Cost-minimisation analysis of laparoscopic and open appendicectomy

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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 appendicectomy.

Type of intervention
Treatment.

Economic study type
Cost-effectiveness analysis (cost-minimisation analysis).

Study population
Patients with a clinical picture of suspected acute appendicitis, with or without laboratory evidence of acute inflammation.

Setting
Secondary care, namely University Hospital. The economic study was conducted in Sweden.

Dates to which data relate
Effectiveness data were collected between January 1995 and March 1996. Costs are expressed in 1995 prices.

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

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

Study sample
102 consecutive patients aged 15 years or over were randomised to have either laparoscopic or open appendicectomy. Exclusion criteria were contraindications to laparoscopic surgery (including anaesthetic contraindications), pregnancy, drug abuse, or psychiatric disease. Randomisation was made in blocks of four, computer-generated, in sequential numbers with sealed envelopes. Of the 102 patients randomised, 99 were included in the final analysis (1 excluded patient had appendiceal carcinoma and the remaining two refused to participate in the follow-up study), leaving 50 patients (21 men) in the open group and 49 patients (28 men) in the laparoscopic group. The pathological findings did not differ between the two groups, with a median age of 32 years in the laparoscopic group compared to 24 in the open group. Duration of follow-up was 28 days, with weekly follow-up for recording pain (with a visual analogue scale graded from 0 to 10) and functional status. The end point of follow-up was complete recovery, defined as the time when there were no limitations to the patients' normal activities.
Study design
Prospective randomised trial.

Analysis of effectiveness
The main health outcomes used in the analysis were the postoperative complications, namely morbidity (deep abdominal infection, wound infection).

Effectiveness results
There was no significant difference in complication rates between the two groups. The open group had 0 cases of deep abdominal infection, 0 cases of peritonitis and 2 cases of wound infection, compared to the laparoscopy group with 1 case of deep abdominal infection, 1 case of peritonitis and 1 case of wound infection (total 2 versus 3 complications).

Clinical conclusions
Further experience in using the laparoscopic technique might reduce the operating time, thus making it more economically viable.

Measure of benefits used in the economic analysis
The authors assumed the effectiveness of the two procedures to be equal and as such the economic analysis was based on cost-minimisation.

Direct costs
Direct hospital costs were considered: costs for different services including salaries for anaesthetic and operating staff, basic equipment and operating facilities; specific equipment such as laparoscopic instruments and disposables were also considered using the investment costs for laparoscopic equipment and a life expectancy of two years. The daily cost of hospital stay was also calculated (technically these last two elements are indirect costs). Discounting was not relevant due to the short time scale of the study.

Statistical analysis of costs
Student's t-test was used, with p<0.05 accepted as significant.

Indirect Costs
See comments in 'Direct costs' above. Also, the authors used a human capital approach to estimate indirect costs, by using the Swedish labour cost per hour including social benefits and calculating the value of lost production for each day of sick leave, by multiplying the average number of working hours in Sweden per day (7.36) with the cost per hour. All costs refer to 1995 prices. Discounting was not relevant due to the short time scale of the study.

Currency
Swedish kroner (SEK) (8 SEK = US$1, 1998).

Estimated benefits used in the economic analysis
This is not applicable to cost-minimisation analysis.

Cost results
Disposable extra material used for the laparoscopic operation and longer operating time raised its median cost by
SEK912 and SEK1,785 respectively. The total median direct cost for the open procedure was SEK13,898 (range: 7,732 - 36,236) compared with SEK16,719 (range: 7,722 - 38,236) for the laparoscopic group, (p=0.01). The mean duration of hospital stay and period of work (indirect costs) did not significantly differ between the two groups: SEK13,102 (range: 0 - 37,598) and SEK11,963 (range: 0 - 35,319) for the open and laparoscopic procedures, respectively.

Synthesis of costs and benefits
Not applicable.

Authors' conclusions
Laparoscopic appendicectomy has higher direct costs than the open operation and is not as cost-effective when the long-term outcome is the same in both groups.

CRD COMMENTARY - Selection of comparators
The reason for the choice of the comparators is clear, as both operating procedures (open and laparoscopic appendicectomy) are widely used in the authors' setting. You, as a database user, should consider if this applies to your own setting.

Validity of estimate of measure of benefit
The authors indicated that patients achieved full recovery in both procedures and, in terms of the outcomes addressed, the two interventions were found to be equal, allowing for cost-minimisation analysis. As the authors conducted a randomised trial and applied a rigorous methodology, the validity of their effectiveness assumption is likely to be high.

Validity of estimate of costs
The estimate of costs is likely to be valid, with a good analysis of both direct and indirect costs. No important items appear to have been omitted.

Other issues
The issue of generalisability was not specifically addressed by the authors, but appropriate comparisons were made with other studies.

Implications of the study
Further randomised controlled trials are called for which address the issues of social class (and therefore indirect costs) and the potential to reduce operating time for the laparoscopic approach, a significant cost driver in this procedure.

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