Short-stay open appendectomy

Janik J S, Janik J E

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
The use of a minimally invasive short-stay open appendectomy technique, with local infiltration of bupivacaine hydrochloride, in children.

Type of intervention
Treatment.

Economic study type
Cost-effectiveness analysis.

Study population
The patient population comprised children aged between 3 and 18 years undergoing appendectomy for the treatment of acute non-perforated appendicitis. Children with a normal appendix, non-appendiceal pathology, or a perforated appendix were excluded.

Setting
The setting was secondary care. The economic study was carried out in the USA.

Dates to which data relate
The effectiveness and resource use data were derived from a study carried out between 1996 and 2001. The price year was not reported.

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

Link between effectiveness and cost data
The costing was performed retrospectively on the same patient sample as that used the effectiveness study.

Study sample
The use of power calculations for the study sample was not stated. The patients were described as "200 consecutive" appendectomies. The authors reviewed 100 consecutive patients operated on using the traditional open approach, and then reviewed 100 consecutive patients treated with a modified (short-stay) open appendectomy technique. The sample comprised 106 males and 94 females.

Study design
This was a retrospective cohort study that was carried out in a single centre in Colorado, USA. The duration of follow-up was not reported, but it appears to have been until discharge of each patient from hospital subsequent to appendectomy. The patients were discharged when afebrile and able to tolerate a general diet.

**Analysis of effectiveness**

The primary health outcomes in the analysis were:

- the mean operative times,
- the return-to-full-activity times,
- the incidence of complications, and
- the mean length of hospital stay (LOS) (which appears to have been used as a proxy effectiveness measure).

The methods used to evaluate these data were not reported. Comparability of the groups at baseline and adjustments for confounding factors were not reported.

**Effectiveness results**

The traditional open appendectomy and short-stay open appendectomy groups had similar mean operative times (24 minutes for open versus 28 minutes for short-stay), return-to-full-activity times (4.9 days for open versus 4.6 days for short-stay) and incidence of complications (3% for open versus 2% for short-stay).

The traditional open group had a mean LOS of 2.7 days, while the short-stay open group had a mean LOS of 1.0 day, (p<0.5).

All of the patients in the traditional open group required morphine sulphate for pain, compared with 17% of those in the short-stay open group.

The authors also noted that, during the same period, the mean LOS for acute non-perforated appendicitis treated with laparoscopy by other surgeons was 1.0 day.

**Clinical conclusions**

The authors stated that the new technique improved on the results of traditional open appendectomy. It also compared favourably with laparoscopic appendectomy in LOS and return-to-activity time.

**Measure of benefits used in the economic analysis**

No summary measure of health benefit was used and the clinical outcomes were left disaggregated. In effect, a cost-consequences analysis was performed.

**Direct costs**

The perspective was not reported and a breakdown of the direct costs included was not given. Hospital charges were used as a proxy for costs of treatment. The quantities and the costs were not analysed separately. Discounting was not reported but, given the time horizon of the study, was not relevant. It was not stated whether the costs were reflated to a single price year, nor to which price year the results related.

**Statistical analysis of costs**

The cost data were treated deterministically.
Indirect Costs
The indirect costs were not included.

Currency
US dollars ($).

Sensitivity analysis
No sensitivity analysis was performed.

Estimated benefits used in the economic analysis
See the 'Effectiveness Results' section.

Cost results
The mean hospital charge per patient was $7,668 in the traditional open group and $6,795 in the short-stay open group, (p<0.5).

The authors also noted that the mean hospital charge for laparoscopy patients during the same period was $8,162, (p<0.5 in comparison with short-stay open appendectomy).

Synthesis of costs and benefits
Not relevant.

Authors' conclusions
The short-stay open technique offers an alternative for surgeons who are dissatisfied with traditional open appendectomy, for surgeons who cannot perform laparoscopic surgery, and for surgeons who service areas where laparoscopic equipment is unavailable or too expensive for appendectomy. The new technique improves on the results of traditional open appendectomy and compares favourably with laparoscopy in LOS, return-to-activity time and cost.

CRD COMMENTARY - Selection of comparators
The authors did not explicitly justify their choice of the comparator, although it appears to have represented current standard practice in their setting. You should decide whether the choice represents an appropriate comparator in your setting.

Validity of estimate of measure of effectiveness
An analysis based on a randomised controlled trial would have been more appropriate to the study question. It was unclear whether the two groups were comparable at baseline, and this was exacerbated by the lack of information on how the patients were allocated to the relevant procedure. The retrospective, observational nature of the study design has the potential to lead to biased results. In addition, it was not clear how far the study sample was representative of the study population. No statistical analyses were undertaken. It is worth noting that the authors have used an unusually high value in reporting significant differences in outcome, (p<0.5 rather than the more common p<0.05 or p<0.01).

Validity of estimate of measure of benefit
The authors did not derive a summary measure of benefit. The reader is thus referred to comments in the 'Validity of estimate of measure of effectiveness' field (above).
Validity of estimate of costs
The perspective of the study was not reported. Hence, it is impossible to know if all the relevant costs have been included given the absence of any breakdown. In addition, as hospital charges have been used to proxy prices, it is possible that the true costs of treatment have not been applied. A more detailed cost analysis would have been useful. Given the lack of reporting, it was difficult to ascertain what was actually included in the mean total costs reported. As such, it is not possible to generalise these cost results to any other setting, or to reproduce them in any future analysis.

Other issues
The authors made appropriate comparisons of their findings with those of other studies. The issue of generalisability was addressed but statements were made with limited justification. The authors do not appear to have presented their results selectively. The study enrolled young children with acute non-perforated appendicitis but the authors generalised their conclusions to "older, larger patients" and "a variety of clinical settings". The authors did not report any further limitations to their study.

Implications of the study
The authors stated that the reduced LOS and cost associated with the new technique make it a legitimate alternative to traditional open appendectomy and to laparoscopic appendectomy. They suggested that the technique can be applied to a variety of clinical settings, including older and larger patients. The limitations highlighted should be taken into consideration when interpreting the results.

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