Anaesthesia technique and outcomes following endovascular aneurysm repair of ruptured abdominal aortic aneurysm

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Background:

The post-hoc subgroup analysis of a large randomized controlled trial, alongside a single case series, has suggested a potential benefit from managing ruptured abdominal aortic aneurysms (rAAA) with endovascular repair (EVAR) using local anaesthesia (LA) rather than general anaesthesia (GA). The uptake and outcomes of this technique in everyday clinical practice are as yet unknown.

Methods:

A retrospective analysis of the United Kingdom (UK) National Vascular Registry (NVR) was conducted between 1st January 2013 and 31st December 2016. All patients presenting with rAAA that were managed with EVAR were included in the analysis. The primary outcome was in-hospital mortality. Secondary outcomes included the number of centres offering LA EVAR, the length of stay and postoperative complications.

Results:

Some 3101 patients with rAAA were managed in 72 hospitals; 2306 open procedures and 795 EVAR (319 LA, 435 GA and 41 regional anaesthesia). Overall, 56/72 hospitals (78%) offered LA EVAR for rAAA. Baseline characteristics and morphology were similar across the three EVAR sub-groups. Patients who had LA EVAR, had a lower in-hospital mortality compared to GA EVAR, 59/319 (18.5%) versus 22/435 (28.0%) and this was unchanged after adjustment for factors known to influence survival (adjusted hazard ratio 0.64, 95%CI 0.46 to 0.88, p=0.006).

Conclusion:

The use of local anaesthesia for the endovascular management of rAAA has been widely adopted in the UK. Mortality rates appear lower in those undergoing local versus general anaesthesia.
Outcomes in patients turned down for aortic surgery: An important indicator of responsible patient selection

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Background

Studies reporting the fate of patients deemed unsuitable for aortic aneurysm repair (‘turndowns’) are sparse. Our aim was to compare outcomes between turndowns and those managed operatively.

Methods

Data were collected on all patients referred to a tertiary referral centre with an aortic aneurysm over an 18-month period beginning April 2016. Kaplan-Meier analysis was used to measure survival and multivariate analysis to determine factors that predicted turned down.

Results

568 patients were considered for intervention; complete data were available for 531 (infra-renal:284, juxta-renal:106, thoracic:41, thoraco-abdominal:100). Mean age was 76.4yrs, and 80.0% were male. 345 patients (73 emergent) were managed operatively (endovascular:272, open:73). 86 [16.2%] patients were turned down (infra-renal:40, juxta-renal:18, thoracic:5, thoraco-abdominal:23). Median follow-up was 156 (38-343) days. Renal disease, cardiac disease and history of TIA/stroke predicted turndown (P<0.05 for all). One-year all-cause mortality for elective open and endovascular procedures was 2.4% and 5.2%, respectively (infra-renal EVAR:0.4%, TEVAR:0.9%, complex endovascular repair:3.9%). One-year aneurysm related and all-cause mortality for those turned down for elective surgery was 7.1% and 21.4%, respectively, with a third of these patients dying from cancer rather than aneurysm rupture.

Conclusions

The short term aneurysm-related mortality in elective turndowns is low, with a significant number of patients succumbing for other reasons. Given the plethora of treatment options available, objective selection of patients who will benefit most from intervention is increasingly important.
The impact of Endovascular Aneurysm Repair on long-term renal function

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Background: Endovascular Aneurysm Repair (EVAR) is associated with superior short-term outcomes compared with open repair; however, concerns have been raised over the impact of EVAR on renal function. Long-term renal outcomes after EVAR remain largely unknown. We therefore aimed to define long-term renal decline following elective EVAR, using estimated Glomerular Filtration Rate (eGFR).

Methods: We used our in-house database of elective EVAR to identify consecutive patients who had been followed-up for more than 5 years. Subsequently, 270 consecutive patients (24 females - 8.6%, mean age: 71 years) who were not previously on Renal Replacement Therapy (RRT) were included; they had undergone elective EVAR between January 2000 and July 2010. We examined pre-operative, post-operative, and most recent eGFR values using the CKD-EPI equation. The primary outcome was change in eGFR at latest follow-up.

Results: Patients were followed-up over a median of 9 years (range: 5-17 years). Their mean eGFR dropped from a pre-operative value of 67 ml/min/1.73² [Standard Deviation (SD): 9.4] to 52 ml/min/1.73² (SD: 7.7), which amounts to a yearly loss of 1.7 units. Overall, 6 patients (2%) required RRT during late follow-up. Patients requiring RRT and those with an eGFR loss exceeding 20% at latest follow-up were more likely to die (Odds Ratio: 2.4 and 3.3 respectively, p<0.001).

Conclusion: This analysis, with the longest available follow-up to date, suggests that patients undergoing EVAR have a drop in renal function almost 3 times higher of the expected annual renal decline and that may be associated with mortality.
Endovascular repair of acute thoracoabdominal aortic aneurysms with surgeon-modified fenestrated endografts

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Objectives: To report the short and medium-term outcomes of surgeon-modified fenestrated endovascular repair (SM-FEVAR) for acute thoracoabdominal aortic aneurysms (TAAA).

Methods: A retrospective analysis of consecutive SM-FEVAR for acute TAAA between October 2009 and October 2017 was performed and short and medium-term outcomes were determined.

Results: A total of 44 patients (28 male; median age 71.7 [50.0, 84.6] years) were treated for acute symptomatic (34) or contained ruptured (10) TAAA (diameter 82.5 [50.0, 150.0]; 19 extent I-III, 25 extent IV) with SM-FEVAR. Thirty-six patients underwent SM-FEVAR alone, 7 had adjunct CHIMPS and 2 had bypass. A total of 148 vessels were targeted and 136 were preserved. Ten vessels occluded intra-operatively or within 30-days. 30-day mortality was 20.5% (9 patients; 11.8% for symptomatic and 50% for rupture). 15 patients developed major complications. One (2.3%) patient with rupture developed SCI and died within 30 days. Median observed follow-up was 12.2 months (IQR 2.5-36.5). Estimated overall survival at 12 months was 72% (95%CI 56%-83%) and remained unchanged at 24 months. Estimated freedom from reintervention at 12 and 24 months was 89% (95% CI 69%-97%) and 80% (95% CI 58%-91%).

Conclusions: SM-FEVAR delivers good early and medium-term outcomes in a challenging group of patients. The skills required for planning, modification and implantation are within the capabilities of a specialist aortic centre and the technique is a valuable addition to the armamentarium providing an off-the-shelf customised solution for acute TAAA which complements the use of t-Branch device.
Gender differences in the rates of repair of emergency abdominal aortic aneurysm

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Aim

We examined gender differences in the rate and type of repair for intact emergency and ruptured abdominal aortic aneurysm (AAA).

Methods

Hospital episode statistic (HES) datasets from April 2002 to February 2015 were obtained. Clinical and administrative codes were used to identify patients who underwent primary definitive repair for ruptured and emergency-intact AAA and patients with AAA diagnosis who died in-hospital without repair. These three groups included all the patients with primary emergency AAA presentation. We examined gender differences between repair rates and type (EVAR versus open) over time.

Results

In total, 15,717 patients (83% male) received surgical intervention for ruptured AAA, 10,276 (81% male) for intact AAA and 12,767 (62% male) died in-hospital without attempted repair. The observed odds ratio for no repair for an emergency AAA presentation in men was 0.34 versus 0.9 for women. The adjusted odds ratio was 0.4 for men and 0.53 for women after adjustment for age, deprivation and co-morbidities. EVAR rates for increased over time but were lower for women compared to men; 22% versus 28% for ruptured AAA and 48% versus 50% for emergency intact repair, in the most recent year.

Conclusions

The proportion of patients presenting as an emergency with AAA who do not undergo a repair is higher for women than for men. Although some of this can be explained by differences in age and co-morbidities, the differences persist after case mix adjustment. Reasons for the higher turndown rate for women warrant further investigation.
Can Transcranial Magnetic Stimulation be used to detect potential spinal cord injury following thoracic endovascular aortic repair (TEVAR)? A preliminary study to characterise baseline motor evoked potentials in vascular disease patients

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Background

Spinal cord injury (SCI) following TEVAR is a devastating complication. Transcranial Magnetic Stimulation (TMS) is a simple, safe and painless alternative to electrical neuromonitoring of the spinal cord and could be used post-operatively. The study aim was to determine the reliability of TMS motor evoked potentials (MEPs) in peripheral vascular disease (PVD) patients. The data is essential for the development of a late SCI TMS management protocol.

Methods

20 healthy controls (mean(±SD) age 28±7.7yrs) and 6 PVD patients (59±14.5yrs, mean VascuQol 4.0) were recruited. Twelve TMS stimuli were given every 10minutes for one hour. MEPs were measured from two upper limb (left brachioradialis (LBR), abductor pollicis brevis (LAPB)) and three lower limb muscles (left vastus lateralis (LVL), tibialis anterior (LTA), adductor hallucis (LAH)). MEP amplitude, latency and variability were calculated and compared using one-way ANOVA.

Results

MEP amplitudes in controls were not, in general, significantly different from those in patients, except for those in LBR - 0.42 vs 0.26mV (control vs patient) (p=0.04); LAPB - 1.91 vs 0.48mV, LVL - 0.31 vs 0.21mV, LTA - 0.67 vs 0.52mV, LAH - 1.07 vs 0.94mV (p>0.05). There were no differences in MEP latencies and variability; a combined muscles coefficient of variation was 0.29 vs 0.44 (p=0.06).

Conclusion

The preliminary data show TMS-induced MEPs appear similar in size, latency and variability in healthy subjects and PVD patients, although data collection is ongoing. They provide evidence that TMS may be a reliable tool with which to monitor for SCI development following TEVAR.
Endovascular aneurysm sealing for intact, infrarenal abdominal aortic aneurysm - results from the first 199 cases at a single institution

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BACKGROUND

Endovascular aneurysm sealing (EVAS) was conceived as a new paradigm in the treatment of abdominal aortic aneurysm (AAA). Two aortic stent grafts are surrounded by polymer-filled endobags, creating a sealing zone in the aortic neck and common iliac arteries, thus providing anatomical fixation within the aortic sac.

METHODS

Pre-, intra- and postoperative data were collected and analysed for all patients undergoing EVAS at a single institution for unruptured, infrarenal AAA, since between March 2013 and December 2017.

RESULTS

199 patients (87.3% male) with a mean age of 75.2 years were studied. Two thirds of patients were graded ASA 4 (American Society of Anesthesiologists). The average aortic diameter was 64 mm. 45.7% of cases adhered to the original instructions for use (IFU) and 17.1% adhered to the revised IFU of 2016. 21.6% of cases have required reintervention. Type 1a endoleak was seen in 17.6% of cases, type 1b in 4.0% and type 2 in 2.0%. Migration of the aortic stent was seen in 15.6% of cases and rupture in 6.0%. Aneurysm-related and all-cause mortality are 5.0% and 26.1% respectively. Adherence to IFU is associated with significantly fewer cases of type 1a endoleak (P=0.003) and aneurysm-related death (P=0.023).

CONCLUSION

Results with this device have not borne out the initial optimism regarding near-universal morphological applicability. Experience has shown that morphological considerations remain of great importance, as evidenced by the better results when adherent to IFU. This device has allowed the treatment of patients who may not have been treatable using conventional devices.