles, but assessment of publication bias showed no evidence of bias. The authors attempted to reduce the potential for reviewer error and bias by undertaking validity assessment and data extraction in duplicate, but this did not appear to be the case for study selection. The quality of the included trials was assessed and, although the quality of the majority of trials was low, the authors did investigate this as part of the sensitivity analyses.

Appropriate methods were used to combine the results and assess for statistical heterogeneity. Although there was no evidence of statistical heterogeneity, the authors did acknowledge the potential for clinical heterogeneity, and there may also have been potential methodological heterogeneity. For some outcomes, event rates were low, resulting in wide confidence intervals, which reduced the robustness of the results.

Although review methods were not described in full, the rest of the review was well conducted and the authors’ conclusions are likely to be reliable.

Implications of the review for practice and research
Practice: The authors stated that the included studies assessed antibiotic prophylaxis in low-risk elective laparoscopic cholecystectomy and that it remains uncertain whether this treatment has a role in high-risk elective patients.

Research: The authors stated that further research is needed to assess the use of antibiotic prophylaxis in high-risk patients undergoing elective laparoscopic cholecystectomy.

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This is a critical abstract of a systematic review that meets the criteria for inclusion on DARE. Each critical abstract contains a brief summary of the review methods, results and conclusions followed by a detailed critical assessment on the reliability of the review and the conclusions drawn.