Efficacy of antibiotic-impregnated cement in total hip replacement
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CRD summary
This review evaluated the efficacy and safety of antibiotic-impregnated cement for uninfected arthroplasty. The authors concluded that use of antibiotic-impregnated cement lowered the infection rate by approximately 50 per cent in primary hip arthroplasty. The authors' conclusions reflect the evidence presented, but are unreliable due to possible publication bias, the number of included studies and unclear data analysis.

Authors' objectives
To evaluate the efficacy and safety of antibiotic-impregnated cement for uninfected arthroplasty.

Searching
MEDLINE (January 1966 to December 2004) was searched without language restriction to identify relevant studies. Search terms were reported. Bibliographies of all retrieved articles were scanned. The authors stated that no attempt was made to search for unpublished research.

Study selection
Comparative studies of antibiotic-impregnated cement versus non-antibiotic cement with data on more than 100 or more primary hip replacements or 20 or more revision hip replacements were eligible for inclusion in the review. Outcome data on the incidence of deep infection and overall survival rate at the specified interval after surgery at specified follow up times was also required. Studies related to mechanical properties of cement, in vitro studies or studies of joints other than the hip were excluded from the review. The antibiotic used in the cement was gentamicin. Two reviewers, who were blinded to the source institution, journal and authors of each publication, performed the study selection. It was not stated how disagreements were resolved.

Assessment of study quality
Study quality was assessed using criteria based on the Agency for Healthcare Research and Quality's systems to rate the strength of scientific evidence. Two reviewers, who were blinded to the source institution, journal and authors of each publication, performed the validity assessment. It was not stated how disagreements were resolved.

Data extraction
Data were extracted in order to calculate risk ratios (RR), weighted mean and 95% confidence intervals (CI). The authors stated neither how the data were extracted for the review nor how many reviewers performed the data extraction.

Methods of synthesis
RRs were combined in a meta-analysis using a random-effects model. Heterogeneity was assessed using the Q statistic.

Results of the review
Nineteen studies (n=36,033 hips) met the inclusion criteria, but the authors stated that 13 were subsequently excluded from the meta-analysis because they did not have a control group. There was a discrepancy between the number of studies stated by the authors as included in the meta-analysis and those presented in the forest plots. Of the six remaining studies stated to be included in the meta-analysis (n=24,661 total hip replacements), 3,224 hips were excluded from the meta-analysis for the following reasons: lost to follow up (n=1,081 hips); Boneloc cement used (n=1,990 hips); Simplex cement containing erythromycin and colistin used (n=145 hips); and Simplex cement containing erythromycin only used (n=8 hips). Thus, 21,437 hips performed with or without the use of gentamicin as the sole antibiotic were included in the meta-analysis. There was a small discrepancy of eight hips between the number of hips included in the meta-analysis and the number stated by the authors.

Compared to non-antibiotic cement, antibiotic-impregnated cement was found to reduce the risk of infection after
primary total hip arthroplasty (RR 0.506, p 0.001) and to reduce the risk of revision due to failure of primary total arthroplasty (RR 0.721, p<0.001).

There were no reported adverse effects of complications associated with the use of antibiotic-impregnated cement.

**Authors' conclusions**
The use of antibiotic-impregnated cement lowered the infection rate by approximately 50 per cent in primary hip arthroplasty. For revisions of previously infected hips, combinations or culture-dependent antibiotics lowered infection rates by approximately 40 per cent.

**CRD commentary**
This review addressed a clear research question. The search strategy was limited to one database and searching of bibliographies, and there was no attempt to locate unpublished material. This meant that there was a high risk of the review being subject to publication bias. The authors reported using methods designed to reduce reviewer bias and error in the assessment of validity, but not at other stages of the review process. Although a validity assessment was performed, the authors did not comment on the quality of the included studies, which meant that the reliability of the evidence was unclear. From the six studies that fulfilled the inclusion criteria and had a control group, it was unclear how data relating to 3,224 hips from these studies were identified and subsequently excluded from the meta-analysis. This meant that data included in the meta-analysis may no longer have been fully randomised. The authors' conclusions reflect the evidence presented, but are unreliable due the risk of publication bias and questionable data synthesis.

**Implications of the review for practice and research**
The authors did not state any implications for practice or research.

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