A clinical outcome and cost analysis of laparoscopic versus open appendectomy

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Record Status
This is a critical abstract of an economic evaluation that meets the criteria for inclusion on NHS EED. Each abstract contains a brief summary of the methods, the results and conclusions followed by a detailed critical assessment on the reliability of the study and the conclusions drawn.

Health technology
Laparoscopic appendectomy.

Type of intervention
Treatment.

Economic study type
Cost-effectiveness analysis.

Study population
Patients undergoing appendectomy for suspected acute appendicitis.

Setting
Hospital, the University of Washington Medical Centre, Seattle, Washington, USA.

Dates to which data relate
Effectiveness and cost data were collected between January 1, 1991 and January 1, 1995. Price dates were not stated.

Source of effectiveness data
Effectiveness data were taken from a single study.

Link between effectiveness and cost data
Costing was undertaken retrospectively on the same patient sample as that used in the effectiveness analysis.

Study sample
163 appendectomies were performed in 82 men and 81 women (mean age 29 years, range: 16 - 73 years). Twenty-seven (17%) patients had laparoscopic evaluation, of whom 21 underwent attempted laparoscopic appendectomy. Patients undergoing incidental or interval appendectomy were excluded as were cases in which diagnostic laparoscopy was performed before a planned open approach (n= 7, 22%). 136 open appendectomies were performed (14 performed through a midline incision and the rest were done through a right lower quadrant (McBurney) incision).

Study design
Retrospective cohort study. The duration of follow up was not clearly stated, although the authors noted that follow-up included all clinic visits as well as re-evaluations in the emergency room or re-admissions following discharge.
Analysis of effectiveness
The analysis of effectiveness was based on intention to treat. The main health outcomes used in the analysis were postoperative complication rates and cases with alternative diagnosis established upon surgery. The success rate, as defined by the proportion of attempted operations completed laparoscopically, was also documented. The reference tests were provided by the pathology department. The duration of hospital stay was also measured for both groups, and reported separately for the perforated and nonperforated categories of patients. No other control/adjustment for differences in patient characteristics between groups was reported in the effectiveness analysis.

Effectiveness results
Of the 21 laparoscopic appendectomies attempted, the successful cases represented a 91% success rate (two cases were converted to the open procedure). The corresponding figure for perforated cases was 80% (4/5). Complication rates were reported as 19% for the laparoscopic procedure versus 16% for open (p>0.05). In patients with a normal appendix, an alternative diagnosis was established in 66% of those undergoing laparoscopy compared to 33% of patients undergoing open appendectomy. The false diagnostic rate for women was 4 times greater than for men among patients undergoing open appendectomy (31% versus 8%, p<0.01). The mean duration of hospital stay showed differences between groups (p>0.05), both for the perforated and nonperforated sub-populations.

Clinical conclusions
For open appendectomy, patients with perforated appendicitis who were explored through a midline incision stayed in hospital longer than those explored through a McBurney incision.

Measure of benefits used in the economic analysis
Since the authors considered no difference in clinical benefit was observed between strategies, the economic analysis was based on the difference in costs only.

Direct costs
Quantities of resource use were analysed separately from the costs. Health service costs were estimated using data from billing records of the study hospital, and considered total hospital charges (inclusive of operating room charges) excluding physician fees. Operating room charges included those charges associated with "total time in the operating room" and equipment costs. The price year was not clearly reported.

Currency
US dollars ($).

Sensitivity analysis
No sensitivity analysis was performed.

Estimated benefits used in the economic analysis
Not applicable.

Cost results
Among non-perforated patients, laparoscopic appendectomy led to greater hospital charges ($7,760) then those associated with the open procedure ($5,064), (p<0.001).

Synthesis of costs and benefits
Since the comparator (open appendectomy) turned out to be the dominant strategy, the associated costs and benefits...
were not combined.

**Authors' conclusions**
Laparoscopic appendectomy, while safe, was more expensive and was not associated with better clinical outcome compared to open appendectomy patients.

**CRD COMMENTARY - Selection of comparators**
The reason for the choice of the comparator is clear, as this is a widely used technique in the authors' setting. You, as a user of this database, should consider if this applies to your own setting.

**Validity of estimate of measure of benefit**
Although one of the study's strengths relates to the analysis of the difference in length of hospital stay between the intervention and control groups while controlling for the presence of appendicitis perforation, it is not clear that the rest of the outcome estimates were analysed in such a way (the number of perforated and nonperforated cases in each group was not clearly stated). Therefore, the effectiveness results upon which the conclusions were formulated may be biased.

**Validity of estimate of costs**
Details of the methods of quantity/cost estimation were lacking (no price year was specified). No important cost items were omitted with the exception of physician fees. Note, however, that charge data were used in the study to approximate true total costs, which are likely to differ from total charges.

**Other issues**
Cost data may not be generalisable to other settings/countries.

**Implications of the study**
Randomised controlled trials are warranted to fully assess the benefits of the laparoscopic approach and validate the results of the present study.

**Source of funding**
None stated.

**Bibliographic details**

**PubMedID**
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**Other publications of related interest**

**Indexing Status**
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