

VASCULAR 1

O15 VASCULAR ENDOANCHORING FOR PROXIMAL AND DISTAL FIXATION AND SEAL OF EVAR

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Introduction: Vascular endostapling/anchoring systems were developed to achieve better sealing at the proximal or distal ends of stent grafts and to prevent endograft migration. We report our early results in utilising Aptus Heli-Fx Endoanchors for primary or secondary sealing of endovascular aneurysm repair (EVAR).

Method: 8 patients (6 men; median age 71 years (39-79)) underwent endoanchor fixation (Aptus EndoSystem) between February 2013 and June 2015. Follow-up evaluation consisted of computed tomography 1 month after the procedure, at 12 months, and then annually.

Result: Adjuvant endoanchors were used to reinforce the fixation of 6 thoracic EVARs and 2 fenestrated EVARs. In 6 patients, endoanchors were deployed primarily with EVAR, whilst 2 patients received secondary endoanchoring (1 for proximal graft migration and type 1b endoleak and 1 for a proximal aortic dilatation). Endoanchors were inserted to achieve distal seal in 6 patients and proximal seal in 2 patients. A median of 8 devices were implanted per patient (6-10). Primary technical success was achieved in all patients with no intraoperative device-related complications. During the median follow up of 12 months (1-28), there were no mortalities and no reports of device failures, migrations, endoleaks, conversions, or secondary procedures.

Conclusion : Primary and secondary endoanchoring is feasible, and early results were promising in this series. It is however imperative that a multi-centre register is established to evaluate both medium and longer-term outcomes for these devices.

Take-home message:

Endo-leak and graft migration are common and serious complications of EVAR. This study shows promising initial results with a feasible technique in both primary and secondary sealing and would be a candidate for a large multi-centre analysis.

O16 ASSOCIATION AND OUTCOME BASED ANALYSIS OF TOE PRESSURE MEASUREMENT IN A CONSECUTIVE COHORT OF PATIENTS

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Introduction: The toe vessels are less susceptible to medial calcification, which makes the TBI useful. The current literature is however, somewhat sparse on the role of TPI in vascular surgery. This study aims to shed further light on associations with the toe pressure index (TPI).

Method: A consecutive series of patients who underwent toe pressure assessment within our vascular studies unit were studied. Patient demographics were recorded as were associated ankle brachial pressure index (ABPI) measurements where assessed. Atherosclerotic burden was assessed using duplex and scored using the Bollinger score. Subsequent cardiovascular event rate was determined.

Result: A total of 133 patients were assessed (78 men, mean age 72.73 years). An abnormal TPI was determined as <0.6. Abnormal TPI was significantly associated with chronic kidney disease, a diagnosis of diabetes, male sex and increasing age ($p < 0.05$). No / poor correlations were seen with TPI and ABPI (Pearson coefficient 0.37) or Bollinger score (Pearson coefficient -0.05). Toe pressure measurement was associated with subsequent risk of a cardiovascular event ($p = 0.004$).

Conclusion: As expected, we found a low TPI to be associated with diabetes and worsening renal function. The lack of a correlation between atherosclerotic burden and TPI reinforces the small vessel related issues seen in such patients and clinicians must not be falsely reassured of foot perfusion in such patients. Further work is required to assess the significance of toe pressure with cardiovascular risk.

Take-home message:

Lack of TPI with atherosclerotic burn means vigilance of vascular surgeons is required with the determination of the role of small vessel disease in foot ulceration.

O17 TYPE 1 ENDOLEAK POST ENDOVASCULAR ANEURYSM REPAIR – IS THERE A ROLE FOR CONSERVATIVE MANAGEMENT IN SELECTED PATIENTS?

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Introduction: Inadequate proximal and/or distal endograft sealing occurs in approximately 4% of endovascular aneurysm repairs (EVAR). Prompt intervention for type 1 endoleak is generally advocated due to the risk of rupture; however, several reports describing spontaneous sealing exist. We describe our experience with intra-operative type 1 endoleak treated conservatively and after intervention.

Method: 904 patients who underwent EVAR between 1995 and 2013 at a single centre were entered onto a prospective database. All patients were suitable for EVAR, had a completion angiogram and were followed up by duplex ultrasound. Patients with an intra-operative type 1 endoleak were included.

Management of the endoleak was down to surgeon preference. Those treated with intervention were compared to those conservatively managed.

Result: 36 patients developed a type 1 endoleak (3.9%), 22 of which were type 1a. Median follow up was 3.6 years (1.5-5.9), median age was 75 years (IQR 72-80) and mean pre-operative aneurysm diameter was 60mm (IQR 56-63). 28 patients underwent intervention, 6 endoleaks persisting and 4 required re-intervention. 8 endoleaks were treated conservatively, 7 spontaneously resolving, however, one required conversion. Median 6 week sac diameter changed from 60mm (IQR 53-62) to 57mm (IQR 53-62) in the intervention group and 63mm (IQR 59-87mm) to 61mm (IQR 56-80mm) in the conservative group. There was no difference in peri-operative complication rates ($P=1$), and no 30 day mortality occurred.

Conclusion: Selected type 1 endoleak may be safe to manage conservatively. Further research is required to quantify which small leaks are most suited to this approach.

Take-home message:

Selected type 1 endoleak may be safe to manage conservatively potentially reducing the morbidity associated with further interventions.

O18 ENDOVASCULAR TREATMENT VERSUS ENDARTERECTOMY FOR COMMON FEMORAL ARTERY ATHEROSCLEROTIC DISEASE: A SYSTEMATIC REVIEW

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Introduction: Endovascular treatment to common femoral artery (CFA) atherosclerotic disease is a novel technique. We aim to assess the comparative safety and efficacy of CFA endovascular treatment versus endarterectomy.

Method: Searches were restricted to publications from 1980 onwards. Two reviewers independently extracted data and quality assessed the studies.

Result: We identified eight case series reporting CFA endovascular treatment (482 patients, 510 limbs), 15 case series and one registry reporting CFA endarterectomy (2519 patients, 2629 limbs), and a registered RCT. CFA endovascular treatment and endarterectomy had comparable technical success rate: median 97.0% (range 90.5% to 100%, 6 studies, $n=378$) vs. 100% (96.7% to 100%, 10 studies, $n=754$). Endarterectomy had a higher primary 1-year patency rate: median 94.6% (70.0% to 100%, 7 studies, $n=357$) vs. 78.1% (range 46.9% to 92.3%, 4 studies, $n=201$). Safety wise, there was one stent fracture and one stent deformity. Endovascular treatment had a lower 30-day mortality rate: median 1.1% (range 0 to 5.0%, 3 studies, $n=207$) vs. 1.4% (0 to 18.2%, 9 studies, $n=615$) and lower one-year mortality rate: median 16.4% (0 to 37.1%, 4 studies, $n=235$) vs. 19.1% (0 to 34.5%, 8 studies, $n=555$). No studies reported wound infection, haematoma or lymph leak after endovascular treatment. For endarterectomy, median rates of these complications were 4.9%, 3.7% and 4.7% respectively.

Conclusion: CFA endovascular treatment appeared to be a safe approach but its comparative efficacy is uncertain. An RCT is required to assess the clinical and cost-effectiveness of CFA endovascular treatment.

Take-home message:

CFA endovascular treatment appeared to be a safe approach but its comparative efficacy is uncertain. An RCT is required to assess the clinical and cost-effectiveness of CFA endovascular treatment.

O19 METABOLIC PROFILING IN CHRONIC VENOUS ULCERATION OF THE LOWER LIMB - A POTENTIAL TOOL FOR DISCOVERING BIOMARKERS OF PROGNOSIS?

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Introduction: Despite the enormous clinical challenge of chronic venous ulceration (CVU) of the leg, the pathophysiological pathways from sustained venous hypertension to tissue loss and failure of healing remain unclear. Metabolic profiling of the end-products of cellular processes has emerged as a viable tool in systems biology driven by multivariate statistical models. We sought to apply these methods to CVU.

Method: Ulcer fluid was obtained from multiple patients with CVU by the placement of filter discs on the wound (ethical approval 13/EE/0137). Ulcer fluid was extracted from filter disks for metabolic profiling analysis. The aqueous extracts were analysed by proton nuclear magnetic resonance ($^1\text{H-NMR}$) and the organic extracts by reversed-phase ultra performance liquid chromatography coupled to mass spectrometry (RP-UPLC-MS). Pooled samples, blank solvents and blank discs analysed for quality control assessment. Processed data underwent multivariate statistical analyses (orthogonal partial least squares discriminant analysis & partial least squares regression) with stratification for clinical data including ulcer size, ulcer age, healing status and healing rate.

Result: Samples were obtained from 28 patients with CVU (18 male, 10 female, median age 70.5 years) with median ulcer duration of 24.5 months. Multivariate statistical analysis revealed significant differences in the lipid species of the ulcer fluid microenvironment associated to the healing status, the chronicity of the wound and the healing rate.

Conclusion: Metabolic profiles in ulcer fluid from CVU appear to vary depending on key clinical

outcomes, including healing status. Identification of biomarkers of healing may be feasible using a metabolic profiling approach.

Take-home message:

Biomarkers predictive of venous ulcer healing may lead to more effective prognostication in a patient with venous ulceration or direct future study towards novel therapeutic targets.

O20 FRAILTY PREDICTS POOR OUTCOME IN PATIENTS UNDERGOING LOWER LIMB INFRAINGUINAL SURGICAL REVASULARISATION.

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Introduction: Given the changing demographics of the population, frailty is becoming an increasingly recognised concept, recognised to be associated with poor outcome. No study has yet determined the effect of frailty following infrainguinal lower limb bypass surgery (ILLBS).

Method: Data was collated on a consecutive cohort of patients (>65 years of age) undergoing ILLBS. Patient demographics, surgery specific factors and frailty specific data was collated. Frailty severity was determined using a modified Vascular Frailty Score (VFS: 0 – no frailty / 6 - severe frailty). Primary outcome measure was length of stay (LOS). Secondary outcome was mid term mortality.

Result: 83 patients were assessed (median age 74 yrs ; 32 women). Median LOS was 9 days. Overall median VFS was 1. 26 had a VFS of 0, 21 a VFS of 1, 26 a VFS of 2 and 10 a VFS of 3 or 4. Increasing VFS score equated to a longer LOS ($p < 0.01$) and increased mortality rate ($p < 0.01$) but not with age or indication for surgery.

Conclusion: Frailty specific factors appear to predict a poorer outcome in older patients undergoing ILLBS. Some of these are reversible and amenable to intervention to improve outcome.

Take-home message:

Frailty is a predictor of poorer outcome in patients undergoing lower limb bypass surgery.

O21 EXCIMER LASER ATHERECTOMY FOR CHRONIC OCCLUSIVE FEMOROPOPLITEAL DISEASE

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Introduction: The use of laser therapy as a treatment strategy for revision femoropopliteal intervention has not been explored. We report our experience of using Excimer laser-assisted angioplasty in patients with chronic complex femoropopliteal occlusive disease.

Method: Patients with complex femoropopliteal occlusive disease and limited options for revascularisation were reviewed. The procedure was performed under local anaesthetic using a 2.0 mm Turbo – Elite laser atherectomy catheter. Consecutive patients treated from January 2010 – June 2014 were analysed. Mean follow up was 27 months (range 7 – 52). 11 patients had occluded stents in-situ and 31 patients had at least 1 previous recanalisation procedure. Patency rates were by Kaplan – Meier analysis.

Result: 52 patients were included in this study (mean 67 ± 1 , 41 male, 32 Rutherford 3, 20 Rutherford 4). 33 patients had TASC B and 19 TASC C on pre-op imaging. 50% of patients were high risk for anaesthesia (ASA 4). 36/52 received laser and plasty alone and 16, adjunctive stenting. The 12 months primary patency rate was 81%. 5 patients had acute re-occlusion and there was an overall re-intervention rate of 12%. None of the patients underwent surgical bypass. Limb salvage rate 100% at 12 months. There was a significant improvement of pre-laser ABPI vs. post-laser ABPI (0.61 [0.59-0.64] vs. 0.84 [0.77-0.9], $P < 0.001$ t-test).

Conclusion: Excimer laser atherectomy is a valuable and effective intervention in high risk chronic occluded femoropopliteal disease.

Take-home message:

Excimer laser atherectomy as an alternative intervention in high risk chronic occluded femoropopliteal disease.

O22 AUDIT ON TEMPORAL ARTERY BIOPSIES IN GIANT CELL ARTERITIS

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Introduction: Giant cell arteritis (GCA) is characterised by critical ischaemia at presentation and is an important cause of acute blindness in the elderly population. Prompt diagnosis, investigation and management are therefore paramount in this sight-threatening condition. An early temporal artery biopsy (TAB) is the gold standard for diagnosis.

Method: Guidelines published by the British Society for Rheumatology state that TABs should be performed within 1 week of starting steroids as this is prognostically and diagnostically important. It also states that biopsy specimens should be no less than 1cm and ideally 2cm in length. We analysed data over 2 years (March 2013 to March 2015) from three hospitals.

Result: There were a total number of 107 patients (mean age 69.3 years, 73.6 % female, 26.4 % male) with suspected GCA, with 43.9% of patients biopsied within 7 days. Biopsies were mostly carried out by vascular surgeons. Out of all the biopsies, 49.0% were $\geq 1\text{cm}$ as per guidelines' minimum length, and only 4.1% were $\geq 2\text{cm}$ as per guidelines' ideal length. This shows a general poor accordance with both guidelines.

Conclusion: The promptness and length of specimen taken in temporal artery biopsies in suspected GCA patients is inadequate. This could reflect a lack of awareness in biopsy surgeons, with no unified referral process in GCA patients and a lack of a dedicated TAB unit in our Trust. We are in the midst of creating a one-stop referral pathway and a dedicated vascular surgery-led TAB unit.

Take-home message:

It is good practice to carry out temporal artery biopsies promptly and of sufficient length, and a dedicated giant cell arteritis referral pathway and biopsy unit in the trust should be beneficial.

O23 OBSERVATIONAL STUDY DESCRIBING THE ACCURACY OF ULTRASOUND ABDOMINAL AORTIC ANEURYSM (AAA) DIAMETER MEASUREMENT IN DIFFERING AAA MORPHOLOGY

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Introduction: Ultrasound (US) is the gold standard measurement aortic diameter for AAA surveillance. EVAR as valid option for treating AAA has raised the need for Computer Tomography (CT). Accurate measurement of aortic diameters is crucial in the diagnosis, surveillance and treatment of Abdominal Aortic Aneurysm disease (AAA).

Method: Single centre observational study. Including patients with a infra-renal Aorta $\geq 3\text{cm}$ and US aorta and CT-Aorto-gram within 90days. Excluding Post EVAR scans and unreported measurements on ultrasound or CT. Retrospective identification of prospective collected data. All patients had CT Aorto-gram between 2008-2013. US maximum AP aortic diameter and CT measurements maximum aortic diameter have been used. Analysis using Bland-Altman plot, Pearson Correlation.

Result: 212 patients (33females,179males), with a mean age of 76years, were included. There is a significant correlation between CT and US measurement (CC0.938 [P<.001]). There is significant disagreement between mean of the two measurements (CT+US/2) and the difference between them (US-CT). Pearson correlation test between the difference between the two measurements and the aneurysm size on the CT showed significant weak correlation (CC0.297 [P<.001]).

Conclusion: There is high correlation between the CT and US measurements with weak agreement. We failed to demonstrate any correlation between increasing aneurysm size in relation to difference of measurement between CT and US. These results suggest that serial measurements of US or CT can be usefully compared in the context of surveillance. However, we were unable to demonstrate agreement supporting the routine use of US and CT measurements interchangeably for determining thresholds for intervention.

Take-home message:

it is important to understand the agreement and the relation between the CT and US. as both of them has its role in surveillance and treating of Aortic aneurysm.

O24 VASCULAR EHLERS-DANLOS SYNDROME TYPE IV: BEST MODERN MANAGEMENT

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Introduction: Vascular Ehlers-Danlos Syndrome (vEDS) presents with arterial dissection, rupture and aneurysm. The aim is to review our clinical experience and the literature.

Method: All cases with vEDS in our database over the last 12 years were reviewed. A systematic literature review was performed and PubMed and references were analysed.

Result: A total of 11 patients (mean 49 years; range 18-91) were identified with no gender preponderance. One had type III (hypermobile), one had type I/II (classic) but all others (9/11) had type IV (vascular). Four (45%) had aneurysms, often multiple (splenic/hepatic/radial/subclavian/pulmonary). Three (27%) had arteriovenous fistulae (AVF) 2 iliac and 1 carotid-cavernous. No patients had open surgical repair. Four (45%) had endovascular intervention including embolisation of aneurysms, stent/stent-graft for AVFs and 1 had peripheral angioplasty. There was no procedure-related mortality but significant morbidity in 1 (25%) with reintervention for stent occlusion and embolisation for persistent fistula. All patients are alive (mean follow-up 11 months; range 1-25). One had medical treatment with Celiprolol. The literature mortality rate is high at 30% (median 31 years) probably as result of open repair. Literature review revealed only case reports, small case series and expert opinion.

Conclusion: vEDS is a challenging condition with limited evidence-based knowledge and should be considered in unexplained vessel rupture or dissection. In addition to genetic counselling, conservative treatment with novel agents may have a role. Endovascular treatment is highly successful avoiding open surgery to optimise life expectancy and quality of life. We recommend a prospective registry to improve outcomes. Abbreviations: vEDS: Vascular Ehlers-Danlos Syndrome; AVF: arteriovenous fistula

Take-home message:

Vascular Ehlers-Danlos Syndrome is a challenging condition with limited evidence-based knowledge. High index of suspicion is essential for optimum management. Endovascular surgery is the treatment of choice avoiding open repair to optimise life expectancy.

025 PHARMACOMECHANICAL THROMBOLYSIS OR CATHETER-DIRECTED THROMBOLYSIS: WHICH IS THE BEST TREATMENT FOR DEEP VEIN THROMBOSIS? A SYSTEMATIC REVIEW AND META-ANALYSIS

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Introduction: The techniques CDT and PMT were developed to reduce clot burden in an attempt to decrease rates of PTS development, a major determinant in long-term quality of life, seen with conventional systemic anticoagulation treatment. The primary aim of this systematic review and meta-analysis was to compare the outcomes of CDT and PMT, and conclude as to which is the safest and most effective technique.

Method: Studies reporting endovascular interventions for treating lower extremity DVT were included and outcomes were divided into three sections: radiological (complete clot lysis), complications (total, major and minor bleeding and pulmonary embolism), and follow up (patency, normal venous function, recurrent DVT number and PTS). A national survey was developed to collect data on the current management of DVT in the NHS.

Result: The qualitative results analysed CDT and PMT only studies. Complete clot lysis was achieved in a mean of 55% and 63% and the mean incidence of PTS was 17% and 22% for CDT and PMT respectively. The meta-analysis of three studies comparing CDT to PMT showed no significant difference in the incidence of complete clot lysis, total bleeding or major bleeding.

Conclusion: This review suggests no added benefit of PMT over CDT. The results of an ongoing randomised controlled trial, the ATTRACT study, are needed to determine the true efficacy and safety of PMT. Abbreviations CDT = catheter-directed thrombolysis, PMT = pharmacomechanical thrombolysis, PTS = post-thrombotic syndrome, DVT = deep vein thrombosis, NHS = National Health Service.

Take-home message:

PMT is now widely used for clot lysis, however this study found no significant advantages of it over CDT.

026 THE COMPARATIVE HAEMODYNAMIC EFFICACY OF LOWER LIMB MUSCLES USING TRANSCUTANEOUS ELECTRICAL STIMULATION

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Introduction: Circulation in the limbs can be augmented using transcutaneous electrical stimulation devices. The optimum muscle stimulation sites for enhancement of vascular haemodynamic parameters have not been identified.

Method: Seven suitable anatomical sites were identified within the right leg. Twelve healthy participants were recruited, mean age 23.1 ± 3.2 years, body mass index 23.1 ± 3.1 kg/m². Muscles were stimulated via transcutaneous bipolar electrodes at a current twice their motor threshold, at 1Hz, for 5-minutes. Haemodynamic ultrasound measurements were taken from the right femoral vein. Laser Doppler measurements from the feet of the stimulated and non-stimulated sides were. Baseline measurements were compared to readings after 5-min stimulation, with device active. Discomfort experienced for stimulation of each muscle was rated out of 100.

Result: Haemodynamic changes displayed large inter-subject variation, with no muscle statistically superior to the others. All muscles increased peak velocity; contraction of medial gastrocnemius increased time-averaged maximum velocity and volume flow. All muscles increased foot fluximetry ($p < 0.05$). Discomfort correlated weakly with current applied. Tibialis anterior and vastus lateralis were most tenable.

Conclusion: Transcutaneous stimulation increases haemodynamic parameters significantly, locally and systemically. No optimum stimulation site has been identified, and is limited by comfort and variability in subject response. Gastrocnemius, tibialis anterior and vastus lateralis all provoke large changes in haemodynamic parameters, but clinical efficacy in disease prevention and management has not been explored.

Take-home message:

Electrical muscle stimulation of skeletal muscle can be used to increase haemodynamic parameters both locally and systemically, and represents a therapeutic target with very few risks or side-effects.