Loco-regional versus general anaesthesia for elective endovascular aneurysm repair: Results of a cohort study and a meta-analysis

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Background. To investigate whether patients undergoing elective endovascular aneurysm repair (EVAR) with loco-regional anaesthetic techniques have better outcomes than those treated with general anaesthesia (GA).

Methods. We retrospectively evaluated outcomes of EVAR performed with regional anaesthesia or GA over a 5-year period. Furthermore, we searched electronic bibliographic sources to identify studies comparing different anaesthetic methods in EVAR. We defined perioperative mortality and morbidity and length of hospital stay as the primary outcome measures. Pooled effect estimates were calculated using fixed-effect or random-effects models. Results are reported as the odds ratio (OR) or mean difference (MD) and 95% confidence interval (CI).

Results. 355 patients underwent EVAR over the study period (RA, 215 patients; GA 140 patients). Perioperative mortality was significantly lower in the RA group (0.5% versus 4.3%, P=0.017). No difference was found in perioperative morbidity (P=0.370), LOS (P=0.146), postoperative destination (P=0.799), reoperation (P=0.355) or readmission within 30 days (P=0.846). Meta-analysis of data on 15,472 patients from 15 observational studies found a significantly lower perioperative mortality and morbidity in patients treated with loco-regional anaesthetic techniques than those treated with GA. Our sub-group analysis demonstrated that both local anaesthesia (LA) (P=0.003) and RA (P< 0.0001) were associated with a significantly shorter LOS compared to GA.

Conclusions. Local and regional anaesthetic techniques may be advantageous over GA in elective EVAR. Considering the current level of evidence, LA or RA should be considered in selected patients. Further clinical research is required to provide high level evidence on the optimal anaesthetic technique in EVAR.
The true graft related endoleak detection rate of contrast enhanced ultrasound: A prospective single UK centre study of the predictive values of contrast enhanced ultrasound compared to time-resolved computer tomography angiography in the detection and characterisation of graft related endoleaks in high risk endovascular aneurysm repair surveillance patients

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Arterial Phase CT Angiography (CTA) is the commonest reference standard in studies to define predictive values of surveillance modalities. This approach has methodological limitations when investigating Contrast Enhanced Ultrasound (CEUS).

CTA captures a single “snapshot” of an endoleak, so may totally/partially fail to define an endoleak and flow directionality (useful in characterisation). CEUS offers continuous imaging which is more likely to detect an endoleak and can define directionality. This means CTA may fail to characterise an endoleak as accurately as CEUS. Time-resolved CTA (tCTA) overcomes this limitations by performing 7 phases in rapid sequence in place of the single phase in CTA.

We undertook the first prospective study to define the predictive values of CEUS compared to the methodologically superior tCTA.

Methods

30 patients planned to undergo CT investigation of an endoleak or aneurysm expansion were enrolled. Participants underwent tCTA and CEUS on the same day and predictive values for graft related endoleaks along with 95% confidence intervals were calculated, with tCTA as reference standard.

Results

25 endoleaks were detected in the participants on tCTA, 9 Graft Related (Type I & III) & 16 Type II. CEUS predictive values to detect and correctly characterise graft related endoleaks were: Sensitivity 0.55 (0.23-0.88), Specificity 0.90 (0.77-1.00), Positive Predictive Value 0.71 (0.37-1.00) and Negative Predictive Value 0.82 (0.67-0.98).

Conclusions

CEUSs negative predictive value to graft related endoleaks make it an excellent adjunct to duplex ultrasound surveillance, thus reducing the need for adjunctive CTA.
Endovascular aneurysm sealing with chimney grafts - outcomes from the first 77 cases at a single institution

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BACKGROUND

Chimney grafts are placed parallel to an aortic stent-graft to maintain perfusion through visceral branches. When used in combination with conventional endovascular aneurysm repair (EVAR), there is a significant risk of type 1 endoleak due to “guttering”. In combination with endovascular aneurysm sealing (EVAS), this risk is likely to be reduced due to the fact that the polymer within the endobags conforms to the shape of the chimney stents, whilst maintaining a proximal seal at the aneurysm neck. EVAS with chimney stents (ChEVAS) may therefore represent an alternative to fenestrated EVAR (FEVAR) for the treatment of juxtarenal abdominal aortic aneurysms (AAA).

METHODS

Detailed pre-, peri- and postoperative data were collected for each patient undergoing the ChEVAS procedure.

RESULTS

77 patients (82% male) with a mean age of 75.2 years were studied. All patients had juxta- or suprarenal aneurysms. 33 patients were treated with 1 chimney stent, 26 with 2 and 18 with 3. Chimney stent patency is 97.8%. 9.1% of cases have required reintervention. 11.7% of cases have developed type 1a endoleak, 9.1% demonstrated migration of the aortic stents and 2.6% have seen secondary rupture. Aneurysm-related and all-cause mortality are 9.1% and 23.4% respectively.

CONCLUSION

ChEVAS is an effective treatment for juxtarenal AAA, particularly for those patients with aneurysms unsuitable for FEVAR or those requiring urgent treatment. These data form part of the international, multicentre ASCEND registry, results from which will allow us to determine the long-term efficacy of this new approach.
EVAR use for ruptured abdominal aortic aneurysm: a European comparison

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Introduction:

Endovascular aneurysm repair (EVAR) has been widely adopted in developed healthcare systems for elective infra-renal abdominal aortic aneurysm (IRAAA) but the use of EVAR for ruptured aneurysms (rAAA) is less well embedded. The objective of this study was to examine EVAR usage in rAAA in the UK and Spain.

Methods

Retrospective analysis of elective and rAAA in the national vascular registries of the UK (2017) and Spain (2014) was conducted. UK units were ranked by volume of elective and rupture caseload.

Results:

In both countries, elective IRAAAs were predominantly repaired using EVAR, UK 70% and Spain 62%. This reflected an increase in EVAR use since 2008, UK 57%, Spain 39% (p<0.05). By comparison, fewer rAAAs were repaired using EVAR; UK 27%, Spain 39%. Evaluation of UK units (n=78) revealed that 95% used EVAR for >50% of their elective cases. For rAAAs, substantial variability in repair technique was demonstrated; only 17% used EVAR > 50% of the time. Analysis of the top ten centres by rupture volume, identified four centres that used EVAR predominantly (61% EVAR (IQR 56-66)) and six centres who used it infrequently (18% EVAR (17-19)), p<0.01.

Conclusion

EVAR use for elective work is widespread, but there is substantial variability in uptake for rAAA repair. This study suggests that barriers to EVAR use in rAAA should be identified to optimise provision and training opportunities. The reduction in open elective IRAAA experience also has implications for skill acquisition required for open rAAA.
Outcomes and reintervention rates of physician modified fenestrated endografts for managing the ruptured or symptomatic aortic aneurysm

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**Purpose:** Fenestrated endovascular aneurysm repair (FEVAR) grafts have a 10-12 week manufacturing time and are generally not available for emergency cases of symptomatic or ruptured aortic aneurysm. In the absence of other alternatives, conventional off-the-shelf stent grafts can be modified by trained operators to treat these complex cases. The study aim is to investigate the outcomes and reintervention rates of physician modified FEVAR.

**Methods:** A retrospective clinical documentation review of all physician modified FEVAR cases identified from the hospital endovascular database at a single tertiary referral centre between September 1996 and September 2017 was performed.

**Results:** Eight cases of urgent or emergency FEVAR managed with physician modified grafts were identified. Mean follow up was 44 weeks (range 5-106). One patient died prior to graft implantation. Outcomes for all implanted grafts (7/8 cases) included 100% technical success, 29% rate of endoleak, no procedure related complications, no adverse visceral events, 0% 30-day mortality and 100% one year target vessel patency and freedom from aneurysm related death. There was a 43% (3/7 cases) re-intervention rate including iliac branch extension, covered stent extension and further covered stent insertion.

**Conclusion:** Modifying EVAR grafts is a highly technical process requiring meticulous planning and extensive elective experience with FEVAR. The current series demonstrates this approach is safe and feasible but operators must be mindful of the higher reintervention rate associated with this technique when compared to elective FEVAR. The authors suggest closer follow up of this group of patients.
Endovascular repair of primary mycotic thoracoabdominal aortic aneurysms

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Objectives: To report the short and medium-term outcome of endovascular repair (EVAR) for primary mycotic thoracoabdominal aortic aneurysms (pmTAAA).

Methods: Interrogation of a prospectively-maintained database identified all patients who underwent EVAR for pmTAAA between October 2011 and August 2017. Early and medium-term outcomes were analysed.

Results: A total of 16 patients (9 men; median age 70.7 years [60.4-81.1]; median diameter (71.5 [50.0, 110.0]) were treated for acute symptomatic (13) or contained ruptured (3) pmTAAA (6 extent I-III, 10 extent IV) using surgeon-modified fenestrated EVAR (SM-FEVAR; 14), t-Branch (1) and chimney-periscope EVAR (CHIMPS; 1). The repair was staged during the same admission in three patients. A total of 57 vessels (median 4.0/patient) were targeted for preservation, two occluded intra-operatively and three more occluded within 30-days. One patient died within 30-days of the procedure from small bowel ischaemia secondary to occlusion of an SMA stent-graft. No patients required renal replacement therapy or developed SCI. Median observed follow-up was 22.1 months [IQR 7.8-42.4]. Estimated overall survival at 12 and 24 months was 87% (95% CI 57%-97%) and 77% (95% CI 44%-92%). Estimated freedom from re-intervention at 12 months was 88% (95% CI 59%-97%) and remained unchanged at 24 months. No patients developed late infective complications.

Conclusions: Endovascular repair for primary mycotic TAAA is associated with very encouraging mid-term outcomes, supporting a need for a paradigm shift in treatment of this otherwise invariably fatal pathology.