Application of patient-reported outcome measures (PROMs) data to estimate cost-effectiveness of hernia surgery in England

Coronini-Cronberg S, Appleby J, Thompson J

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.

CRD summary
The study objective was to demonstrate the usefulness of national patient-reported outcome measures (PROMs) using an assessment of the cost-effectiveness of elective hernia repair surgery in adults as an example. The authors concluded that hernia surgery offered value for money with laparoscopic repair being more cost-effective than open surgery. The study had some methodological limitations, particularly in estimating costs. The authors' conclusions are plausible but there is some uncertainty in the results.

Type of economic evaluation
Cost-utility analysis

Study objective
The study objective was to demonstrate the usefulness of national patient-reported outcome measures (PROMs) using an assessment of the cost-effectiveness of elective hernia repair surgery in adults as an example.

Interventions
The intervention was elective inguinal hernia repair surgery for adults aged above 18. Two forms of surgery were considered separately: laparoscopic and open repair surgery. The comparator was no treatment.

Location/setting
UK/hospital

Methods
Analytical approach:
Data on PROMs and national costs were combined to assess the cost-effectiveness of surgery over a 25-year time horizon. The authors did not explicitly state the perspective, but appeared to adopt a hospital perspective.

Effectiveness data:
The key effectiveness outcome was patient quality-adjusted life-years (QALYs). Since 2009, all hospitals had to record the EQ-5D quality of life questionnaire before and after four types of surgical procedures.

Monetary benefit and utility valuations:
Patient health was measured using two EQ-5D questionnaires: one administered to patients prior to surgery and one administered at least three months after surgery. Adjustment was made for differences in patient baseline characteristics. For the no treatment arm an individual's health state was assumed to remain the same. For surgery arms the primary analysis assumed that health remained constant after surgery. Secondary analysis assumed quality of life degraded evenly over 25 years to the pre-surgery level. The social value weights applied to the EQ-5D health states to derive QALY scores were from a survey of the UK general population.

Measure of benefit:
The health benefit was measured in terms of QALYs gained. Future QALYs were discounted at an annual rate of 3.5%.

Cost data:
Only the cost of surgery was included in the analysis. Clinical codes for each hernia procedure included in the PROMs programme were mapped to the corresponding healthcare resource group (HRG) from the NHS Reference Cost dataset. PROMs data were then linked with a restricted Hospital Episodes Statistics data-set to classify the type of surgery. Reference cost data did not differentiate between laparoscopic and open hernia procedures so individual costs for these procedures were derived on a weighted average basis using healthcare resource group codes and Hospital Episodes Statistics records. The final data-set included 13,971 patients who had open repair in 228 hospitals and 3,805 patients who had laparoscopic surgery in 171 hospitals. Costs were reported in GBP (£).

Analysis of uncertainty:
95% confidence intervals (CI) were reported for QALY outcomes.

Results
Compared to no treatment and assuming degrading health, the mean change in QALYs was 0.826 (95% CI 0.793 to 0.859) following case-mix-adjusted surgery, 0.923 (95% CI 0.859 to 0.988) for laparoscopic repair and 0.817 (95% CI 0.782 to 0.852) for open surgery.

The national average cost of hernia surgery in England was £1,554 and represented a mean cost per QALY of £1,881. The average unit cost of laparoscopic surgery was £1,421 compared to £1,426 for open surgery. Open repair surgery cost £1,746 per QALY compared to £1,540 per QALY for laparoscopic surgery.

Authors’ conclusions
The authors concluded that hernia surgery offered value for money with laparoscopic repair being more cost-effective than open surgery.

CRD commentary
Interventions:
The interventions and comparator were stated clearly. The interventions were commonly given treatments, which made them useful comparators.

Effectiveness/benefits:
There were several limitations concerning the assessment of treatment benefits but these were addressed by making what the authors claim to be a conservative assumption regarding effectiveness: (1) utility data was derived from patients who were not randomised to treatment, so there was an increased risk of selection bias; (2) the authors assumed that there would be no degradation of health in the comparator arm although health would be expected to deteriorate due to an increased risk of emergency surgery due to strangulation; (3) the authors assumed that health after surgery would decline over 25 years but no justification was provided for this assumption; (4) no adverse events or complications related to surgery were included in the analysis; and (5) there was potential for bias in the results due to poor PROMs questionnaire return rates among patients (data covered around 30% of eligible hernia operations). As patients with worse outcomes were less likely to return questionnaires the results may have been biased due to excluding such patients. The authors did not indicate whether one form of surgery had a significantly worse return rate than the other. Despite that, the authors claimed that assuming no degradation in quality of life following no surgery was a conservative assumption which, if true, effectively addressed some concerns regarding the effectiveness evidence.

Costs:
Costs and methods used to derive them were reported clearly. Appropriate national sources were used to derive costs. Limited costs were included in the analysis. In particular the analysis excluded in-patient or outpatient hospital visits and other health care utilisation. The authors highlighted that the method used to determine separate laparoscopic and open surgery costs was likely to have underestimated laparoscopy costs. It was possible that future costs related to the no surgery option may have been incurred. However, this would be a conservative assumption. The authors did not state that future costs were discounted, presumably because surgery costs were contained in the first year of the analysis so discounting was unnecessary. The authors did not state the price year.

Analysis and results:
The results were reported adequately. A limited analysis of uncertainty was conducted and there was no assessment of uncertainties around costs. However, the significant assumptions made in the analysis (such as no degradation of quality...
of life if there was no surgery) arguably made scenario and one-way sensitivity analyses more important.

The authors highlighted that there was large variation in the cost per QALY generated by individual providers so generalisability of the results was unclear. In particular the analysis excluded all trusts with fewer than 30 PROMs returns so the results should not be transferred to settings with low surgery volumes.

Concluding remarks:
The study had some methodological limitations, particularly in estimating costs. The authors’ conclusions are plausible but there is some uncertainty in the results.

Bibliographic details

PubMedID
23759893

DOI
10.1177/0141076813489679

Original Paper URL
http://jrs.sagepub.com/content/106/7/278.abstract

Indexing Status
Subject indexing assigned by NLM

MeSH
Activities of Daily Living; Adult; Confidence Intervals; Cost-Benefit Analysis; Economics, Hospital; England; Health Care Costs; Hernia, Inguinal /economics /surgery; Herniorrhaphy /economics /methods; Hospitals; Humans; Laparoscopy /economics; Outcome Assessment (Health Care) /economics; Quality of Life; Quality-Adjusted Life Years; Self Report; State Medicine; Surveys and Questionnaires; Treatment Outcome

AccessionNumber
22013024293

Date bibliographic record published
08/07/2013

Date abstract record published
24/09/2013