O128 POPLITEAL ARTERY ANEURYSM GROWTH RATES IN PATIENTS WITH MULTIANEURYSMAL DISEASE
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Introduction
The aim of this study was to investigate the rate and determinants of popliteal artery aneurysm (PAA) growth in a cohort of patients with multianeurysmal disease.

Methods
Following a retrospective review of all patients who underwent PAA repair at a tertiary centre between 2006-2012, 22 popliteal arteries in 18 patients were identified for PAA growth study. In total, 154 duplex ultrasound scans (median 7 scans per artery (range 1 – 17)) were reviewed. The median total number of aneurysms per patient was 3 (2 – 10). Potential predictors of PAA growth were tested using linear regression modelling.

Results
Overall mean and median PAA growth rates were 3.8 ± 6.0mm/year and 1.0 (-8.2 – 19.2mm/year) respectively. None of the variables tested (popliteal artery diameter at index scan, patient age at index scan, patient co-morbidity status, smoking status, total number of aneurysms or presence of extrapopliteal aneurysms) significantly predicted PAA growth rates using linear regression. However, when median PAA growth rates were separated into 3 groups based on popliteal artery diameter at index scan there was a trend towards higher PAA growth rates in arteries with larger index diameters (<1.5cm: 0.5mm/year; >1.5cm – <2.5cm: 0.9mm/year; >2.5cm: 2.1mm/year).

Conclusions
For multianeurysmal disease, PAA growth rates are fast relative to their size and highly variable. Severity of multianeurysmal disease does not determine PAA growth rates. Predictors of PAA growth appear to be different to those for abdominal aortic aneurysm growth although aneurysm diameter may be important.

Take-home message
In patients with multianeurysmal disease, popliteal artery aneurysm growth rates are fast relative to their size and growth rate determinants are not the same as those for abdominal aortic aneurysms.

O129 DEVELOPMENT AND VALIDATION OF CONDITION-SPECIFIC PATIENT-REPORTED OUTCOME MEASURES (PROMS) OF QUALITY OF LIFE, SYMPTOMS AND TREATMENT SATISFACTION FOR PATIENTS WITH AORTIC ANEURYSMS
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Introduction
The aim was to develop and validate PROMs to assess individualised quality of life (QoL), symptoms and treatment satisfaction in patients with abdominal aortic aneurysms (AAA).

Methods
Literature review, patient focus groups and specialist linguistic input informed the qualitative design of AAA PROMs items. These were used to populate existing questionnaire templates previously developed by Bradley and colleagues with other patient populations. One-to-one patient interviews and clinician review were used to optimise content/face validity. Patients recruited from 5 NHS Trusts included those having endovascular or open AAA repair. Psychometric validation included exploratory factor analysis and reliability analyses on cross-sectional questionnaire data collected from patients pre-intervention or at subsequent points in the treatment pathway.

Results
Design work with 54 patients in 3 centres produced three new measures: 1.Aneurysm-Dependent Quality of Life (Aneurysm-DQoL) questionnaire 2.Aneurysm Symptom Rating Questionnaire (Aneurysm-SRQ) 3.Aneurysm Treatment Satisfaction Questionnaire (Aneurysm-TSQ). 172 further patients completed questionnaires for quantitative psychometric analysis (157 men/15 women; mean age 75.0yrs). Factor and reliability analyses revealed that 20/23 items from the Aneurysm-DQoL formed a single scale with excellent reliability (Cronbach’s-α coefficient of internal consistency=0.95); the 44 Aneurysm-SRQ items divided into five subscales α=0.61–0.78); whilst the 11-item
Aneurysm-TSQ formed a single scale ($\alpha=0.88$) with two subscales ($\alpha=0.88$ and 0.77).

**Conclusions**
The Aneurysm-DQoL, Aneurysm-SRQ and Aneurysm-TSQ are newly validated, AAA-specific questionnaires for assessment of QoL, symptoms and treatment satisfaction. Their use will clarify the impact of AAA and its treatment, highlight the issues most relevant to patients and facilitate targeted improvements in care.

**Take-home message**
We present a set of newly designed and validated PROMS to assess quality of life, symptoms and treatment satisfaction amongst patients with AAA.

**0130 DECISION MAKING IN SYMPTOMATIC MODERATE CAROTID ATHEROSCLEROSIS: A SURVEY OF UK VASCULAR SURGEONS AND STROKE PHYSICIANS**

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**Introduction**
Benefit from carotid endarterectomy (CEA) in symptomatic moderate (50-69% NASCET) carotid stenosis remains marginal. The 4th National Clinical Guideline for stroke recommends clinicians use the risk of stroke score from the European Carotid Surgery Trial (ECST) to aid decision making in symptomatic carotid disease. However, little is known about whether clinicians are, in fact, influenced by it.

**Methods**
Using the ECST risk prediction model, three scenarios of patients with low (<10%), moderate (20-25%) and high (40-45%) 5 year risk of stroke were devise and validated. Invitations to complete the online survey were sent by e-mail to vascular surgeons and stroke physicians with responses gathered and then repeated with the addition of the ECST risk score. Statistical analysis was performed using a Chi-squared test.

**Results**
A total of 201 responses were analysed; 53% stroke physicians and 47% vascular surgeons. The high risk scenario post-introduction of the ECST risk score showed increased use of CEA (67% vs 80%, $p=0.009$). The low risk scenario post risk score analysis demonstrated a swing toward best medical therapy (23% vs 57%, $p<0.001$). CEA was preferred in the moderate risk scenario and not altered significantly by the introduction of the risk score (72% vs 76%, $p=0.837$). Vascular surgeons exhibited preference toward CEA compared to stroke physicians in both low and moderate risk scenarios ($p<0.001$, $p=0.003$).

**Conclusions**
The addition of a risk score appeared to influence clinicians in their decision making towards CEA in high and moderate risk patients and away from this in low risk patients.

**Take-home message**
Without risk stratification clinicians have a preference toward CEA for patients with 50-69% symptomatic carotid stenosis. Addition of a risk prediction model appears to influence clinician management with CEA preferred in high and moderate risk whilst BMT is preferred in low risk patients.

**0131 METABOLIC PROFILING IN CHRONIC VENOUS ULCERATION OF THE LOWER LIMB - A NEW APPROACH TO AN OLD PROBLEM?**

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**Introduction**
Chronic venous ulceration (CVU) of the lower limb remains a challenge yet the precise pathophysiological translation from sustained venous hypertension to tissue loss and failure of healing remains unclear. Metabolic profiling of the end-product of cellular processes has emerged as a viable tool in systems biology driven by the development of multivariate statistical models. We seek to determine the utility of these techniques in the understanding of CVU.

**Methods**
With ethical approval (13/EM/001) and after informed consent. Ulcer fluid was sampled from ten patients with chronic venous ulceration by the placement of sterile absorbent filter disks and the direct sampling of fluid beneath an occlusive dressing. Aqueous and organic metabolites were extracted using a bilayer extraction protocol. Aqueous extracts from filter disks underwent proton nuclear magnetic resonance (1H-NMR) and organic extracts from ulcer fluid and filter disks underwent reverse phase-ultra performance liquid chromatography - mass spectrometry (RP-UPLC-MS). Blank solvents and filter disks were used as controls.

**Results**

Fluid collection was 100% successful with filter disks and 90% successful with dressings. Ulcer area determined fluid volume. RP-UPLC-MS using filter disks and ulcer fluid demonstrated clear separation of common lipid classes including lysophospholipids, sphingomyelins, phospholipids, fatty acyls and cholesterol esters. 1H-NMR using filter disks demonstrated multiple metabolites including choline, lactate, succinate, creatine and succinate. Principal component analysis from repeat samples confirmed reproducibility.

**Discussion**

This pilot study has demonstrated the feasibility of metabolic profiling in bio-fluid samples from patients with CVU.

**Take-home message**

The biology of venous ulceration is complex and incompletely understood. We have demonstrated for the first time that metabolic profiling is possible in venous ulcer samples and a systems biology approach may shed some new light on a poorly understood subject.

**O132 CREATING A PREDICTIVE MODEL OF VEIN OUTCOMES**

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**Introduction**

Background Varicose veins offer a complex clinical scenario with no clear clinical link between symptoms and anatomy. Rationing of care necessitates identifying patients who will benefit most from treatment. Modelling using real-world data enables predictions of treatment outcomes.

**Methods**

Consecutive symptomatic vein patients attending the vascular clinic underwent venous duplex ultrasound, clinical assessment and completed validated questionnaires pre- and post-treatment. The pre-operative data sets were then analysed using univariable and multivariable and reverse removal techniques to produce a predictive model which was then tested on the post-operative data for assessment of accuracy.

**Results**

Data from 450 prospectively completed questionnaires were analysed. Clinical stage, gender and leg side were significantly associated with symptom questionnaire scores on univariable analysis. On multivariable analysis only clinical stage and gender were significantly associated. A model utilising this to predict symptom scoring on follow-up showed reasonable mid-range agreement with post-operative scores but poor agreement with extreme scores.

**Conclusions**

Modelling of venous disease is complex and whilst mid-range patients are easy to predict, low and high symptom scores are difficult to predict accurately. Larger cohorts are required to fully investigate this complex disease.

**O133 HOSPITAL BASED EXERCISE PROGRAMME IMPROVES PREOPERATIVE AEROBIC CAPACITY IN ABDOMINAL AORTIC ANEURYSM PATIENTS**

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**Introduction**

Cardiopulmonary exercise testing (CPET) provides objective assessment of aerobic capacity in preoperative patients. We aimed at assessing whether a hospital based exercise programme can improve aerobic fitness in patients awaiting interventions for AAA.

**Methods**

In this prospective controlled cohort study, patients listed for AAA repair underwent supervised exercise programme (SEP) or standard treatment. Treadmill CPET was done at
baseline for all participants and repeated after 4-6 weeks of exercise in the intervention group and on the last preoperative day in the control group. Wilcoxon rank test was used to assess for the change in parameters.

**Results**

36 patients were included (25 exercised, 11 controls) with a mean age (±SD) of 72.4 (±7.3). Median (IQR) peak oxygen consumption (VO2 peak) improved in the exercise group from 17.9 (14.8-20.0) to 19.8 (16.9-21.2) (P = 0.011) and anaerobic threshold (AT) improved from 11.8 (9.7-14.9) to 14.3 (10.8-15.4) (P = 0.018). These parameters minimally changed in the control group: VO2 peak from 19.8 (16.1-21.0) to 19.5 (17.1-20.6) (P = 0.755) and AT from 12.1 (10.7-13.5) to 11.7 (10.4-14.3) (P = 0.859). Significant improvements were also seen in the total exercise and AT achievement times in the exercise group only.

**Conclusion**

Patients with AAA of sufficient size to warrant intervention can benefit from SEP in to improve their aerobic fitness, reduce the incidence postoperative complications and perhaps influence the decision-making regarding their suitability for repair.

**Take-home message**

Preoperative exercise improves functional capacity and potentially operative outcomes.

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**O134 HIGH SUSCEPTIBILITY OF HUMAN ABDOMINAL AORTIC ANEURYSM (AAA) VASCULAR SMOOTH MUSCLE CELLS (VSMC) TO APOPTOSIS**

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**Introduction**

One of the key characteristics of end-stage abdominal aortic aneurysm (AAA) tissue is loss of vascular smooth muscle cells (VMSC) from the aortic media, related to a pro-apoptotic environment. The aim of this study was to compare the susceptibility to apoptosis in AAA and healthy VSMC.

**Methods**

VSMC were cultured by explant technique from aortic wall samples taken from patients with AAA (n=4) undergoing open AAA repair and from normal saphenous vein tissue (SV, n=4) harvested from age and sex matched patients undergoing cardiac surgery. Ethical approval was obtained from the local ethics committee. Apoptosis was studied using time lapse fluorescence microscopy and the live cell apoptosis marker, DEVD-NucView488.

Apoptosis was measured in the absence of stimulation (basal), or in the presence of 50nM staurosorine over 24 hours. Cell area was quantified using ImageJ. Groups were compared using ANOVA with Bonferroni correction.

**Results**

Exposure to staurosporine induced morphological changes in both populations, cells became larger (SV: 76% increased area, p<0.001; AAA: 52% increased area, p<0.001) with a more condensed nucleus. In basal conditions the proportion of apoptotic cells was not significantly different between the cell populations (SV: 0.4±0.2%, vs. AAA: 7.7±4.3%, p=0.1). However, there was a 4 fold greater increase in apoptosis in response to staurosporine in the aneurysm VSMC compared to the SV VSMC (SV: 6.6±1.6%, vs. AAA: 27.8±3.3%, p=0.002).

**Conclusion**

AAA VSMC exhibit greater susceptibility to staurosporine induced apoptosis than those from SV. Strategies to increase resistance to apoptosis may be a valuable research avenue for new AAA therapies.

**Take-home message**

Vascular smooth muscle cells cultured from human abdominal aortic aneurysm exhibit an increased susceptibility to apoptosis compared to healthy smooth muscle cells. Conferring resistance to apoptosis may prevent medial degeneration in abdominal aortic aneurysm and should be explored in the future.

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**O135 REGIONAL AND SYSTEMIC PROTHROMBOTIC BIOMARKERS IN VARICOSE VEIN PATIENTS AND HEALTHY CONTROLS**

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Introduction
The relationship between thrombosis and varicose veins is poorly understood. The aim of this study was to determine whether pro-thrombotic biomarkers varied between patients with varicose veins and healthy controls and whether standard venous samples from the arm differed from leg samples.

Method
This was a prospective study on 24 patients (17 male, median age 45 years (range: 25-91 years)) awaiting saphenous laser ablation and 24 healthy volunteers (17 male, median age 42 years (range: 24-89 years)) without venous disease. Five mL of venous blood was taken from the ante-cubital fossa, with a concurrent sample from a varicose tributary (patients) or foot vein (volunteers). The following tests were performed: thrombin-antithrombin (TAT), anti-thrombin III (ATIII), microparticles (MP), fibrinogen, prothrombin fragments 1.2 (F1.2), P-selectin and dilute Russell’s viper venom time (DRVVT). Regional ethical approval was granted.

Results
Significant differences were observed between patients and controls as well as between arm and leg samples in all of the haemostatic markers, except fibrinogen. Evidence to support an increase in thrombotic activity in varicose vein patients is from the statistically elevated TAT (p=0.038), ATIII (p=0.003) and F1.2 (p=0.026). However, the relationship was inverse with MP (p=0.020) and DRVVT (p=0.048). Evidence to support an increase in thrombotic activity in legs > arms is from statistically elevated TAT (p=0.015). However, the relationship was significantly inverse with ATIII (p=0.001) and F1.2 (p=0.028).

Conclusions
There is conflicting evidence for thrombosis risk assessment by using elevated venous biomarkers in patients with varicose veins or leg samples. Venous leg sampling opens up a new anatomical site of investigation which may have future clinical value.

Take-home message
Prothrombotic biomarkers from the ante-cubital vein are significantly different from leg veins in both varicose vein patients and healthy volunteers. The reasons require further investigation and may explain why the leg has a greater predisposition to thrombosis.

O136  A RANDOMISED CLINICAL TRIAL COMPARING CONCOMIANT AND SEQUENTIAL PHLEBECTOMY FOLLOWING ENDOVENOUS LASER ABLATION: 5 YEAR OUTCOME RESULTS
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Introduction
There is no long-term data comparing concomitant ambulatory phlebectomy with endovenous laser therapy (EVLT) for Great Saphenous vein (GSV) incompetence with EVLT alone. This randomised clinical trial compares the 5 year outcomes of EVLT with concomitant or sequential ambulatory phlebectomy.

Methods
Patients undergoing EVLT for primary sapheno-femoral junction (SFJ) incompetence with GSV reflux were equally randomised to receive EVLT alone (EVLT) or EVLT with concomitant phlebectomies (EVLTAP). EVLT was undertaken as an outpatient local anaesthetic procedure according to previously reported unit protocol. Patients were reviewed at 1, 6, 12, 52, 104, 260 weeks post-operatively. Primary outcomes included recorded secondary procedures, clinical outcomes (Recurrence, CEAP, VCSS), duplex GSV reflux and disease specific QoL (Aberdeen Varicose Vein Questionnaire (AVVQ)).

Results
50 patients were equally randomised to receive EVLTAP or EVLT. One patient withdrew from the EVLT group. Baseline characteristics for both groups were well matched. All patients successfully underwent their procedure. Follow-up at 5 year for EVLTAP was 84% (n=21) and EVLT was 75% (n=18). After 1 year; additional re-intervention was required 7 times following EVLT and 5 in EVLTAP (p=0.520). At 5 years both groups improved but there was no statistical difference between the groups comparing recurrence (p=0.725), CEAP (p=0.661), VCSS (p=0.581), AVVQ (p=0.835).

Conclusion
In treating superficial venous incompetence, EVLT or EVLTAP does not significantly alter the long-term clinical symptoms and quality of life up to 5 years. This may influence surgeon and patient choice of intervention.

**Take-home message**
At 5 years the quicker improvement in clinical outcomes was maintained in the concomitant ambulatory phlebectomy group compared to EVLT alone.

**O137 A SYSTEMATIC REVIEW OF OPEN REPAIR VERSUS FENESTRATED ENDOVASCULAR ANEURYSM REPAIR OF JUXTARENAL ANEURYSMS**
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**Introduction**
Open repair is currently considered the gold standard management for juxtarenal aneurysms, and Fenestrated Endovascular Aneurysm Repair (FEVAR) is indicated for high risk patients. The long-term outcomes of FEVAR are largely unknown, and there is no level I comparative evidence. This systematic review and meta-analysis of case series compares elective juxtarenal aneurysm surgery by open repair and FEVAR.

**Methods**
A systematic literature search for all published studies on elective repair of juxtarenal aneurysms by open repair and FEVAR was conducted. The databases Medline, Embase and Cochrane were searched from 1947 to April 2013. The exclusion criteria were case series containing fewer than 10 patients or ruptured aneurysms. The primary outcomes were perioperative mortality and postoperative renal insufficiency. The secondary outcomes were secondary interventions and 5-year survival.

**Results**
35 case series were identified with data on 2326 patients. Perioperative mortality was 4.1% in both open repair and FEVAR case series (odds ratio for open repair versus FEVAR, 1.06; 95% confidence interval (CI), 0.64-1.75; P = 0.82). Postoperative renal insufficiency was not significantly different (odds ratio for open repair versus FEVAR, 1.14; 95% CI, 0.75-1.71; P = 0.54). FEVAR patients had higher rates of secondary intervention, renal impairment over follow up and a lower 5-year survival compared to open repair.

**Conclusion**
FEVAR and open repair have similar short-term outcomes, but FEVAR appears to be less durable in the long term. However, as the evidence from case series is not reliable enough, randomised controlled trial evidence is probably required.

**Take-home message**
The evidence from this systematic review of case series suggests that there are no significant differences in perioperative morbidity and mortality between open repair and FEVAR in the management of juxtarenal aneurysms. However, open repair appears to have more favourable long-term outcomes.

**O138 OUTCOMES IN ABDOMINAL AORTIC ANEURYSM SURGERY IN IRELAND FOLLOWING THE INTRODUCTION OF EVAR – A POPULATION ANALYSIS.**
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**Introduction**
With the advent of novel operative techniques in the management of Abdominal Aortic Aneurysms (AAA), several randomized controlled trials have been carried out that have resulted in dramatic changes in the surgical approach to this disease. We evaluated evolving changes in the management of AAA since the introduction of endovascular repair (EVAR) and its respective influence on post-operative morbidity and mortality.

**Methods**
A retrospective analysis of all patients who underwent operative repair of AAA in Ireland between the 1st of January 2002 and the 31st of December 2011 was performed. The primary endpoint measured was in-hospital mortality while secondary endpoints included length of stay and post-operative complications.

**Results**
4,347 patients underwent operative repair of AAA. 81.99% were male, 93.93% were over 70 years and 35.79% underwent EVAR. 17.12% were emergency operations for a ruptured AAA. Patients who underwent elective EVAR had significantly lower post-operative morbidity (23.75% vs 37.76%, p<0.001), mean length of stay (22.18 days vs 12.32 days,
p<0.001) and in-hospital mortality (2.02% vs 7.86%, p<0.001) compared with elective open surgery (OS). In those patients who underwent emergency surgery for a ruptured AAA post-operative morbidity (EVAR 55.56% vs OS 60.71%) and mortality (EVAR 41.67% vs OS 44.35%) remained high despite operative technique.

**Conclusion**
Since the introduction of endovascular techniques, there is an increasing rate of operative intervention, with significant short-term benefits in the elective setting. With persistent high mortality rates for emergency surgery we highlight the need for consideration of a national screening programme.

**Take-home message**
The short term benefits of EVAR are confirmed in a national population analysis. Outcomes in ruptured AAA remain poor and reinforce the potential benefit of a screening programme.

**O139 A UK PERSPECTIVE ON INDEPENDENCE AND MOBILITY FOLLOWING INFRA-INGUINAL LOWER LIMB BYPASS SURGERY FOR CRITICAL LIMB ISCHAEMIA**

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**Introduction**
Critical limb ischaemia (CLI) is a common condition associated with high levels of morbidity and mortality. To date, most work has focussed on surgeon-oriented outcomes such as patency, but there is increasing interest in patient-oriented outcomes such as mobility and independence. The aim of this project was to determine the effect of infrainguinal lower-limb bypass surgery (LLBS) on post-operative mobility in a UK tertiary vascular surgery unit, and investigate causes and consequences of poor post-operative mobility.

**Methods**
We collected data on all patients undergoing LLBS for CLI at our institution over a three-year period and analysed potential factors that correlated with poor post-operative mobility.

**Results**
Ninety-three index LLBS procedures were performed for patients with CLI during the study period. Median length of stay was 11 days (IQR 11 days). Twelve month rates of graft patency, major amputation and mortality were 75%, 9% and 6% respectively. Rates of dependence increased four-fold over the first post-operative year, from 5% pre-operatively to 21% at twelve months. Female sex and poor pre-operative mobility were predictive for poor post-operative mobility (P=.04 and P<.001 respectively), both initially and at twelve-month follow-up. Patients with poor post-operative mobility had significantly prolonged length of hospital stay (15 versus 8 days; P<.001).

**Conclusions**
Patients undergoing LLBS for CLI suffer significantly impaired post-operative mobility, and this is associated with prolonged hospital stay, irrespective of successful revascularisation. Further work is needed to better predict which patients will benefit from revascularisation and in whom a non-operative strategy is optimal.

**Take-home message**
Patients undergoing LLBS for CLI suffer significantly impaired post-operative mobility, and this is associated with prolonged hospital stay, irrespective of successful revascularisation. Further work is needed to better predict which patients will benefit from revascularisation and in whom a non-operative strategy is optimal.