Quality of life before and after endovascular and retroperitoneal abdominal aortic aneurysm repair


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 endovascular versus open retroperitoneal abdominal aortic aneurysm (AAA) repair was examined.

Type of intervention
Treatment.

Economic study type
Cost-effectiveness analysis.

Study population
The study population comprised patients undergoing elective infrarenal AAA repair.

Setting
The setting was a hospital. The economic study was carried out in the USA.

Dates to which data relate
The effectiveness and resource use data were gathered from October 2000 and May 2003. The price year was not 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 prospectively on the same sample of patients as that used in the effectiveness study.

Study sample
Power calculations were not reported. The patients were identified from the vascular registry at the authors’ institution. A final sample of 129 patients was included in the analysis, of which 22 were in the endovascular group and 107 were in the open group. The patients in the endovascular group had a mean age of 77 years (age range: 51 - 87) and 90% were men. The patients in the open group had a mean age of 72 years (age range: 33 - 89) and 76% were men. During the study period, 75 additional aortic aneurysms were also repaired at the medical centre. However, these were excluded because they were thoraco-abdominal (n=40), ruptured (n=25), or suprarenal (n=10) aneurysms.

Study design
This was a prospective cohort study that was carried out at the Loma Linda University Medical Center in California. The authors stated that the open approach had been chosen at their institution for a variety of reasons. In particular, patient preference (29 patients), unfavourable aortic aneurysm neck anatomy or excessive angulation (40 patients), and iliac or other access vessel problems (38 patients). The average length of follow-up was 17.5 months. No patient was lost to the follow-up assessment. However, questionnaire data (on quality of life) were available for a smaller group of patients at any assessment time.

**Analysis of effectiveness**

All of the patients included in the initial study sample were considered in the analysis of effectiveness. The outcome measures used were:

- quality of life, which was examined using the Short-Form Health Survey, 12 items (SF-12), administered preoperatively and at 3 weeks, 4 months, and one year after hospital discharge;
- the length of hospital stay (LOS) and the length of stay in the intensive care unit (ICU);
- the frequency of perioperative complications and deaths;
- discharge disposition;
- the rate of hospital readmissions; and
- the average readmission stay.

The patients were also questioned as to when they thought they had returned to baseline health status in terms of weeks from the date of surgery, and whether they would undergo the same procedure again. With the exception of age, which was significantly higher in the endovascular group, the study groups were comparable at baseline.

**Effectiveness results**

No statistically significant differences between the open and endovascular groups were observed with respect to the SF-12 in either the Physical Component Summary (PCS) or Mental Component Summary (MCS) for any time period.

At 3 weeks, the PCS and MCS scores were 32.2 and 45.8, respectively, for the open repair group versus 34.9 and 46.8 for the endovascular group.

At 4 months, the PCS and MCS scores were 42.2 and 52.4, respectively, for the open repair group versus 39.8 and 50.2 for the endovascular group.

At 1 year, the PCS and MCS scores were 42.1 and 51.5, respectively, for the open repair group versus 41.4 and 51.0 for the endovascular group.

When the whole sample was considered, both PCS and MCS scores declined at postoperative week 3, but returned to baseline by 4 months. The 1-year scores were essentially identical to those obtained at 4 months. The statistical analysis showed a significant difference of the two scores at 3 weeks compared with the other three periods.

The number of weeks required to return to baseline health status was higher after open versus endovascular repair (7.22 versus 5.47 weeks), but the difference did not reach statistical significance, (p=0.09). Also, no statistically significant difference in the proportion of patients who would undergo the same procedure again was observed.

The average LOS was 4.4 days for the open group versus 1.9 days for the endovascular group, (p<0.0001). The average stays in the ICU were 1 day (open group) and 0 days (endovascular group), respectively, (p<0.0001).
The rate of perioperative complications was 9.3% in the open group and 4.5% in the endovascular group, (p=0.689). No perioperative deaths were observed. There were 2 late deaths in the open group versus 1 in the endovascular group, (p=0.42).

No statistically significant differences in discharge disposition were observed.

There were 5 hospital readmissions in the open group versus 1 in the endovascular group, (p=1.00).

The average readmission stay was 3.67 days (range: 2 - 6) for the whole group.

**Clinical conclusions**

The effectiveness analysis showed that the open and endovascular AAA repairs were comparable in terms of health-related quality of life, rate of death, and admissions. However, endovascular repair was associated with a significantly shorter LOS.

**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. In effect, a cost-consequences analysis was carried out.

**Direct costs**

Discounting was not relevant since the costs per patient were incurred during a short timeframe. The unit costs were not presented separately from the quantities of resources used. The health services included in the economic evaluation were surgical procedures (labour and supplies), administrative or ancillary services, and utilities. The cost/resource boundary adopted in the study was unclear, but it might have been that of the hospital. Costs (not charges) were obtained from the hospital accounting office. Resource use was estimated using patient-level data derived from the same sample of patients as that included in the effectiveness study. The price year was not reported.

**Statistical analysis of costs**

The costs were presented as mean values with 95% confidence intervals (CIs). Statistical analyses were performed to test the statistical significance of differences in the costs.

**Indirect Costs**

The indirect costs were not included in the economic evaluation.

**Currency**

US dollars ($).

**Sensitivity analysis**

Sensitivity analyses were not performed.

**Estimated benefits used in the economic analysis**

See the 'Effectiveness Results' section.

**Cost results**

The average costs for the surgical intervention in the endovascular group were 1.50 times that in the open repair group (mean difference $7,109, 95% CI: 1,787 - 12,431; p=0.009).
The average cost for other services was twice that in the open repair group (mean difference $4,552, 95% CI: 2,986 - 6,118; p=0.0001).

The average total hospital cost in the endovascular group was 1.60 times that in the open repair group (mean difference $11,662, 95% CI: 5,525 - 17,799; p=0.0001).

Synthesis of costs and benefits
The costs and benefits were not synthesised because a cost-consequences analysis was carried out.

Authors' conclusions
The effect on quality of life was comparable between open and endovascular abdominal aortic aneurysm (AAA) repair. Similar death and complication rates were also observed. However, costs were significantly higher with endovascular than with open retroperitoneal AAA.

CRD COMMENTARY - Selection of comparators
The selection of the comparators was appropriate as the open and endovascular approaches were two commonly used strategies for elective AAA repair. You should decide whether they are valid comparators in your own setting.

Validity of estimate of measure of effectiveness
The effectiveness evidence came from a cohort study. The lack of random allocation of the patients to the study intervention could have introduced some selection bias. In fact, age at baseline was significantly different between the groups, and this could have represented a confounding factor. The authors noted that open surgery was recommended at their institution, which could have further biased the results of the analysis. Indeed, the two groups were quite unbalanced with respect to the number of participants. There was no evidence that the sample size was appropriate, and the authors noted that the sample was too small to detect significant differences in some outcome measures. The evidence came from a single centre and it was unclear whether the study sample could be considered representative of the patient population. The authors noted also that the instrument used to assess quality of life was less sensitive to detect minor differences in the two scales than other validated measures.

Validity of estimate of measure of benefit
No summary benefit measure was used in the analysis because a cost-consequences analysis was conducted. Please refer to the comments in the 'Validity of estimate of measure of effectiveness' field (above).

Validity of estimate of costs
The authors did not state explicitly which perspective was adopted in the study. The costs came from the hospital accounting system, while resource use was based on patient-level data. Statistical analyses were performed to examine the statistical significance of differences in the costs. However, the cost estimates were specific to the study setting and no sensitivity analyses were carried out. The price year, unit costs and quantities of resources used were not reported, which limits the possibility of replicating the analysis and reflating the results of the study in other settings.

Other issues
The authors compared their findings on quality of life with those from published studies, observing that both similar and contrasting results had been found. The issue of the generalisability of the study results to other settings was not addressed and no sensitivity analyses were carried out. In effect, the external validity of the analysis was low. The study referred to patients undergoing elective AAA repair and this was reflected in the authors' conclusions.

Implications of the study
The study results suggested that the choice of the most appropriate retroperitoneal AAA repair strategy should not be based on the expectation that quality of life would be improved. The authors stated that future studies with large sample sizes might find statistically significant differences in the rates of complications, deaths and readmissions.

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None stated.

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**Other publications of related interest**


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