Elective inguinal hernia repair with mesh: is there a need for antibiotic prophylaxis? A review
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CRD summary
This review evaluated the effectiveness of intravenous prophylactic antibiotics in the mesh repair of inguinal hernias. Only two trials supported the use of the intervention. Despite reservations about the review methodology, the author's conclusion that there is a lack of clear evidence supporting antibiotic prophylaxis, and that further rigorous research is required, appears justified.

Authors' objectives
To evaluate the effectiveness of single-dose intravenous antibiotics as prophylaxis in the mesh repair of inguinal hernia.

Searching
PubMed (individual databases not specified) and EMBASE were searched using the specified search terms. The reference lists of retrieved articles were also examined for further studies. Only articles in the English language were considered.

Study selection
Study designs of evaluations included in the review
The author did not specifically state what types of trials were eligible for inclusion. However, both prospective, randomised controlled trials (RCTs) and retrospective studies were included in the review.

Specific interventions included in the review
Studies of single-dose intravenous antibiotics administered pre-operatively were eligible for inclusion. Studies of topical antibiotics and antiseptics were not eligible. The studies included in the review reported on the use of the following intravenous antibiotics: ampicillin and sulbactam; cefazolin; cefonicid; co-amoxiclav; chloramphenicol; erythromycin; ceftriaxone; perfloxacin and unspecified cephalosporins and quinolones. One study included both intravenous and topical preparations of antibiotics. Where stated, the interventions were given at different time periods ranging from 90 minutes to 30 minutes prior to surgery. Antibiotic doses varied between studies. The author did not specify which comparators were to be included; 4 studies compared the interventions with placebo and one with no antibiotic prophylaxis.

Participants included in the review
Studies of patients undergoing surgery for the repair of an inguinal hernia using mesh were eligible for inclusion. The individual studies varied in their inclusion criteria for the participants. However, studies with and without mesh were included in the review; one appeared to be of only non-mesh surgery. The review also included 2 studies of inguinal and femoral repair, and another of abdominal repair. Two studies assessed the use of Lichtenstein mesh. Where stated, studies reported on elective surgery only (2 studies) and on elective and emergency surgery (2 studies).

Outcomes assessed in the review
Studies assessing the incidence of wound infection were eligible for inclusion. One study also reported the rate of hernia recurrence.

How were decisions on the relevance of primary studies made?
The author did not state how the papers were selected for the review, or how many reviewers performed the selection.

Assessment of study quality
The author did not report using a structured validity assessment, but aspects of individual study methodology were reported. The author did not state how the validity assessment was performed.

**Data extraction**
The incidence of wound infection was reported using absolute numbers and/or percentages. In some studies P-values were reported for comparisons between the intervention and control groups.

**Methods of synthesis**
How were the studies combined?
The details of the individual studies were reported separately in a narrative.

How were differences between studies investigated?
Differences between the studies were evident from the individual study descriptions and the table of study details.

**Results of the review**
Seven studies were included in the review: 4 double-blind, placebo-controlled RCTs (n=1,543) and 3 retrospective studies (n=5,064 hernia repairs).

RCTs (4 studies).
Two RCTs (n=368) found antibiotics to be associated with lower infection rates (0.7% versus 9%, P=0.00153 and 0% versus 8%, P=0.059). However, the reviewer stated that these trials had potential type 1 errors and unusually high rates of infection in the placebo groups. A further RCT (n=612) reported infection rates of 2.3% for antibiotic and 4.2% for placebo, corresponding to a risk ratio of 0.55 (95% confidence interval: 0.2, 1.38) in favour of antibiotic prophylaxis, but the difference was not significant and this trial did not include participants undergoing hernia repair with mesh. The remaining multicentre RCT (n=563) found similar overall infection rates in both the antibiotic (8.8%) and placebo groups (8.9%), but the different study centres within the trial reported different infection rates (range: 0 to 13.6%).

Retrospective studies (3 studies).
One retrospective study (2,493 operations including 78 mesh repairs using prophylactic antibiotics) showed no benefit of prophylaxis; the infection rate in primary mesh hernia repair was 0.98% with antibiotics and 0.34% without antibiotics. Another study (1,262 inguinal hernia repairs including 1,181 with mesh) found no wound infections in any of the study participants. The third study (1,309 inguinal hernia repairs with and without mesh) reported that one patient developed an infection, but it was not reported if mesh or antibiotic prophylaxis was used. All three of these studies had methodological problems which were likely to have affected the validity of their data.

**Authors' conclusions**
Only two of the seven identified studies supported the use of prophylactic antibiotics. However, an absence of evidence in clear support of the intervention should not be taken as a reason not to implement the intervention. Further large, rigorous trials may be needed to prove the advantage of prophylaxis.

**CRD commentary**
This review was based on a clear research question. However, the study inclusion and exclusion criteria were not clearly defined and, although the aim was to assess mesh hernia repair, several of the included studies reported results for non-mesh surgery. The search strategy was poorly reported, and it is possible that relevant data were missed as the author failed to search for unpublished material and only included English language publications. It was difficult to assess whether appropriate steps were taken to reduce the chance of errors, selection bias and reporting bias since the author failed to report how studies were selected for inclusion, their validity assessed, and their data extracted. Given that this is a single author review, it is possible that the review methodologies were not independently verified by other
reviewers. The author does not appear to have assessed validity formally, although some elements of study methodology were considered.

The author was justified in reporting the data in a narrative summary given the heterogeneity between the studies. Although the author considered the main outcome of importance to be infection rate, one notable omission was the incidence of adverse events, which is an important factor to consider when assessing the effectiveness of a prophylactic intervention. The reoperation rate is also likely to be important in hernia repair, especially if this is a result of infection. Overall, despite reservations about the review methodology, the paucity and poor quality of the data validate the author's recommendation for further research.

Implications of the review for practice and research
Practice: The author stated that antibiotic prophylaxis for inguinal hernia repair using mesh should not be withheld.

Research: The author stated that further research is required. This should be in the form of large rigorously performed RCTs assessing prophylactic antibiotic treatments in the repair of inguinal hernias using mesh.

Bibliographic details

PubMedID
15951924

DOI
10.1007/s00268-005-7854-5

Indexing Status
Subject indexing assigned by NLM

MeSH
Antibiotic Prophylaxis; Hernia, Inguinal /surgery; Humans; Prosthesis Implantation; Surgical Mesh; Surgical Procedures, Operative

AccessionNumber
12005004608

Date bibliographic record published
31/03/2007

Date abstract record published
31/03/2007

Record Status
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.