A meta-analysis comparing conservative treatment versus acute appendectomy for complicated appendicitis (abscess or phlegmon)

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CRD summary
The review concluded that conservative treatment appeared to be a safer option than acute appendectomy in patients with complicated appendicitis; further research was required. The authors’ cautious conclusion is likely to be reliable.

Authors’ objectives
To determine the efficacy of conservative treatment compared with acute appendectomy in patients with complicated appendicitis.

Searching
MEDLINE, EMBASE and The Cochrane Library were searched without language restriction up to June 2008; search terms were reported. References of relevant articles were checked. Only published studies were included.

Study selection
All studies that compared conservative treatment with acute appendectomy in patients who presented with complicated appendicitis were eligible for inclusion. Studies needed to report at least one outcome of interest; these included duration of hospital stay, duration of antibiotic use, complications and reoperations. Clear reporting of inclusion criteria, indications of treatment for each group and the ability to extrapolate or calculate the necessary data from the published results were required. Studies that included patients with acute non-complicated appendicitis or with diffuse peritonitis caused by freely perforated appendix were excluded.

Inclusion criteria varied across studies and included patients with appendiceal mass, appendiceal abscess and perforated appendix. Studies included paediatric and/or adult populations; most studies recruiting only paediatric patients. Were reported, mean age of participants ranged from 6.9 years to 53 years. Studies were matched on various criteria that included duration of symptoms, American Society of Anesthesiologists (ASA) classification, body mass, heart rate, white cell count, temperature and size of appendiceal mass.

The authors did not state how studies were selected for inclusion in the review.

Assessment of study quality
Two reviewers assessed study quality with a modified version of the Newcastle-Ottawa Scale for patient selection, comparability of study groups and assessment of outcome. Studies that achieved more than 6 from a maximum of 12 points were considered to be high quality.

Data extraction
Two reviewers independently extracted data on (or that allowed calculation of) odd ratios (ORs) and their associated 95% confidence intervals (CIs) for dichotomous outcomes and mean differences and 95% CIs for continuous outcomes. For studies that presented continuous data as means and range values, standard deviations were calculated using bootstrap resampling techniques.

Methods of synthesis
Summary odds ratios and weighted mean differences, along with their 95% confidence intervals (CIs), were estimated using the DerSimonian and Laird random-effects model. Yate’s correction was used for studies that contained a zero in one cell. Studies with zero events in both groups were excluded from the meta-analysis.

Statistical heterogeneity was assessed using  \( \chi^2 \) and  \( I^2 \) (statistical significance was set at  \( p<0.10 \)). Data were re-analysed using a fixed-effects model. Sensitivity analyses were performed for paediatric patients only, studies of higher quality, studies published from 2001 and studies with more than 90 participants. Funnel plots were used to assess publication
Results of the review
Seventeen studies (n=1,572) were included in the review: 16 of retrospective non-randomised design and one prospective non-randomised design. Quality scores ranged from 4 to 9 and 11 studies scored more than 6.

No significant difference was found between conservative treatment and acute appendectomy for the duration of intravenous antibiotics given to patients (four studies), duration of first hospitalisation (eight studies) and overall duration of hospitalisation (seven studies); significant statistical heterogeneity was found for all these analyses.

Significantly more complications were found with acute appendectomy than with conservative treatment (OR 0.24, 95% CI 0.13 to 0.44, I²=74.6%; 16 studies). Specifically, a significantly greater incidence of ileus/bowel obstruction (OR 0.35, 95% CI 0.17 to 0.71; eight studies), abdominal/pelvic abscess formation (OR 0.19, 95% CI 0.07 to 0.58; eight studies), re-operations (OR 0.17, 95% CI 0.04 to 0.75; four studies) and wound infection (OR 0.28, 95% CI 0.13 to 0.60; 10 studies) were found with acute appendectomy. No significant between-group differences were found for incidence of pneumonia, sepsis/diffuse peritonitis, deep venous thrombosis/pulmonary embolism, mortality, adhesions and fistula formation.

No significant between-group difference was found for ileus/bowel obstruction after sensitivity analyses (only paediatric patients, score of more than 6 on the Newcastle-Ottawa scale, studies published in or after 2001) were carried out or for re-operation (studies with >90 patients); otherwise, results were not significantly altered.

No evidence of publication bias was observed.

Authors' conclusions
Conservative management of complicated appendicitis, with or without elective interval appendectomy, was associated with a decreased complication and re-operation rate compared with acute appendectomy. There was comparable duration of hospital stay and duration of antibiotic use. Significant heterogeneity between studies and potential for bias arising from the included studies meant that further studies were required to confirm these findings.

CRD commentary
The review question was supported with clear inclusion criteria. Several databases were searched for published studies. There were no language restrictions. When assessed, no evidence of publication bias was found. Appropriate steps were taken to minimise the likelihood of error and bias in the data extraction and assessment of study quality; whether similar methods were used for study selection was unclear. The validity of the included studies was assessed using a modified version of a standardised scale; as only summary scores were reported it was unclear which criteria were used and so there was no clear picture of study quality. Heterogeneity was assessed and the method of synthesis appeared appropriate. As acknowledged by the authors, the retrospective nature of the included studies and the heterogeneity observed suggested that caution should be exercised when interpreting these results.

The authors' conclusions regarding conservative management should be interpreted with caution due to uncertain study quality; they justifiably suggested that further research was required.

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

Research: The authors stated that randomised controlled trials or prospective controlled studies were required to compare conservative treatment to acute appendectomy. These studies should have predefined entry and outcome criteria.

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