What is the Best Option for Elective Repair of an Abdominal Aortic Aneurysm in a Young Fit Patient?

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WHAT THIS PAPER ADDS

This study questions whether young patients are better served with endovascular or open repair of an abdominal aortic aneurysm in the elective setting. This research question is important in the light of the recently introduced national screening programme, as a greater number of young patients will present electively for repair. One of the main criticisms of endovascular repair has been lack of long-term durability with the need for life-long surveillance and a significant number of late reinterventions. Few studies have described long-term complications following open repair. This study specifically examines outcomes in young patients and include long-term reinterventions following both open and endovascular repair.

Objective: The lower procedural risk associated with endovascular aneurysm repair (EVAR) compared with open aneurysm repair (OAR) is well known. Younger patients are likely to represent a group at low perioperative risk. The long-term durability and late complications following EVAR may have more significance when considering the optimal treatment for young patients with a longer life expectancy. This study examined perioperative and long-term outcomes of young patients undergoing aneurysm repair by either open surgical or endovascular means.
Methods: A retrospective review of a prospectively collated database was performed. Patients undergoing elective aneurysm repair at the age of 65 years or younger between January 2000 and September 2010 were included. All EVAR patients were followed up in a nurse-led clinic. Data regarding long-term outcomes for patients undergoing open repair were gathered from case note review.
Results: There were 99 patients who underwent open repair and 59 patients who underwent endovascular repair. Groups were well matched in terms of demographics and co-morbidities. 30-day mortality was 1% after open repair. There were no perioperative deaths after endovascular repair. Overall, 30-day complication rates were 15% after open repair and 12% after EVAR. The nature of complications differed between the two groups with the EVAR group experiencing endoleaks and the OAR group demonstrating more cardiorespiratory complications. Mean follow-up was 75.5 months and there was a 14% reintervention rate after EVAR compared with 7% after OAR.
Conclusion: Young patients are likely to have a lower procedural risk for EVAR and OAR than described in published figures. Although mortality and complication rates in these two groups were similar, the nature of complications occurring following open surgery were often more significant than those occurring after EVAR. There remains a risk of late reintervention following either form of repair.

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INTRODUCTION

The introduction of endovascular aneurysm repair (EVAR) has revolutionised aneurysm treatment in the UK. This has been associated with reduced aneurysm related mortality in recent years, with an increase in elective EVAR especially in those aged over 75 years.[1] The significantly lower perioperative morbidity and mortality of EVAR compared with open aneurysm repair (OAR) have been well documented in large multicentre trials;[2,3] however, the early advantage gained in terms of reduced perioperative complications is offset by a risk of late complications (endoleak, device migration, etc.) and the need for postoperative surveillance.

Current practice has moved on since the EVAR trials were performed, with clinician experience and device design improving towards a more durable repair. The issue of EVAR durability is of particular importance when considering younger patients with greater life expectancy, particularly as reinterventions are thought to have a negative impact on

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survival.[4] Recent debate has focussed on the longer-term progression of aneurysmal disease. It is apparent that a proportion of patients may go on to further aneurysmal dilatation despite successful repair by either endovascular or open surgical means.[5]

With the introduction of the National Aneurysm Screening Programme throughout the UK in 2011–12, a large number of 65-year-old men are likely to be considered for aneurysm repair. This cohort may have less significant co-morbid disease and potentially pose a lower perioperative risk for either EVAR or OAR.[6] They may also be reasonably assumed to have a longer life expectancy than those in the EVAR trial, in whom the mean age was 74 years. It is not yet known whether the multicentre trial data are directly applicable to this selected, younger group of patients.

This retrospective review examined outcome data for patients aged 65 years and under from a single centre and the results are presented.

METHODS

Records were kept for all patients undergoing either OAR or EVAR between January 2000 and September 2010. Data were recorded prospectively and included demographic and co-morbidity information in addition to 30-day outcomes. Patients participating in the EVAR trial are included in this dataset, and so a combination of randomised and selected patients were studied.

In order to assess fitness for surgery, patients underwent routine haematological and biochemical blood screening, spirometry, electrocardiography, and echocardiography. Patients were then assessed in a preoperative clinic by a consultant vascular anaesthetist and a detailed functional history was obtained in addition to clinical examination. Following this, a pragmatic judgement was made regarding fitness for OAR and EVAR on clinical grounds rather than on predefined objective criteria This is in keeping with the methodology of the EVAR trials taking place during the same time period.

Decisions regarding choice of repair in patients who were considered fit for both OAR and EVAR were made in two ways. During the period of recruiting for the UK EVAR 1 trial, patients were consented appropriately and randomised according to the study protocol. After this time period, a full discussion was undertaken between the consultant vascular surgeon and the patient regarding the risks and rationales of each technique and a final agreement was reached regarding choice of surgery.

Following surgery, patients underwent pre-discharge duplex ultrasound scan (DUSS) and were subsequently seen for outpatient review at 6 weeks, 3 months, 6 months, and 6-monthly intervals thereafter. Beyond the first outpatient visit, all reviews took place in a specialist nurse-led clinic and consisted of clinical review including history, clinical examination, blood tests, abdominal x-ray and duplex imaging. In cases where there was concern regarding graft function, for example duplex imaging suggestive of endoleak or abdominal tenderness on examination, patients were reviewed by a clinician and further imaging with CT angiogram arranged as appropriate. All imaging was discussed in a multidisciplinary meeting.

All data were collected contemporaneously by the specialist nurses. A retrospective review of this database was conducted, including only patients who were 65 years or younger at the time of surgery and undergoing elective repair.

Data regarding patients undergoing OAR were collected from the department prospective database which holds outcome data for the first 30 days. Longer-term outcomes were obtained by case note review.

Clinical variables relating to co-morbidity and complication data were gathered from case notes. Co-morbidities such as hypertension, hyperlipidaemia, ischaemic heart disease, and diabetes were considered present if the patient reported a history of the illness on admission clerking (corroborated by GP records) and was receiving treatment for that condition. The various postoperative complications were recorded as documented in case notes. Standard clinical definitions used are given in the footnotes to Table 1.

Table 1. Early complications within 30 days following OAR and EVAR.

	OAR ($n = 99$)	EVAR ($n = 59$)	p (Fisher's Exact Test)
Chest infection[a]	5 (5%)	1 (2%)	.42
Acute limb ischaemia[b]	2 (2%)	0	.53
Cardiac arrhythmia[c]	2 (2%)	0	.53
Haemorrhage[d]	1 (1%)	0	.99
Mesenteric ischaemia[e]	1 (1%)	0	.99
Acute coronary syndrome[f]	3 (3%)	0	.29
Renal failure[g]	0	1 (2%)	.38
Sepsis[h]	1 (1%)	0	.99
Endoleak	0	5 (8%)	.008
Type 1		2	
Type 2		3	

EVAR = endovascular aneurysm repair; OAR = open aneurysm repair.

[a] A clinical diagnosis of chest infection was made if the patient had a raised respiratory rate, hypoxia, fever, and x-ray changes suggestive of infection requiring treatment.

[b] Acute limb ischaemia was defined as sudden onset of limb-threatening ischaemia requiring urgent intervention.

[c] Cardiac arrhythmia was considered to be any new onset of a rhythm abnormality requiring treatment in the postoperative period.

[d] Haemorrhage requiring resuscitation with blood products and return to theatre to achieve haemostasis.

[e] Mesenteric ischaemia related to non-viable ischaemic injury to the left colon requiring emergency colectomy.

[f] The acute coronary syndrome was defined as chest pain with an ECG compatible with ischaemia and/or a diagnostic troponin rise.

[g] Renal failure was defined as requiring dialysis.

[h] Sepsis was defined as an acute inflammatory response with bacteraemia.