

An endovascular approach is safe and effective in the treatment of abdominal aortic aneurysms detected by the National Abdominal Aortic Aneurysm Screening Programme

Katherine Stenson, Peter Holt, Ian Loftus
St George's Vascular Institute, London

Background

The National Abdominal Aortic Aneurysm Screening Programme (NAAASP) commenced in England in 2009 and completed implementation in 2013. Its aim being to reduce the rate of death due to ruptured aneurysm in men.

Methods

Patients who underwent repair of a screen-detected aneurysm between February 2010 and 2019 were identified from prospectively-kept records held by the local screening programme. Pre, peri- and postoperative details were collected from case notes and online hospital records.

Results

104 men underwent repair of a screen-detected aneurysm. 81 aneurysms were infrarenal, 19 juxta- and suprarenal and 4 thoracoabdominal. The median aneurysm diameter at operation was 59 mm (IQR 57-62). 2 open repairs and 102 endovascular repairs took place, using a variety of stentgrafts. 3 aneurysm-related deaths have occurred during follow-up, with 2 of these being in patients treated with stentgrafts that have subsequently been removed from the market. There were 11 deaths from all causes. 20 patients (19.2%) have required reintervention. 80 cases were elective infrarenal AAA repairs; 79 were endovascular repairs. Of these patients, there were no aneurysm-related deaths or deaths within 30 days. Survival estimates were 100% at 1 year, 86.9% at 5 years and 74.5% at 9 years of follow-up. 14 patients (17.5%) required reintervention. There were no secondary ruptures in patients treated electively for infrarenal aneurysms.

Conclusions

This study shows that an endovascular first approach to the treatment of screen-detected AAA is a safe and effective one.

How far is too far when there is no landing zone for fenestrated endovascular repair?

Lydia Hanna^{1,2}, Ahmed Fadl¹, Mohammad Hamady^{3,2}, Michael Jenkins^{1,2}

¹Imperial Vascular Unit, Imperial College Healthcare NHS Trust, London ²Department of Cancer and Surgery, London ³Department of Interventional Radiology, Imperial College Healthcare NHS Trust, London

Background

Fenestrated endovascular repair for aneurysms affecting the visceral aortic segment can be impossible without a secure proximal landing zone (PLZ) for durable sealing. The use of TEVAR to facilitate a more PLZ in the thoracic aorta for FEVAR may be an acceptable technique but risks spinal cord perfusion problems. We present 10 patients with supra-renal and juxta-renal aneurysms that required TEVAR to facilitate a PLZ for FEVAR.

Methods

A retrospective review of FEVAR cases carried out at a single institution was undertaken to identify those cases where TEVAR was used. Demographic, clinical and procedural data was collected as well as PLZ adverse feature assessment and length of coverage of the aorta on imaging.

Results

A total of 10 patients were identified that needed TEVAR to facilitate landing zone for FEVAR. Median thoracic aorta dimension was 37mm (range, 23-47mm). Median abdominal aorta dimension was 65mm (range, 60-70mm). Reasons for inadequate PLZ include calcification, extensive thrombus and aortic diameter beyond the instructions for use for fenestrated devices. Maximum length of aortic coverage beyond what would have been the PLZ was 22cm. All patients were managed with a spinal cord protection protocol with 2 patients developing transient neurological deficit.

Conclusion

The use of TEVAR to facilitate landing zone for FEVAR is an acceptable technique but there needs to be a balance between creating a durable proximal landing zone and the subsequent risk of neurological complications with greater aortic coverage.

Selection of open or endovascular repair for complex aneurysms

Benjamin Patterson, Ryan Preece, Marina Kefaza, Michael Jenkins
Imperial Vascular Unit, London

Background

Endovascular repair (ER) has been increasingly adopted in the treatment of complex aneurysms where previously only open repair (OR) was available. We sought to define factors that determine the modality of treatment employed using a retrospective, single centre cohort study.

Methods

Consecutive patients operated on for suprarenal and thoracoabdominal aneurysms (TAAAs) over a 1-year period were identified. Physiological and anatomical data were collected from the clinical records and correspondence. The primary reason for the modality of treatment selected was identified. The Chi-squared test was used to test for differences between groups.

Results

Of 65 patients identified between February 2018 and 2019, 25 OR, 23 ER and 4 hybrid repairs were included. 13 were excluded as they were primarily thoracic or infra-renal cases. There were 19 juxtarenal, 34 extent I-IV TAAAs and 41 were elective. Patients with type IV TAAA underwent more OR (10 vs. 1) and type I-III TAAAs more ER (16 vs. 4 + 4 hybrid). OR patients were more likely to have a good exercise tolerance (OR 4.7;p=0.19), good pulmonary function (OR 7.6;p=0.005) and less likely to have had previous abdominal surgery (OR 3.6;p=0.047). Cardiac and renal status was similar in both groups. Anatomical and physiological reasons were equally cited as reasons for choosing treatment modality (p=0.365).

Conclusion

A complex interplay of anatomical and physiological factors renders conventional risk stratification tools unhelpful in this group and a multidisciplinary approach to assessment is mandated. It is unusual that a single major factor ultimately determines treatment modality.

Percutaneous Endovascular Aneurysm Repair (PEVAR) - A single centre experience over 4 years

Martin Hossack, Shady Zacki, Matthew Brimfield, Leith Williams, Ragai Makar
South Mersey Arterial (SMART) Centre, Chester

Background

PEVAR is thought to reduce groin complications and recovery time. Frequent use of Perclose Proglide devices (Abbott Vascular, Redwood City, Calif) in our institution prompted an audit of our practice and outcomes.

Methods

Retrospective analysis was performed of patients undergoing PEVAR in a single-centre over a 4-year period. Demographic, procedural, biochemical and radiological data were collected. Primary outcome measures were inpatient mortality and reintervention. Secondary outcomes included length of stay (LOS), number of preclose devices used, number of failures and need for adjuncts. Concurrent data was collected on EVAR using open access for comparison.

Results

318 patients (88.4% male) underwent an EVAR (86.8% elective) between January 2015 and October 2018, with an average age of 76.9 years and median maximal aortic diameter of 60mm. 99% of elective and 83% of non-elective patients survived to discharge. 3.6% of elective and 7% of non-elective EVARs returned to theatre, most commonly for limb ischaemia. In total 67% (n=399) of access was percutaneous, increasing from 33.1% (n=43) in 2015 to 92% (n=107) in 2018. The median LOS following PEVAR was shorter than with open access (2 vs 3 days). Two Proglides were used in 61% of closures, three in 26%. 20.7% of devices failed, and surgical cutdown was required in 12.8% of groins.

Conclusions

PEVAR is increasingly the approach of choice in our institution and is associated with a shorter length of stay and fewer groin complications, but there is a significant risk of device failure and need for adjuncts to achieve closure.

Radiation exposure associated with endovascular aortic repair and the lifetime risk of malignancy

Azeem Alam¹, Richard Harbron², Mohamed Abdelhalim¹, Ashish Patel¹, Elizabeth Ainsbury³, Jonathan Eakins³, Bijan Modarai¹, Guy's and St Thomas' Vascular Research Collaborative¹

¹King's College London, Academic Department of Vascular Surgery, School of Cardiovascular Medicine and Sciences, BHF Centre of Excellence and the Biomedical Research Centre at Guy's & St Thomas' NHS Foundation Trust and King's College London, London ²Institute of Health and Society, Newcastle University, Royal Victoria Infirmary, Newcastle-upon-Tyne; NIHR Health Protection Research Unit in Chemical and Radiation Threats and Hazards, Newcastle University, Newcastle ³Public Health England Centre for Chemical, Radiological and Environmental Hazards (CRCE), Oxford

Background

The risks associated with low dose ionising radiation exposure to patients during endovascular interventions and with lifelong follow-up imaging are unknown. We examined these exposures and estimated the associated malignancy risk.

Methods

Cumulative radiation dose to individual organs after infra-renal endovascular aortic repair (IEVAR), any re-intervention and CT imaging was calculated using PCXMC Monte Carlo Modelling. Input data included, dose area product (DAP), field size, x-ray energy spectra, and beam angle. Lifetime cancer risk was estimated for various organs using the online risk estimation tool RadRAT.

Results

Fifty patients (n=25 male, operated 2016-2018) were included. Their median age was 76 (range: 53-89) years and median body mass index was 27.1 (15.7-38.9). The median DAP per IEVAR was 81.742 (3.771- 994.200) Gy cm^2 . The median cumulative CT dose length product was 1316 (106-4811) mGy cm with a median of 2 (1-6) CTs per patient. The cumulative median effective dose was 42.8 (9.8-316.7) mSv. Excess lifetime risk of malignancy per 100,000 persons was: leukaemia 94 (CI 19-224), colon 69 (CI 37-156), kidney 23 (CI 3-58), stomach 17 (CI 2-64), lung 14 (CI 5-27) and liver 10 (CI 1-38).

Conclusions

Recent reports suggest a raised incidence of malignancy in patients after IEVAR compared with open repair. Our modelling work demonstrates a wide variation in the theoretical excess lifetime risk of cancer after IEVAR. Such tools could be used to identify individuals at particular risk and may inform a novel consideration that impacts treatment choice.

Evolution of EVAR stent graft design provides opportunity to reduce peri-operative radiation exposure

Paul Hayes¹, Jonathan Ghosh², Steven Richardson², Simon Kreckler¹, David Murray²

¹Cambridge University Hospitals, Cambridge ²Manchester University NHS FT, Manchester

Background

The modular design of older, traditional stent grafts relies on the presence of a single infra-renal uni-body with attached ipsilateral and contralateral limbs. Cannulation of the latter to complete the EVAR can take a variable length of time, introducing uncertainty about procedure duration and the extent of fluoroscopic screening required. Increasingly the dangers of unnecessary radiation to operators, staff and patients are being reported.

Methods

We evaluated operation times and radiation exposure comparing standard infra-renal EVAR devices with the newer Altura system. This is a system with a bifurcated body which does not require contralateral limb cannulation. Data relating to radiation exposure were prospectively collected across 2 teaching hospital sites prospectively between Apr 2016 and Dec 2017, allowing one year for follow up.

Results

Dose area product (cGym²) and screening times (mins) were available for 40 Altura cases, and these data were compared with 136 conventional EVAR devices. The mean DAP for the Altura cases was 7010, rising to 11018 for conventional bifurcated EVAR cases ($p < 0.001$). The screening time for the EVAR cases was 20% higher than for Altura (27.6mins v 22.9mins; $p = 0.008$).

Conclusions

The use of Altura was associated with significant reductions in radiation exposure, which is potentially good for patients and the teams treating them.