Economic considerations for aortic surgery: retroperitoneal approach - is it worth it?

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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
The use of a retroperitoneal (RP) approach for aortic surgery, based on a specific clinical pathway, with the intention of streamlining the care process without compromising quality issues. A vascular nurse coordinator monitored each patient as they progressed along the pathway.

Type of intervention
Treatment.

Economic study type
Cost-effectiveness analysis.

Study population
The study population comprised patients undergoing aortic surgery. Further details on the inclusion and exclusion criteria were not reported.

Setting
The setting was a hospital. The economic study was carried out at the Texas A & M University Health Science Center, Scott & White Clinic, Temple (TX), USA.

Dates to which data relate
The effectiveness evidence and resource use data were gathered from December 1995 to April 1998. No price year was reported.

Source of effectiveness data
The effectiveness evidence was derived from a single study.

Link between effectiveness and cost data
The costing was carried out on the same patient sample as that used in the effectiveness analysis, but it was unclear whether the costing was carried out prospectively or retrospectively.

Study sample
Power calculations to determine the sample size were not performed. An overall sample of 120 patients prospectively enrolled in a vascular registry, was retrospectively reviewed. Sixty patients underwent RP surgery and 60 patients underwent TP surgery. Details on the patient demographics were not reported.
Study design
This appears to have been a case-control study carried out in a single centre (the Texas A & M University Health Science Center). It was presumably carried out retrospectively. The patients had been randomly assigned to one of three vascular surgeons and the choice of either RP or TP was based on the surgeon’s preference. The length of follow-up was not reported.

Analysis of effectiveness
All patients included in the study were accounted for in the analysis. The health outcomes assessed in the analysis were:

- the length of the operation;
- blood replacement requirements;
- the use of intraoperative intravenous crystalloid;
- the length of hospital stay (LOS);
- complications;
- days in the intensive care unit (ICU);
- postoperative ileus;
- combined mortality;
- time of recovery to full activities; and
- patient satisfaction, as measured using a modified version of the Standard Form (SF)-36 by an outside vendor.

The study groups were similar at baseline in terms of their demographics and clinical conditions. However, the co-morbidities of pre-existing renal insufficiency or failure and morbid obesity were higher in the RP group.

Effectiveness results
Generally, there were no statistically significant differences between the two groups in terms of the length of operative procedures, blood replacement requirements, and complications. The exceptions were statistically significant increases in pulmonary oedema and pneumonia in the TP group.

The use of intraoperative intravenous crystalloid was higher in the TP group (4,500 mL) than in the RP group (2,300 mL), (p<0.0001).

The average LOS was 8.8 days in the TP group and 6.2 days in the RP group, (p<0.0001).

Time of recovery to full activities, patient satisfaction, ICU days, and postoperative ileus statistically favoured the RP group.

The combined mortality was 0.9%.

Clinical conclusions
The effectiveness analysis showed the RP approach to be safe and preferred by the patients. In addition, it was associated with shorter LOS and ICU stay, and less operative crystalloid.
Measure of benefits used in the economic analysis
The health outcomes were left disaggregated and no summary benefit measure was used in the economic analysis. A cost-consequences analysis was therefore carried out.

Direct costs
Discounting was not carried out since the costs per patient were incurred over a short period of time. The unit costs and the quantities of resources were not reported. A complete breakdown of the costs was not given. The cost/resource boundary adopted was that of the hospital. The costs and quantities were estimated using actual data derived from patient charts, and a cost-to-charge ratio was used to convert to realistic cost data. The resource data were gathered between December 1995 and April 1998. No price year was reported.

Statistical analysis of costs
Statistical analyses of the total costs were carried out to test for statistical significance of the results. The Wilcoxon Rank-sum test was used, with p-values of less than 0.05 being considered as statistically significant.

Indirect Costs
The indirect costs were not included in the analysis.

Currency
US dollars ($).

Sensitivity analysis
No sensitivity analysis was carried out.

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

Cost results
The total costs were $14,523 in the RP group and $18,510 in the TP group. This difference was statistically significant, (p<0.01). The savings mainly arose from a lower expenditure for ICU stay, respiratory therapy, room and board, and a reduced incidence of complications.

Synthesis of costs and benefits
Not relevant.

Authors' conclusions
The retroperitoneal (RP) approach for aortic surgery was a safe procedure, and was associated with better outcomes and reduced costs when compared with a transperitoneal (TP) approach. The development of a "clinical pathway helped minimise practice variations and provided postoperative progress benchmark for both physicians, patients, and their families".

CRD COMMENTARY - Selection of comparators
The rationale for the choice of the comparator was clear. The TP approach was selected as it represented the conventional procedure for patients undergoing aortic surgery.
Validity of estimate of measure of effectiveness
The design of the study was unclear, but it appears that a retrospective study was carried out on the basis of the retrospective evaluation of patients prospectively enrolled in a registry. Although randomisation was carried out, it was probably not determined by the analysts, but by subjective allocation of the patients to the available surgeons (although this point is not clear from the original paper). The study groups were not completely comparable at baseline and power calculations were not carried out. Details on the demographics and clinical conditions of the study groups were not given. Thus, it was not possible to assess objectively whether the study sample was representative of the overall study population of patients included in the analysis, which in turn were not explicitly defined. These issues clearly limit the internal validity of the analysis.

Validity of estimate of measure of benefit
No summary benefit measure was used, and a cost-consequences analysis was therefore carried out. The use of a summary benefit measure based on quality evaluation (which was measured in the analysis on the basis of the SF-36) in an economic synthesis of the costs and benefits, would have been useful.

Validity of estimate of costs
The analysis of the costs was presumably carried out from the perspective of the hospital. However, the unit costs and the quantities of resources used were not reported. Also, a breakdown of the resources involved in the interventions was not provided. Consequently, it was unclear whether all the relevant cost items were included in the analysis. No price year was reported, thus making reflation exercises to other setting difficult. These issues limit the generalisability of the results to other settings. The analysis of the cost data was, however, based on actual accounted-for costs, rather than estimated costs based on the ratio of costs to charges. This approach provided more realistic opportunity costs, and was a strength of the cost analyses.

Other issues
The authors compared their findings with those from other studies. However, since the issue of the generalisability of the study results to other settings was not addressed, and sensitivity analyses were not carried out, the external validity of the analysis is somewhat low. The details of the analysis were not reported comprehensively in the paper, although the results were reported clearly. Finally, the study population was not defined clearly with respect to the sample used in the study.

Implications of the study
The main implication of the study is that the RP approach for aortic surgery reduces costs and improves outcomes, compared with the conventional TP approach. However, these results should be considered in view of the limitations of the analysis highlighted.

Source of funding
None stated.

Bibliographic details

PubMedID
11236176

Indexing Status
Subject indexing assigned by NLM
MeSH
Aorta; Aortic Aneurysm /economics /surgery; Arterial Occlusive Diseases /economics /surgery; Cardiac Surgical Procedures /economics; Cost-Benefit Analysis; Critical Pathways; Elective Surgical Procedures /economics; Health Care Costs; Humans; Statistics, Nonparametric

AccessionNumber
22001000389

Date bibliographic record published
31/01/2003

Date abstract record published
31/01/2003