Antibiotic prophylaxis for preventing wound infection after breast surgery: a systematic review and metaanalysis

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CRD summary
The authors concluded that prophylactic antibiotics reduce post-operative wound infections in patients undergoing breast surgery. Apart from the limited search, overall this was a well-conducted review and, on the basis of the evidence presented, the authors’ conclusions appear reliable.

Authors’ objectives
To evaluate the effects of prophylactic antibiotics on wound infection after breast surgery.

Searching
MEDLINE (from inception) and the Cochrane Library were searched. The search dates were unclear but search terms were reported. In addition, citations identified using the ‘similar studies’ function of PubMed and the reference lists of selected studies were screened. No language restrictions were applied.

Study selection
Study designs of evaluations included in the review
Randomised controlled trials (RCTs) were eligible for inclusion in the review. In the included studies, the duration of follow-up ranged from 10 days to 6 weeks.

Specific interventions included in the review
Studies that compared pre-operative antibiotics with placebo were eligible for inclusion. Studies could also use post-operative prophylactic antibiotics. The included studies evaluated a variety of peri-operative antibiotics (cefonicid, cefazolin, azithromycin and amoxicillin-clavulanate); in one study, antibiotics were also given post-operatively.

Participants included in the review
Studies of adults (older than 18 years) undergoing breast surgery for benign or malignant disease were eligible for inclusion. Data for eligible patients undergoing breast surgery were extracted from studies that included patients undergoing other types of surgery. Most (85%) of the participants in the included studies were undergoing surgery for malignant disease. The patients were undergoing a variety of operations, such as lumpectomy and mastectomy with and without axillary lymph node dissection.

Outcomes assessed in the review
Studies that assessed wound infection or adverse reactions to the antibiotics were eligible for inclusion in the review.

How were decisions on the relevance of primary studies made?
Two reviewers independently selected studies for inclusion.

Assessment of study quality
Validity was assessed using the ‘users guides to evidence-based medicine’ described by the Journal of the American Medical Association. The criteria assessed in the review included method of randomisation, blinding and the use of intention-to-treat analysis. The authors did not explicitly state how the validity assessment was performed; it might have been performed by two reviewers.

Data extraction
Two reviewers independently extracted the data.

Methods of synthesis
How were the studies combined?
Pooled relative risks (RRs) with 95% confidence intervals (CIs) were calculated using a fixed-effect model. The number-needed-to-treat (NNT) with antibiotics to prevent one wound infection was calculated.

How were differences between studies investigated?
The results of chi-squared tests for statistical heterogeneity were presented in forest plots.

**Results of the review**
Five RCTs (n=1,307) were included.

The authors stated that overall the methodological quality of the studies was good. All of the studies were double-blinded. Three studies reported the method of randomisation. Four studies did not use intention-to-treat analysis.

Wound infection rates were significantly reduced for patients who received pre-operative antibiotics compared with placebo (RR 0.60, 95% CI: 0.45, 0.81). No significant heterogeneity was found (p=0.11). The NNT with antibiotics to prevent one wound infection was 17.

Three of the four studies that reported adverse events reported zero adverse reactions. The fourth study reported no significant difference between antibiotics and placebo; the RR was reported in the text as 1.15 (95% CI: 0.72, 1.82).

**Cost information**
One of the included studies reported ‘substantially higher’ costs per patient in the placebo group ‘because of the high cost of treating postoperative infection’ (no other details were reported).

**Authors’ conclusions**
Prophylactic antibiotics reduce post-operative wound infections in patients undergoing breast surgery.

**CRD commentary**
The review addressed a clear question that was defined in terms of the participants, intervention, outcomes and study design. The search was restricted to two databases and references, and this might have resulted in the omission of other relevant studies. Although there were attempts to minimise language bias, no specific attempts to minimise publication bias were reported. Methods were used to minimise reviewer error and bias in the study selection and data extraction processes. Validity was assessed using specified criteria and the results reported. The studies appear to have been appropriately combined using meta-analysis and the results were statistically homogeneous. There was a discrepancy between the RR reported in the text and the forest plot. Apart from the limited search, this was overall a well-conducted review and the authors’ conclusions appear reliable.

**Implications of the review for practice and research**
Practice: The authors recommended that prophylactic antibiotics be given routinely to patients undergoing breast surgery.

Research: The authors did not state any implications for further research.

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