Predictors of outcome following Complex Infra-Popliteal Revascularisation in Octogenarians and Nonagenarians with Critical Limb Ischaemia

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The incidence of Critical Limb Ischaemia (CLI) is exponentially rising among our aging population. There is a paucity of scientific evidence on best management and predictors of clinical outcome following infra-popliteal (IP) revascularisation in elderly patients with CLI.

A prospectively collected database was analysed to identify consecutive octogenarians and nonagenarians who underwent IP revascularisation (bypass or angioplasty) for CLI (Rutherford 4-6) in a single centre between 2010-2014. The primary endpoints were Overall Survival (OS) and Amputation-Free Survival (AFS) at 12-24 months. Secondary endpoints were primary, assisted-primary, secondary patency, freedom from Major Adverse Limb Events (F-MALE), and Limb-Salvage (LS) rates by Kaplan-Meier analysis.

A total of 129 limbs in 120 patients were treated with IP bypass (n=42) and endovascular (n=87) revascularisation with a mean age of 85 (±5) years (range 80-96 years). Perioperative mortality rate was 2%. OS and AFS were 68% and 62%, respectively at 12 months; 54% and 46% at 24 months. Analysed by treatment method, both OS and AFS were significantly better in the bypass-group (P<0.001). The overall primary, assisted-primary and secondary patency was 58%, 65% and 70%, respectively at 12 months; 34%, 48% and 59% at 24 months. There was no significant difference in primary patency (P=.66) and F-MALE (P=.86) between the bypass and endovascular group, though assisted-primary (P=.008) and secondary patency (P=.017) were better in the bypass group. LS was 89% at 12 months and 84% at 24 months, with no significant difference between the two modalities (P=0.24). Multivariate Cox-Regression identified low eGFR (P=.041; HR:0.98) and diabetes (P=.046; HR:0.58) as independent predictors of worse OS and AFS, respectively.

IP revascularisation (either endovascular or surgical) is feasible and effective in octogenarians and nonagenarians with CLI. Renal impairment and diabetes are predictors of poor outcome in this group of patients.
Outcomes of Hybrid revascularisation of multi-level arterial disease in patients with critical limb ischaemia

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Hybrid revascularisation (HR) procedures combining open and endovascular techniques have been used to treat multilevel disease in patients with critical limb ischaemia (CLI). These techniques offer an alternative to complex or staged open revascularisation in this group of high-risk patients. The aim of this study was to examine outcomes following HR in patients with CLI.

Consecutive CLI patients treated by hybrid intervention at a single institution between 2012 and 2014 were analysed. All procedures were performed in a hybrid-operating suite to facilitate combined open and endovascular surgery at the same sitting. Postoperative outpatient duplex and clinical surveillance was conducted at 6 weeks, 6 months and yearly thereafter. The primary end-point was Amputation Free Survival (AFS) and secondary end-points were patency rates at 1 and 2 years.

164 pts (34 female, median age 74 yrs) with CLI classified as Fontaine IIb (n=62), Fontaine III (n=38) or Fontaine IV (n=64) were included, with 46 pts (28%) treated as an emergency/urgent. 89 pts required common femoral artery (CFA) endarterectomy combined with endovascular iliac intervention, 65 pts had CFA endarterectomy combined with infrainguinal endovascular reconstruction and 10 pts had both supra- and infra-inguinal segments treated endovascularly together with open surgery. AFS was 98% and 96% at one and two years. Overall primary patency rates were 86% and 52% at 12mth and 24mths, with secondary patency, 90% and 56% at the same time points.

HR is feasible and safe in patients with CLI due to multi-level disease. Outcomes following HR are satisfactory with reasonable AFS even in this group of high-risk patients.
Day Case EVAR: The Patient's View

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A move to a faster discharge from hospital after endovascular abdominal aortic aneurysm (EVAR) repair has been shown to be safe and cost effective in the small studies performed so far. However, little research has been done into the patient's perspective of this reduced inpatient stay. The aim of this study was to document pre-operative social circumstances and perceived health status, the patient's views on whether discharge within 24 hours would be feasible given the current provision of care and their view on what support would be needed if 23 hour discharge was routine.

A seven point questionnaire with both multiple choice and short answer questions was designed. Patients were identified by a search of hospital episode data showing those who had undergone EVAR in a set 24 month period. These patients were then called for a phone interview and invited to take part in the survey.

39 patients were interviewed. Of these, 22 reported they had a good functional capacity prior to their operation, lived independently but had a potential carer who could have been with them during the immediate post-operative period. However when questioned, only 3 of those patients felt they would have been able to go home on the first post-operative day.

A significant proportion of patients interviewed could potentially undergo EVAR with discharge within 24 hours. However, this would require a lot of work to change the mind-set of patients to prepare them for this early discharge.
Feasibility and outcomes of local anesthesia in ruptured endovascular aneurysm repair

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Previous retrospective studies and a post-hoc analysis of a large trial has shown a potential benefit in treating ruptured abdominal aortic aneurysms (rAAA) under local anesthesia (LA). The aim of this study is to assess feasibility and uptake of local anesthesia during endovascular treatment of rAAA in the United Kingdom.

We compared data from the National Vascular Registry for patients treated with EVAR for rAAA according to anaesthesia type. The primary outcome was 30-day mortality. Length of stay and postoperative complications were also evaluated.

During the study 267 patients with a rAAA were treated in 57 hospitals between January 2014 and January 2015, 16 hospitals did not offer treatment of ruptured aneurysms under local anesthesia. 122 patients (45.7%) underwent rEVAR under LA, 19 patients (7.1%) under regional anesthetic (RA) and 126 patients (47.2%) under general anesthesia (GA), baseline characteristics were similar amongst three groups and not significantly different. No statistically significant difference in 30-day mortality was observed between treatment groups. Mean Length of Stay (LOS) was not significantly different amongst the three groups; LA 12.8 days (95% CI 10.2-15.3) vs RA 14.3 days (95% CI 6.3-22.3) vs GA 13.1 days (95% CI 10.1-16.1), p-value 0.922.

Endovascular aneurysm repair under local anesthesia is feasible and safe with comparable 30-day mortality and outcomes when analyzing the prospectively collected data from the National Vascular Registry (NVR).
Aortic volume and diameter before and after EVAR. A simple analysis of volume can help with clinical decision making in selected cases

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Studies correlating aneurysm sac size, using different modalities, are limited. This study compares CT aneurysm volumetry to contemporaneous aneurysm diameter measurements on CT and US in patients undergoing EVAR.

Imaging for EVAR patients at a single centre (November 2011 - November 2014) were retrospectively reviewed. Analyses of pre-operative and three months post-operative scans were performed for each patient. AAA volume was measured from the slice immediately below the lowest renal artery to the slice at the aortic bifurcation. Transverse and anteroposterior images were obtained from the level of the suprarenal aorta above the graft to the distal external iliac arteries. Analyses were undertaken comparing CT volume pre and post op, CT volume versus diameter pre and post op and CT diameter versus US diameter. Kendall’s Tau correlation, Bland Altman plots, limits of agreement and paired t-tests were used respectively.

62 patients were included. Mean pre and post operation diameters were 62.92mm (IQR 58mm-65mm) and 60.30mm (IQR 54mm-63mm). Mean pre and post operation volumes were 133.51ml (IQR 58ml-111ml) and 102.84ml (IQR 79ml-148ml). There was moderate correlation between CT diameter and CT volume post-op (Kendall’s tau 0.59, p<0.001) Post-operation volume is significantly smaller than pre-operation volume (mean difference 32.0, 95% CI 17.9-46.0, p<0.001). Significantly higher diameters were recorded using CT compared to US (p<0.001).

AAA sac volume may provide a more accurate impression of the evolution of the aneurysm sac compared to maximum diameter.
12 years of fEVAR follow-up from a single UK centre

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fEVAR is an established treatment of juxta & para-renal aortic aneurysms. The aim of this analysis is to assess long term outcomes from a single UK centre. We exclusively use the Cook Zenith Fenestrated device.

We performed an analysis of our prospectively maintained EVAR surveillance database augmented with matched data from our entries on the BSET GLOBALSTAR registry. Patients with any branched components or fenestrations as part of a thoracic aneurysm repair were excluded.

From 2003, 174 cases were performed until end 2015, all were included for analysis. Median; Follow-up was 34 months (IQR 18 - 75), Age was 76 years (IQR 70-79) & Aneurysm size was 59mm (IQR 59-70).

Combined Inpatient & 30 day mortality was 5.1%. Kaplan Myer analysis shows 1, 5 &10 year all-cause mortality to be 9%, 39% & 69% respectively. Reintervention free survival was 85%, 56% & 27% at 1, 5 & 10 years. 40 (23%) of patients required at least one reintervention in the analysed follow-up.

Target Vessel patency was 99%, 98% & 97% at 1, 5 & 10 years.

Long term survival following fEVAR remains poor, mainly due to co-morbid patients. Reinterventions are common but can maintain high target vessel perfusion rates. Catastrophic loss of target vessels are rare. Our outcomes are comparable to published international series and UK registry data.
Robotic versus manual renal cannulation during FEVAR: A comparison of efficiency

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Pre-clinical and early clinical experience with robotic catheter systems has highlighted potential advantages during complex endovascular manipulation. We aimed to assess the efficiency of robotic renal cannulation during fenestrated endovascular aortic repair (FEVAR) against conventional manual techniques.

Twenty-one consecutive FEVAR cases performed at a single institution were studied. Fifty-seven renal cannulations in total were assessed using fluoroscopic video-recordings and a novel motion tracking analysis software. Total catheter-tip path-length (PL) cannulation times were recorded by a single observer, and comparisons between robotic (n=25) versus manual (n=32) techniques were made using non-parametric statistical tests. Comparisons of renal vessel angulation and degree of ostial stenosis were performed between vessels cannulated using the differing techniques.

Overall, there were no significant differences in renal angulations or the degree of ostial stenosis between the two study groups. There were five successful manual to robotic conversions, and one robotic to manual conversion. Median PL for robotic cannulations was significantly shorter compared to the manual approach: 49.9 cm (IQR 31-93.9) versus 84.2 cm (42-191.4); (p = 0.044). No differences in cannulation times between robotic (6.38 min (3.6-13.3)) and manual (4.8 min (2.35-11.47)) manipulation strategies were seen (p = 0.27).

Robotic renal cannulation during FEVAR leads to significant reductions in PL with a narrow IQR, which reflects predictability and accuracy of navigation, crucial to avoid vessel injury and embolization. The conversion rate highlights how robotic assistance may benefit current complex endovascular interventions.
A decade of patient safety (Datix) reporting in Elective Aortic intervention directs team training across the patient pathway

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The National Reporting and Learning System has collated >6million patient safety reports 2003-2013. This study explores error reports involving elective aortic patients.

A systematic search using terms pertaining to aortic practice was performed. Independent researchers categorized reports according to failure and harm using WHO classification and modified medication error index. A standardised conceptual framework was applied to identify themes.

6,750 reports were retrieved of which 1180 were elective aortic- 448 preoperative, 321 intraoperative, 411 postoperative. The dominant failure categories were Medical devices (21.1%), Clinical processes (20.8%) and Resource Management (19.5%) - agreement Kappa >0.7

939 events reached the patient, 361 causing harm (30.6%). Of the non-fatal harming events, 64.5% were attributed to process and device failures.

Harming clinical processes (114/361) were primarily procedure-failures (38.6%), including avoidable complications requiring re-intervention- bleeding, thromboembolism or gastrointestinal obstruction. General management errors accounted for 32.5% of harmful processes including inadequate patient observations, failure to follow postoperative instructions and non-escalation of care.

Intraoperative mobile imaging failure/malfunction accounted for 22.1% of medical device errors (86/361). This resulted in 8 cancellations, another 4 persevered with >1hour delay each. Equipment unavailability caused harm in 19.8%, primarily in endovascular procedures.

Focused analysis of this national safety database identifies recurring harmful themes in elective aortic practice, suggesting that an effective team training programme must involve deliberate practice of all stages of the procedure using technology; focus on clinical processes for planned and unplanned procedural phases; be used to develop robust clinical protocols; and, provide a mechanism for learning from such events.
Medium term results of endovascular treatment of TASC C and D aorto-iliac lesions

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To evaluate the results of endovascular treatment for TASC C & D lesions and assess the impact of adjunctive procedures on the outcomes in a consecutive group of patients.

We analysed a prospectively maintained database of consecutive patients who underwent endovascular treatment for TASC II C and D aorto-iliac lesions from 2010 to 2014. Primary endpoints were target vessel patency, limb salvage (LS), amputation free survival (AFS) and freedom from major adverse limb events (MALE).

Overall 132 limbs, in 89 patients were treated. Indications for treatment were life-limiting claudication (n=36), rest pain (n=39) and tissue loss (n=14). Treated lesions were TASC C (n=21, 24%) and TASC D (n=68, 76%). Re-entry devices were used in 18% (n=16). Open adjunctive procedure consisted of femoral endarterectomy (n=60) and cross-over bypass (n=1). Technical success was 97%. Mean follow-up was 12 (range: 1-48) months. Primary, assisted primary and secondary patency rates at 1 year were 84%, 88%, and 95% respectively. LS and AFS at 1 year were 98%, 88% respectively. Freedom from MALE was 87% at 1 year. Peri-operative complications occurred in 14 (16%) patients and included: major adverse cardiovascular events (6%)(stroke n=3, MI n=1 and death n=1), vessel perforation (7%), intervention for surgical site infection (1%), renal failure (3%).

Endovascular treatment of TASC C and D aorto-iliac lesions is a viable option with satisfactory clinical outcomes and a high technical success rate.