

Single centre operative and midterm outcomes of the custom-made fenestrated anaconda stent-graft in the treatment of short neck and juxta-renal aortic aneurysms

Anisha H Perera¹, Tian Yeong¹, Ashish Patel², Adnan Bajwa¹, Marcus Cleanthis¹, Andrew Hatrick¹, David Gerrard¹

¹Frimley Park Hospital, Camberley ²St Thomas' Hospital, London

Background

The custom-made fenestrated Anaconda stent-graft (Vascutek) was introduced in 2010 for treatment of short neck and juxtra-renal aortic aneurysms. We present midterm outcomes from a UK regional vascular unit.

Methods

Analysis of consecutive patients treated with custom-made Anaconda fenestrated endovascular aortic repair (FEVAR) between 2011 and 2018 was performed.

Results

108 patients (median age 78 years, IQR 71-82, 84% male) underwent FEVAR with 293 fenestrations in total; 7% one, 33% two, 40% three, and 20% four vessel fenestrations. Technical success was 97% (two failed renal cannulations and one on-table death following iliac rupture). 30-day mortality was 5.6% (6/108). Median follow up was 12 months (IQR 5-33), with 1, 2, and 5-year survival rates of 89%, 77%, and 39% respectively. Target vessel re-intervention rate was 11% and iliac limb re-intervention rate was 9%. 14% of patients had decline in renal function with post-operative eGFR reduction >25% (6/44 1 and 2 vessel FEVAR, 9/64 3 and 4 vessel FEVAR, p=NS). At follow-up there were no type I, 24 type II (22%) and 3 type III (2.8%) endoleaks detected, with 4 cases (3.7%, 1 type II and 3 type III) requiring re-intervention. In 97% of patients, aneurysm sac size was stable or decreasing. Mean radiation (dose area product mGy.cm²) for 1 and 2 vessel FEVAR was 359,326 versus 554,199 for 3 and 4 vessel FEVAR (p=0.001).

Conclusions

In this large single centre series the fenestrated Anaconda device demonstrates technical and clinical success, with acceptable re-intervention rates and good midterm durability.

Meta-analysis and meta-regression analysis of outcomes of endovascular repair for ruptured abdominal aortic aneurysm

Kerry Burke¹, Nikos Kontopodis², Nikos Galanakis³, Stavros Antoniou⁴, Dimitrios Tsetis³, Christos Ioannou², Frank Veith^{5,6}, Janet Powell⁷, George Antoniou^{1,8}

¹Department of Vascular and Endovascular Surgery, The Royal Oldham Hospital, Manchester ²Vascular Surgery Unit, Department of Cardiothoracic and Vascular Surgery, University Hospital of Heraklion, Heraklion, Greece. ³Interventional Radiology Unit, Department of Radiology, University Hospital of Heraklion, Heraklion, Greece. ⁴Department of Surgery, School of Medicine, European University Cyprus, Nicosia, Cyprus. ⁵Department of Surgery, New York University Langone Medical Center, New York, USA. ⁶Department of Vascular Surgery, Cleveland Clinic, Ohio, USA. ⁷Vascular Surgery Research Group, Imperial College London, London ⁸Division of Cardiovascular Sciences, School of Medical Sciences, University of Manchester, Manchester

Background

The role and potential advantages of endovascular aneurysm repair (EVAR) in the management of ruptured abdominal aortic aneurysm (AAA) is controversial. We aimed to assess the perioperative mortality of EVAR versus open surgical repair for ruptured AAA and investigate whether outcomes have improved over the years and whether there is an association between institutional caseload and perioperative mortality.

Methods

We performed a systematic review that conformed to the Preferred Reporting Items for Systematic Reviews and Meta-analysis (PRISMA) guidelines using a registered protocol (*CRD42018106084*). We selected studies reporting perioperative mortality data of EVAR for ruptured AAA. We conducted a proportion meta-analysis of perioperative mortality and obtained summary estimates of odds ratios (ORs) and 95% confidence intervals (CIs) for EVAR versus open surgical repair using random-effects models. Mixed-effects regression models were formed to investigate changes in outcomes over time and with institutional caseload.

Results

We included 109 studies (4 randomized control trials) in quantitative synthesis reporting a total of 183,956 patients (EVAR 33,146; open surgery 150,810). The pooled perioperative mortality of EVAR and open surgical repair was 0.249 (95% CI 0.236 – 0.264) and 0.391 (95% CI 0.377 – 0.404), respectively. EVAR was associated with reduced perioperative mortality compared to open surgery (OR 0.54, 95% CI 0.51 – 0.57, $P < 0.0001$). Meta-regression analysis found decreasing perioperative mortality following EVAR ($P = 0.0002$) and open repair for ruptured AAA over time ($P = 0.0003$), and a significant association between the OR of EVAR versus open surgical repair for perioperative mortality and the median study point, with the OR decreasing over time in favour of EVAR ($P = 0.0002$). Meta-regression also found a significant association between perioperative mortality and institutional case load for open surgical repair ($P = 0.015$) but not for EVAR ($P = 0.058$).

Conclusion

If EVAR can be done, it is a better treatment for ruptured AAA than open repair. The outcomes of both EVAR and open surgical repair have improved, and the difference in perioperative mortality in favour of EVAR has become more pronounced over the years. There is a significant association between perioperative mortality and institutional case load for open surgical repair of ruptured AAA but not for EVAR.

The impact of fenestrated aortic repair on renal function; a UK tertiary centre experience

Sandip Nandhra, Luke Boylan, Matthew Thomas, Craig Nesbitt, Rob Williams, James McCaslin
Freeman Hospital, Newcastle

Introduction

Renal function, its decline and the presence of acute kidney injury is associated with poor cardiovascular outcomes. It may be a common phenomenon in standard EVAR. The impact of Fenestrated EVAR on renal function in the short and long-term is not fully understood; this study aimed to clarify this.

Methods

A database of FEVAR's performed between 2010 and 2018 was analysed. Creatinine, reciprocal of creatinine (as per the ASTRAD Trial) and eGFR (calculated by the CKD-EPI and MDRD formulae) were assessed. Regression analysis was performed to identify predictive variables.

Results

133 patients treated with FEVAR were included. Median follow-up was 22 months with a mean AAA diameter of 6.4(1.1) cm and a baseline eGFR of 68.9mL/min/1.73m². A statistically significant 14% decline was noted at day 3 but this improved over study follow-up with an overall small decline of 10% in renal function at 22months. Further analysis revealed that there was a subsequent significant return towards baseline at 5-year follow-up. Pre-operative serum creatinine and lower haemoglobin correlated with a decline in both short and long-term renal function. Independently, the larger the AAA diameter the greater the decline in day 3 renal function and the longer the duration of procedure the greater the decline in long-term renal function. Highest risk parameters were identified to help predict AKI and long-term renal failure.

Conclusion

Reassuringly FEVAR is associated with only a small decline in renal function. Pre-operative identification of highest risk patients and their optimization may improve renal function outcomes.

Endovascular versus medical management for uncomplicated acute and subacute type B aortic dissection

Martin Hossack¹, Shanel Patel¹, Ivancarmine Gambardella², Simon Neequaye¹, George A. Antoniou^{3,4}, Francesco Torella¹

¹Liverpool Vascular and Endovascular Service, Royal Liverpool University Hospital, Liverpool ²Weill Cornell Medicine, New York Presbyterian Hospitals, New York, USA ³Department of Vascular and Endovascular Surgery, The Royal Oldham Hospital, Pennine Acute Hospitals NHS Trust, Manchester ⁴Division of Cardiovascular Sciences, School of Medical Sciences, University of Manchester, Manchester

Background

Complicated Type B aortic dissections (TBAD) should be managed by an emergent endovascular strategy, provided this is possible. However, the management of *uncomplicated* Type B aortic dissection (uTBAD) is less clear cut. Our aim was to systematically review the evidence in patients with acute or subacute uTBAD, to see if TEVAR improves early and late all-cause and aorta-related mortality.

Methods

The review was undertaken according to the PRISMA guidelines. We performed an assessment of methodological quality of included studies. The primary outcome measures were early mortality and reintervention, and late all-cause and aorta-related mortality and reintervention. Meta-analysis was performed.

Results

Eight original articles from 6 studies encompassing 14 706 patients (1066 TEVARs) were eligible for inclusion in the meta-analysis. There were no statistically significant differences between TEVAR and BMT with regards to inpatient mortality (RD 0.01, 95% CI -0.01, 0.02, P=0.46), early reintervention with TEVAR (RD 0.02, 95% CI -0.01, 0.04, P=0.19) or surgery (RD 0.00, 95% CI -0.01, 0.01, P=1.00). BMT alone was associated with a significantly lower risk of early stroke (OR 0.64, 95% CI 0.48, 0.85, P=0.002), whereas the risk of late all-cause (HR 1.54, 95% CI 1.27, 1.86, P<.0001) and aorta-related mortality (HR 2.71, 95% CI 1.49, 4.94, P=0.001), was significantly higher than with TEVAR.

Conclusion

In patients presenting with acute/subacute uTBAD, TEVAR with BMT results in reduced late mortality when compared to BMT alone. TEVAR should be considered in all anatomically suitable patients.

Using the ovation stent graft for hostile infra-renal aortic aneurysm necks: A single centre experience

Emmanouil Katsogridakis, Theodoros Spachos, Ansy Egun, Mohammed Banihani
Royal Preston Hospital, Preston

Background

EVAR remains the mainstay in the management of infrarenal abdominal aortic aneurysms. Despite significant advances, ensuring an adequate proximal seal in cases of a hostile neck remains a considerable challenge, particularly for patients not fit for open repair or when access to complex EVAR is not readily available. We present our experience with the Ovation stent graft.

Methods

A retrospective analysis of prospectively collected data on all elective cases of EVAR undertaken in our centre with the Ovation stent graft between January 2015 and October 2018 is presented. Demographic, procedural, anaesthetic and aneurysm morphology related parameters were collected and analysed.

Results

A total of 71 cases (57 male) were identified, with 21 having a past medical history significant for a previously treated malignancy. Median ASA grade, Revised Cardiac Risk Index (RCRI) and Veteran Specific Activity Questionnaire scores were 3, 2 and 7 respectively, with a mean aerobic threshold level of 11.4 +/- 2.4. Average British Aneurysm Repair score, Carlisle score and V-Posum scores were 1.1 +/- 0.8, 2.8 +/- 1.9 and 2.3 +/- 1.5 respectively. Median length of stay was 3 days. 13 cases of endoleak (Type 1a: 4, Type 1B: 3 and Type 2: 7) were seen, requiring reintervention in 8 cases. Sac shrinkage was observed in 62 cases.

Conclusions

The ovation stent graft can be used safely for patients with hostile infrarenal aneurysm necks not fit for open repair or complex EVAR and is associated with a low re-intervention rate.

The frozen elephant trunk to facilitate endovascular repair of thoraco-abdominal aortic pathology
Enrico Mancuso¹, Pedro Catarino², Andrew Winterbottom³, Manjit Gohel¹, Paul Hayes¹, Seamus Harrison¹

¹Addenbrooke's Hospital, Department of Vascular Surgery, Cambridge ²Royal Papworth Hospital, Department of Cardiac Surgery, Cambridge ³Addenbrooke's Hospital, Radiology Department, Cambridge

Background

Lack of a suitable proximal landing zone in the aortic arch is a barrier to endovascular repair of some thoracoabdominal aneurysms. Here we describe our experience of using the frozen elephant trunk (FET) to overcome this.

Method

Retrospective review over a 7 year timeframe of all elective cases undergone endovascular completion of descending thoracoabdominal pathology following FET in a tertiary complex aortic service.

Results

A total of 18 patients were treated: 14 aneurysms and 4 dissections. We performed 12 thoracic endovascular aortic repairs (TEVAR), 3 complex branched endovascular aneurysm repair (EVAR) and 3 hybrid procedures. Patients were 8 females (44%) and 10 males (56%), average age was 69 (+/- 14) year old. Transapical approach was necessary to provide access in 2 complex EVAR cases. All 3 hybrid cases were staged, of them one underwent revision of the coeliac branch for early thrombosis via re-do laparotomy at same time of 2nd stage TEVAR completion. The early mortality at 30 days was 5% (1/18) and there have been no further deaths at one year (overall median follow-up time was 24 months). One patient developed transient spinal symptoms and one had permanent altered sensation in lower limbs. At one year follow-up all sacs were stable and there were no type 1 or type 3 endoleaks.

Conclusions

Combination of frozen elephant trunk and complex endovascular repair is a feasible option for complex thoraco-abdominal aneurysm without a conventional proximal landing zone. Multidisciplinary teams including vascular surgery, cardiothoracic surgery and interventional radiology are required.