Modelling the long-term cost-effectiveness of endovascular or open repair for abdominal aortic aneurysm


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 objective was to assess the cost-effectiveness of endovascular aneurysm repair in males aged 74 years and fit for open repair. The authors concluded that endovascular aneurysm repair was unlikely to be cost-effective. In general, the methodology was appropriate and well reported. The conclusions reached by the authors reflected the currently available evidence.

Type of economic evaluation
Cost-utility analysis

Study objective
The objective was to assess the cost-effectiveness of endovascular aneurysm repair in males aged 74 years and fit for open repair.

Interventions
Endovascular aneurysm repair for an abdominal aortic aneurysm of at least 5.5cm in diameter was compared against open aneurysm surgery.

Location/setting
UK/hospital.

Methods
Analytical approach:
A Markov model was developed to facilitate the combination of the clinical and economic data. A lifetime horizon was adopted. The authors reported that the perspective was that of a collectively funded health care system (UK National Health Service, NHS).

Effectiveness data:
The model was populated with individual patient level data from a recent, large randomised trial (the EVAR 1 trial, with 1,082 patients), which compared endovascular aneurysm repair and standard open repair. This was supplemented with data from another randomised trial, life tables, and a registry. The primary outcome measures were 30-day mortality, and mortality from an abdominal aortic aneurysm cause, cardiovascular cause, or a non-cardiovascular cause, during the follow-up period.

Monetary benefit and utility valuations:
Quality of life weights were derived from published studies.

Measure of benefit:
The measure of benefit was the quality-adjusted life-year (QALY) and it was discounted at an annual rate of 3.5%.

Cost data:
The cost categories were surgery, follow-up, and complications. The resource quantities and unit cost estimates were obtained from published studies. The price year was 2004 and all costs were reported in UK pounds sterling (£). They were discounted at an annual rate of 3.5%.
Analysis of uncertainty:
The uncertainty was investigated through probabilistic sensitivity analyses, the results of which were presented as the probabilities that endovascular aneurysm repair was more cost-effective than open repair for various incremental cost-effectiveness ratio thresholds.

Results
Endovascular aneurysm repair resulted in 5.050 QALYs gained per patient, compared with 5.070 for open surgery. The mean cost of endovascular aneurysm repair was £15,823 compared with £12,065 for open surgery. Therefore, endovascular aneurysm repair was dominated by open surgery, that is, endovascular aneurysm repair was more costly and less effective.

The sensitivity analyses showed that a number of factors influenced the effectiveness, including the relative risk of an abdominal aortic aneurysm, death over the long term and the probability of death within 30 days of open surgery. At a maximum willingness to pay of £40,000 per QALY gained, there was an 8% chance that endovascular aneurysm repair would be considered cost-effective.

Authors' conclusions
The authors concluded that endovascular aneurysm repair was unlikely to be cost-effective on the basis of the existing evidence. They stated that more research should focus on the uncertain estimates.

CRD commentary
Interventions:
The interventions were well described and represented the current practice in the authors' setting.

Effectiveness/benefits:
Most of the effectiveness data were derived from a large randomised controlled trial (RCT), which compared endovascular aneurysm repair with open surgery. RCTs are regarded as the gold standard when comparing health care interventions and should ensure a high degree of internal validity. Individual patient data was used rather than summary data, which is often all that is available. The details of the effectiveness estimates were reported in full, but more details on the RCT might have allowed a full assessment of its quality. The use of QALYs as the outcome measure was appropriate as they capture the impact of the intervention on the quality and length of life, as well as allowing comparisons to be made across various health care interventions. However, no details on how the utilities were elicited were provided.

Costs:
The cost analysis appeared to be valid and well reported. All the costs relevant to the perspective seem to have been included. The estimates of resource use and costs, and their sources, were given. The adjustments to the cost data, including the price year and discounting, were reported.

Analysis and results:
As the authors showed that open surgery dominated endovascular aneurysm repair, the costs and benefits were appropriately not combined (in the base case). The impact of uncertainty was investigated through sensitivity analyses and the results were well presented. The authors noted that a limitation of their analysis was the large degree of uncertainty surrounding many of their estimates and they called for further research in this area.

Concluding remarks:
In general, the methodology was appropriate and well reported. The conclusions reached by the authors reflected the currently available evidence.

Funding
Funded by the National Health Service Research and Development Health Technology Assessment Programme.
Bibliographic details

PubMedID
17876749

DOI
10.1002/bjs.5911

Original Paper URL
http://onlinelibrary.wiley.com/cgi-bin/fulltext/116318421/PDFSTART

Other publications of related interest

Indexing Status
Subject indexing assigned by NLM

MeSH
Aged; Aortic Aneurysm, Abdominal /economics /mortality /surgery; Cost-Benefit Analysis; Decision Support Techniques; Disease-Free Survival; Endoscopy /economics /mortality; Humans; Male; Models, Economic; Quality-Adjusted Life Years; Randomized Controlled Trials as Topic; Risk Factors

AccessionNumber
22008006069

Date bibliographic record published
15/07/2009

Date abstract record published
23/09/2009