



## The Vascular Societies' Annual Scientific Meeting 2023

In conjunction with the Vascular Society of Great Britain and Ireland, the British Association of Chartered Physiotherapists in Limb Absence Rehabilitation, the Society of Vascular Nurses and the Society for Vascular Technology of Great Britain and Ireland.

**22nd - 24th November 2023 | Convention Centre Dublin**

# ABSTRACT BOOK

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## BACPAR Oral Abstracts

BO1

### Healthcare Professionals' Experiences of Primary Lower Limb Prosthetic Rehabilitation during the Covid-19 Pandemic: A Qualitative Study.

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**Purpose:** The Covid-19 pandemic led to rapid service change within prosthetic rehabilitation due to necessity derived from the pandemic rather than evidence-based practice. These resulting changes impacted on prosthetic rehabilitation provided by physiotherapists and prosthetists for patients with a primary lower limb amputation (LLA). Therefore, this study aimed to explore the experiences of physiotherapists and prosthetists providing prosthetic rehabilitation to patients with a primary LLA during the Covid-19 pandemic in the UK.

**Method:** A qualitative study using semi-structured virtual interviews of eight participants who are qualified physiotherapists and prosthetists providing prosthetic rehabilitation to patients with a new lower limb amputation during the Covid-19 pandemic in UK.

**Results:** Three key themes emerged: 1) Prosthetic Rehabilitation Changes from Necessity and Social Responsibility, 2) Detrimental Impact on the Patient and 3) Personal Impact of Change.

**Conclusions:** The results of this study highlight how rapid change occurred within prosthetic rehabilitation due to necessity and social responsibility. These changes impacted both the patients with a primary LLA and the healthcare professionals. This study highlights how we can integrate what we learnt from the Covid-19 pandemic into clinical practice moving forwards.

BO2

## Limb loss; let's talk about it. The Glasgow experience.

Miss Laura Brady<sup>1</sup>, Mr Damien McGovern

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Having an amputation is a life altering event and often our patients and referrers are ill informed about life after amputation. This has resulted in patients attending our clinics with unrealistic expectations and inaccurate information. Our team recognised this and investigated different methods to help address these issues.

As a result, we now have an established pre amputation clinic where we are able to have open and honest conversations with patients prior to amputation, where possible. This clinic has proven to be particularly beneficial for patients who are considering amputation versus limb salvage in order to help them make an informed choice.

We have invested time in providing training sessions for our refers and AHP colleagues on how to approach earlier discussions about the possibility of amputation to ensure the information provided is accurate.

Through this process our team have had the opportunity to work more closely with our Orthopaedic, Oncology and Trauma colleagues which has improved patient pathways.

BO3

## Patient and stakeholder perspectives on routine health data collection, use and sharing: Foundations for data driven improvements in prosthetic care through a national data collection initiative

Ms Chantel Ostler<sup>1,2,3</sup>, Dr Maggie Donovan-Hall<sup>3</sup>, Dr Cleveland Barnett<sup>4</sup>, Miss Janet Riddell<sup>2</sup>, Dr Olga Maslovska<sup>3</sup>, Dr Richard Gomer<sup>3</sup>

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### Introduction

Healthcare data are often collected during prosthetic care. However, unlike some areas of healthcare, there is no formal, nationwide approach to data collection in the UK which could allow patients and clinicians to set goals, benchmark progress, and inform treatment options. There is a significant opportunity for patient benefit. However, it is important to understand patients and wider stakeholder views on data collection, use and sharing, before implementing any nationwide data initiatives.

### Methods

The project aims to inform the development of a nationwide patient-centred healthcare data initiative in prosthetic care. Data collection processes will be mapped with 3-5 UK limb centres, and multi-stakeholder perspectives on the value and barriers to data collection will be explored. A set of patient-centred recommendations for health data collection in prosthetic care will be developed.

### Results

This project has been funded by the NIHR Research for Patient Benefit programme and is due to start in March 2024.

### Conclusion

The project will lay the foundations for a data driven approach to prosthetic care in the UK. Recommendations can be used to inform data collection practice locally and will underpin a future funding application to develop and implement a nationwide data collection initiative.

BO4

## Claudication, outcome of a multidisciplinary clinic (MDC) as an alternative to initial consultant care.

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### Introduction

Claudication is the manifestation of symptomatic peripheral vascular disease, most obviously demonstrated by pain on walking in the calves. The accepted primary treatment is to provide a supervised exercise regime but these are known to be sparse in their provision.

### Methods

In order to meet the unmet needs for specific exercise advice our centre has established an MDC staffed by a Vascular CNS and specialist physiotherapist. This provides access to both comprehensive vascular and musculoskeletal assessments and provision of specialist exercise advice. The MDC allows triage into consultant clinics of only appropriate patients. Patients are subjectively and objectively assessed, ABPI's taken, 6 minute walk test and VASQOL completed.

Forty-five minute appointments consist of assessment, discussion, recommendation and referrals for best medical treatment, smoking cessation, exercise advice (self-directed/App/supervised), differential diagnosis considered and referral to other services actioned on the day where appropriate; vascular imaging, MSK physio, strength and balance classes, falls referrals, venous team etc.

### Results

Summary of preliminary results in table 1.

### Conclusion

The clinic frees up valuable consultant clinic appointments, provides a comprehensive assessment and triages non-claudicants to an appropriate non-vascular treatment pathway reducing pressure on GP's. We believe this can be replicated in other centres.

BO5

## The impact of a pre-amputation therapy service on function and acute length of stay following major amputation

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### Background:

Lower limb amputation is a life changing surgery, which may lead to poor functional outcomes, lengthy hospital admission, need specialist rehabilitation and requires adaptive equipment to promote independence. These often cause delays in hospital discharge. A pre-amputation therapy (PAT) service was implemented to provide early therapy input to patients at risk of major amputation, aiming to reduce length of stay (LOS) and improve function.

### Methods:

Data was collected over a 12-month period from PAT referred patients between April 2022 and April 2023. LOS and functional independence, day one post-amputation and on discharge (measured using Barthel index) were compared with data from patients who hadn't been referred to PAT (controls).

### Results:

Nine patients were referred for PAT, LOS was significantly lower,  $p < 0.01$ , ( $8.1 \pm 5.2$  days) compared with ( $23.4 \pm 19.5$  days) for 46 control patients. Those referred for PAT had significantly higher Barthel scores at day one post-amputation ( $68.7 \pm 17.26$ ,  $p < 0.01$ ) and on discharge ( $91.4 \pm 7.5$ ,  $p < 0.01$ ) compared with control group respectively ( $31.67 \pm 22.40$ ;  $58.5 \pm 29.3$ ).

### Conclusion:

PAT significantly reduces acute hospital LOS and may improve functional outcomes immediately after amputation and on discharge. A larger sample and health-economic evaluation is now required to influence decision makers.

BO6

## Co-designing storytelling training with and for therapists to support rehabilitation following lower limb amputation: A Delphi study.

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An 8-year collaboration between St Mary's University and the rehabilitation team at Queen Mary's Hospital has led to the production of narrative resources that are used to support professional practice and patient recovery after major lower limb loss.

However, these resources were crafted to meet healthcare professionals' (HCPs) needs in one specific setting. The motivation for, format and content of resources to support healthcare professionals use of storytelling within other limb loss rehabilitation environments, is unknown. Therefore, this research team aimed to work with HCPs to create storytelling training representative of the experiences across the UK and Ireland. To do this, a Delphi study was conducted to explore therapists' perceptions what would best support them in using patient stories. This Delphi study consisted of three online questionnaires with the goal of reaching a nationwide consensus on the content, format and delivery methods that would help them to utilise narratives within their environment.

Fifty-two physiotherapists ranging from Band 5 to Therapy Team Leads across the UK and Ireland returned the first questionnaire. The aim of the presentation is to discuss these initial findings and show how the responses have been used to directly inform the later questionnaires, and final resources developed.

BO7

## The Blatchford Allman Russell tool predicts prosthetic success post major lower limb amputation among frail and non-frail groups.

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### Introduction

The BLARt is a predictive tool for prosthetic success at 12 months post major lower-limb amputation (MLLA). The lower the score the higher the chance of prosthetic success. The tool does not include a frailty measure.

Frailty is described as a physiological decline in reserves and function which reduces the ability to cope with every-day or acute stressors. Vascular patients who are frail on the Edmonton frailty scores (EFS) are likely to have worse outcomes post-surgery.

### Aim

To evaluate frailty and BLARt scores within a MLLA cohort to determine trends and mobility outcomes including any impact of frailty.

### Method

Prospective data collection of BLARt, EFS and mobility outcomes at 12 months were obtained (n = 150).

BLARt scores are split into 3 categories  $\leq 13$ , 14-21,  $\geq 22$ .

An EFS score of  $\geq 7$  is deemed as frail.

### Results

Frail patients were less likely to have prosthetic success at 12 months; 51% categorised as non-frail, compared to 31% of frail patients. Among frail patients scoring  $\leq 13$  on the BLARt, 67% were successful with a prosthesis at 12 months.

Average BLARt and EFS scores for patients with MLLA have both increased since 2019.

### Discussion

The BLARt shows good predictive use regardless of frailty.



BO8

## Face-to-face therapy significantly improves functional independence, reduces length of stay and promotes discharge home after major amputation

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Background:

The provision of vascular services (2021) document recommends patients receive one hour of daily face-to-face therapy, within a gym setting, as part of their rehabilitation following major amputation.

Method:

Amount and location of therapy sessions for the first 4 weeks post-amputation surgery, length of stay (LOS), and functional independence at discharge (measured using the Barthel index) were recorded over a 4-month period.

Results:

Data for 51 patients was available. Patients received a mean of 02:41±00:49hrs of therapy per week and 0.5±0.84hrs gym sessions. Patients who received 2-3 hours (31.85±16.91) and 3+ hours (35.96±17.01) of therapy per week had a statistically significant ( $p<0.01$ ) improvement in Barthel score compared to patients receiving 0-2 hours (16.6±17.80). Average LOS was statistically significantly lower for those receiving more therapy (0-2hrs: 32.7±25.99, 2-3hrs: 23.63±12.75, 3+ hrs: 17.65±9.91 days;  $p<0.05$ ). Ninety-one percent of patients receiving 3+ hours of therapy were discharged home compared to 56% receiving 0-2 hours.

Conclusion:

Patients who receive more inpatient therapy showed larger improvement in functional independence, a lower LOS and are more likely to be discharged home from hospital.

## SVN Oral Abstracts

### Qualitative exploration of the care pathway for patients with venous leg ulceration

Miss Layla Bolton Saghdaoui<sup>1</sup>, Miss Smaragda Lampridou<sup>1</sup>, Ms Sarah Onida<sup>1</sup>, Dr Rachael Lear<sup>1</sup>, Professor Alun Davies<sup>1</sup>, Professor Mary Wells<sup>1</sup>

<sup>1</sup>Imperial College Healthcare Nhs Trust / Imperial College London, ,

Introduction: Venous ulceration (VU) guidance recommends early application of compression therapy and referral for specialist assessment by a vascular service within two weeks. Unfortunately, only a small proportion of eligible patients receive timely assessment and referral.

Methods: Semi-structured interviews with nurses were conducted to explore their experiences caring for and referring patients with VU to see a vascular specialist. QSR N-VIVO was used for inductive thematic analysis of verbatim transcripts.

Results: Eighteen nurses, representing primary and secondary care, participated. Six themes emerged: 'MDT Working; Communication; Organisational Limitations; Skills and Confidence; 'The Cinderella Condition'; Self-management. While equally significant, all themes interlink. Gaps between primary and secondary care are amplified by poor MDT collaboration, ineffective communication systems and organisational limitations, including inadequate data sharing. Staff shortages and limited training opportunities mean junior nurses lack knowledge and confidence in providing care. This encourages 'task-based' rather than holistic care. To address staff shortages, support for self-management is seen as a positive way forward. Overall, staff acknowledged that VU is not prioritised in the context of other competing conditions and pressures.

Conclusion: Both organisational and behavioural barriers impact nurses' ability to provide care. These barriers must be addressed when attempting to develop care pathways.

## Patient-reported outcome measures (PROMs) study using the AneurysmDQoL tool to determine abdominal aortic aneurysm (AAA) quality of life (QOL) in patients preoperatively and postoperatively.

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### Aims:

To determine the impact of AAA on patients' QOL. To ascertain which treatment stage has the greatest impact on the QOL of the patient, to help guide service development and to improve AAA patient care.

### Methods:

Prospective quantitative snapshot study of patients with a diagnosed AAA. Fifty randomly selected patients at a set point in time: surveillance (AAA 3-5.5cm), preoperatively, postoperatively: 6 weeks, 6 months, and 12 months. AneurysmDQoL tool assesses the impact and importance of 22 life domains applicable to each individual to calculate an Average Weighted Impact score (AWIs: range -9 maximum negative impact to +3 maximum positive impact of AAA/AAA treatment on QOL). Questionnaires were sent to patients and returned anonymously.

### Results:

Overall response rate was 40%. Surveillance patients had a negative AWI score (-1.43). The greatest negative impact was in the pre-operative stage (-2.13) with continued impact at 12 months postoperatively (-1.45). The most negatively impacted domain for surveillance patients was anxiety (-2.94), whereas 12 months postoperatively, the greatest negative impact was the general health domain (-2.60).

### Conclusions:

Having an AAA negatively affected the QOL of patients at all stages. Added vascular nurse support at all stages could help to reduce AAA impact on QOL.

# Barriers and facilitators to adherence to guideline-recommended therapy in patients with peripheral artery disease: A qualitative study

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## Introduction:

Adherence to peripheral arterial disease (PAD) treatment remains low, despite its benefit on secondary disease prevention. Currently, there is limited evidence investigating perceptual and practical barriers to treatment adherence.

## Methods:

PAD patients, at different stages of their diagnosis and with different adherence levels, took part in semi-structured interviews. Interviews were transcribed verbatim and inductive thematic analysis was performed.

## Results:

Twelve PAD patients participated. Overarching perceptual barriers included the lack of individualised care and information regarding treatment necessity. Patients reported being stuck between clinical appointments with no one addressing their concerns, perceiving “PAD as an existence, not a life”. Some patients reported not being “a medication person”, whilst others indicated that “my tables must be doing the job, as I am still here”. All smokers concluded that quitting smoking is a “mind-matter”, with some patients believing that personalised strategies would facilitate abstinence. Practical barriers included complex medication regimens, claudication pain and comorbidities. Family and friends' support and fear of amputation were seen as adherence facilitators.

## Conclusion:

Patients expressed a lack of support and a need for detailed information and individualised care. Future research should focus on improving treatment understanding, addressing claudication pain management, and aiding smoking cessation to enhance adherence.

# Identifying which cohort of intermittent claudication patients benefit most from supervised exercise therapy and potential predictors of future revascularisation

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## Background

NICE guidelines recommend patients with intermittent claudication receive supervised exercise therapy (SET) before revascularisation is considered. However, SET is unsuccessful in approximately 15% of patients. We compared patients who received SET with those who received SET and went onto have revascularisation to identify which patients were most likely to benefit from SET.

## Method

Retrospective data was collated for 144 patients (42 female) who received SET between 2016-2020. There were 38 people with diabetes and 48 smoked. Demographics, Pain Onset Distance (POD) and surgical intervention (prior and post completion of SET) were documented.

## Results

Patients who had >50% improvement in POD ( $p=0.06$ ) were less likely to require revascularisation but this was not significant. However, those who had a 100% improvement in POD were significantly less likely to receive revascularisation ( $P<0.05$ ). Gender, diabetes, and age did not infer likelihood of preventing revascularisation. Smokers and those who received previous intervention benefited greater from SET which had preventative effects on subsequent revascularisation ( $p<0.05$ ).

## Conclusion

People who completed SET had a significantly lower likelihood of going on to further surgery. Patients who saw a 100% or more improvement in POD were less likely to require revascularisation post SET. Smokers significantly benefitted from SET.

## The workload of a vascular nurse specialist in a "spoke" hospital

Ms Marida Perez-Miranda<sup>1,2</sup>, Mr Arsalan Wafi<sup>1</sup>, Miss Marina Kafeza<sup>1,2</sup>, Mr Michael Robinson<sup>1,2</sup>, Mr Michael Dialynas<sup>1,2</sup>, Mr Ashish Patel<sup>1,2</sup>

<sup>1</sup>King's College London & Guy's & St Thomas' NHS Foundation Trust, , UK, <sup>2</sup>Dartford and Gravesham NHS Trust, Kent, UK

### Background

The aim of this study was to analyse the care provided by a vascular clinical nurse specialist (CNS) managing patients in a "spoke" hospital.

### Methods

A prospectively maintained database of all admitted patients who received CNS-led care in a single spoke centre (within a hub and spoke network) between 2021-2022 was analysed.

### Results

522 patients received CNS-led care; 58% male and 48% female. Median age was 78 years [range 23-99]. The primary reason for hospitalisation was non-vascular in 60% and vascular in 40% of cases. Vascular referrals included lower limb (56% peripheral arterial/diabetic foot disease, 14% venous), aortic (9%), carotid (4%), upper limb (2%) and other (15%) cases. The initial vascular review was performed by a CNS in 17%, by a consultant surgeon in 48% and by both in 36% of cases. 7% of patients received palliation and 8% conservative treatment after being deemed too unfit for surgery (with significantly higher frailty scores compared with those deemed fit). Only 7% were transferred acutely to the vascular hub for immediate management.

### Conclusion

Vascular CNS-led care in spoke hospitals involves high patient turnover with the majority not needing immediate transfer. CNS-led care is, therefore, an essential service in centralised vascular practices.

## Illness Perceptions in patients with Peripheral Arterial Disease

Mrs Smaragda Lampridou<sup>1,2</sup>, Miss Layla Bolton Sagdhaoui<sup>1,2</sup>, Mr Majd Rawashdeh<sup>1,2</sup>, Professor Mary Wells<sup>1,2</sup>, Professor Alun Huw Davies<sup>1,2</sup>

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### Background:

Understanding patient beliefs is vital for treatment decisions. Limited data on PAD patients led to this pilot study exploring illness perceptions and their association with sociodemographic and clinical factors.

### Methods:

PAD patients attending a large London hospital Outpatient Clinic completed the validated Brief Illness Perception Questionnaire (B-IPQ), which includes nine items related to the Common-Sense Model of illness representations. Descriptive statistics, independent sample tests and ANOVA were performed using SPSS.

### Results:

105 patients (73.3% male, mean age 69.5 years) were included. The highest scoring B-IPQ domain was timeline, whilst the lower scoring domain was personal control. Among older patients (>80), consequences and emotional distress were lower ( $p=0.023$ ,  $p=0.015$ ). Newly diagnosed patients perceived their condition as acute rather than chronic ( $p=0.022$ ). Health literacy showed associations with consequences, coherence, and emotional representation, favouring university graduates ( $p=0.008$ ,  $p=0.024$ ,  $p=0.009$ ). Smoking history correlated with reduced personal control ( $p=0.013$ ). Patients with maximum walking distance <100m experienced more impact on consequences ( $p<0.001$ ), treatment ( $p=0.002$ ), personal control ( $p=0.018$ ), identity ( $p=0.001$ ), concerns ( $p<0.001$ ), and emotional distress ( $p<0.001$ ). Patients with diabetes and depression had higher concern ( $p=0.033$ ) and lower personal control levels ( $p=0.011$ ) respectively.

### Conclusions:

Clinical decision-making and interventions aimed to address illness perceptions should consider these factors.

## SVT Oral Abstracts

### Case Study: Acquired Arterio-Venous Fistula following Deep Vein Thrombosis

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#### Background

Acquired arterio-venous fistula (AAVF) following deep vein thrombosis (DVT) is uncommon, and the pathogenesis of its formation remains unclear.

#### Case Presentation

A 78-year-old male presented to ambulatory care with left leg swelling and a previous history of left ileo-femoral DVT 12 months prior. A lower limb DVT scan demonstrated chronic occlusive thrombus in the popliteal and distal femoral vein (FV) and partial thrombus extending from the proximal FV to the external iliac vein. The waveform in the patent channel was pulsatile, arteriased flow, consistent with an AV fistula. A connection was seen between the proximal common femoral artery and the sapheno-femoral junction, however, there was no history of vascular access via the groin, excluding iatrogenic injury as a cause.

#### Review

A literature analysis revealed three documented cases of AAVF following DVT with similar presentations. The pathogenesis remains unclear, however, factors such as venous hypertension, hypoxia, shear stress, inflammation, angiogenesis, and neovascularisation are thought to contribute to AAVF formation. Treatment options include stenting and embolisation.

#### Conclusion

This presentation is rare, with very few reports of AAVF in DVT patients. AAVF following DVT should be considered in patients with long-standing symptoms that cannot be explained by recurrent DVT or post-thrombotic syndrome.



## Creating and delivering a scientist and nurse-led supervised exercise programme at St George's hospital, London.

Mr Rhodri Furlong<sup>1</sup>, Miss Elizabeth Gibson<sup>1</sup>

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The benefits of supervised exercise therapy for patients with intermittent claudication are far reaching and widely acknowledged. Despite this, the delivery of this service is under utilised within NHS hospitals despite being recommended as the initial management strategy for all claudicants as per NICE and global vascular guidelines.

This presentation will discuss how a supervised exercise programme was created and delivered by a Vascular Scientist and Vascular Clinical Nurse Specialist at a tertiary hospital in London, with specific focus on the logistical challenges that were presented and overcome. Data of a 3-month pilot will also be reported.

# Accuracy of Doppler Ultrasound in Assessing Below Knee Arteries: A Comparative Study

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Purpose: To assess the accuracy of Doppler US in assessing below knee arteries in patients with Peripheral Arterial Disease (PAD) for whom cross-sectional imaging was deemed necessary for further management.

Method: Adult patients diagnosed with PAD who had Doppler US at a tertiary hospital between September 2021 to September 2022 were followed up. Patients who had Magnetic Resonance Angiography (MRA) before intervention were included. Below knee individual vessels were compared. Sensitivity, specificity, negative and predictive values of Doppler US compared to MRA were assessed.

Results: A total of 560 patients with suspected PAD had Doppler US and 68 (12.1%) had MRA before intervention. A total of 93 limbs were assessed. Overall sensitivity, specificity, negative and positive predictive values were 76.19%, 43.13%, 68.75%, and, 54.45% respectively. DUS sensitivity and specificity for peroneal artery were 81.57% and 55.35% compared to 92.00% and 88.37% for anterior tibial and 85.41% and 84.44% for posterior tibial arteries. Overall accuracy in non-diabetics was twice of those with diabetes.

Conclusion: Doppler US is a valuable tool for assessing below knee arteries. It has high sensitivity and specificity for Anterior and posterior tibial arteries but less for peroneal artery. Diabetes is the main patient risk factor causing inaccuracies.

## A retrospective study assessing the clinical significance of pre-operative carotid ultrasound screening prior to cardiac surgery.

Miss Anice Aidi<sup>1</sup>

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Carotid disease is a risk factor for stroke during/after cardiac surgery. Therefore, all patients are scheduled for a carotid ultrasound scan for the detection of carotid artery stenosis (CAS) as part of their surgical work-up. This study aims to address if it is necessary to scan all patients and if there is potential to identify certain factors which can be used to screen only those at high-risk of CAS.

962 patients who had a scan prior to cardiac surgery from 2017- 2022 were retrospectively reviewed. The prevalence of CAS and their surgical follow-up was recorded. Statistical analyses were conducted on 2 risk factors (sex and age) to determine if there was an association with the presence of CAS (>50%).

The results showed a low prevalence (12.3%) of patients that had CAS and of this, a high proportion (84%) of these patients who were not treated for their CAS prior to cardiac surgery, despite the extent of their disease. Males and those  $\geq 65$  years old were found to be significant independent predictors for patients having CAS.

Selectively screening only high-risk patients reduces the screening load and has the potential to save the NHS time and resources from unnecessary scans.

# Open repair (OR) Abdominal Aortic Aneurysm (AAA) patients provide additional insights into their post-operative inpatient care compared to those undergoing endovascular aneurysm repair (EVAR)

Miss Anna Corby<sup>1</sup>, Mr Klaus Bond<sup>1</sup>

<sup>1</sup>Oxford University Hospitals NHS Foundation Trust, ,

## Introduction

This study aimed to understand the post-operative inpatient experiences of patients undergoing open (OR) and endovascular (EVAR) repair for AAA at this Trust, as few studies have previously investigated this element of the AAA patient pathway.

## Methods

This was a mixed-methods prospective service evaluation. 37 patients completed a qualitative questionnaire and the quantitative PPE-15 questionnaire. Six patients were selected for additional semi-structured interviews. The qualitative questionnaire and interview transcripts were analysed thematically. Pearson's chi-squared test was used to test differences in the proportion of patients reporting problems for each PPE-15 question.

## Results

Five themes were common across intervention groups: active participation, gratitude, the hospital environment, communication with staff and confidence in staff. OR patients generated additional unique subthemes: patience, feeling lucky, fear of infection, links to the outside and self-advocacy. PPE-15 responses across both intervention groups suggested improvements could be made in information provision, particularly regarding possible adverse events and medication side effects.

## Conclusion

OR patients have additional insights compared to EVAR patients about their inpatient experience. Furthermore, aspects of the hospital environment and information provision have been identified for improvement which could contribute to enhanced experiences for future AAA patients at this Trust.

# Reflections of setting up a new service in the NHS; The impact of Walk-in Ultrasound Imaging for GCA patients

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Giant-cell-arteritis (GCA) is a large vessel vasculitis comprising of cranial-and-extracranial disease. Vascular complications are due to delay in diagnosis and initiation of effective treatment.

Primary reports on potential applicability of Duplex Ultrasound (US) for the diagnosis of GCA dates back to 1997, yet the formal international consensus was published in 2018 outlining imaging guidelines with the description of the 'halo sign'. Since then, the gold-standard Temporal-Artery-Biopsy is being replaced with US, which has shown to have a higher diagnostic yield, more cost-effective, and a positive prognostic impact.

The aim is to present the impact in our NHS Trust of the walk-in Vascular-imaging service for the GCA pathway. The periods in review are the trial period; March-2017 to March-2019 and implementation phase; September-2020 to Present. During the trial phase, a total of 65 patients were scanned, and 124 Duplex scans were performed during the implementation stage. Data are presented on referral patterns, demographics, diagnostic tests, and outcomes for this period of the service.

Consequently, the introduction of fast-track clinics for the urgent referral of patients to be assessed clinically and with US has significantly reduced the rate of permanent visual loss compared to standard clinical practice.

# An unusual case of ultrasound-proven occipital GCA: disproving the misnomer of Temporal Arteritis

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Giant Cell Arteritis (GCA) is the most common form of vasculitis. It affects medium to large arteries with a granulomatous-type inflammation of the vessel wall and can lead to blindness and stroke. GCA is commonly known as temporal arteritis (TA); TA is a misnomer, as GCA can affect vessels outside of the temporal arteries. Temporal Artery Biopsy (TAB) has long been considered the gold standard in diagnosis of the condition. Ultrasound is now proven to be a useful tool in non-invasive diagnosis of GCA; the ultrasound appearance of GCA is a 'halo' (circumferentially thickened and hypoechoic vessel wall). Standard protocol suggests evaluation of the bilateral axillary arteries as well as the bilateral common superficial temporal arteries (STA) and its frontal and parietal branches (1).

We present an unusual case of a patient presenting initially with occipital pain and 'lumpiness'; corresponding ultrasound showed a halo of the occipital arteries (Figure 1) as well as the STAs and their branches (but more significant in the occipital arteries). This case indicates that occipital arteries should be imaged for those patients presenting with occipital pain, and that GCA is a more appropriate nomenclature than TA for the disease.

## References

1. British Medical Ultrasound Society. Guidance for Giant Cell Arteritis Ultrasound and Service Provision: Recommended Practice Guidelines. UK 2021.

## Differences in duplex ultrasound measurement of Carotid artery blood flow velocity measurements with the subject supine versus seated up-right when performed by accredited vascular scientists.

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### BACKGROUND:

Percentage internal carotid artery (ICA) stenosis using duplex ultrasound (DUS) grading criteria is underpinned by substantial clinical trials. Careful haemodynamic measurement, including ICA peak-systolic velocity (PSV) and end-diastolic velocity (EDV), are critical for accurate stenosis decile reporting. The clinical trials performed DUS with patients supine. There is minimal evidence velocity criteria apply to the seated patient, which is often necessary due to co-morbidities. This study measures haemodynamic differences based on patient position.

### METHODS:

PSV and EDV within the common carotid and ICA in 31 symptomatic TIA patients (41 stenoses) was measured using DUS in both supine and seated positions. Stenoses were graded as per SVT guidelines and blinded inter-observer differences were measured.

### RESULTS:

There was no significant mean difference ( $6.4 \pm 38.8$  cm/s,  $p=0.2245$ ) comparing PSV between position. Mean EDV difference was significantly lower in seated patients ( $12.9 \pm 82.5$  cm/s,  $p < 0.05$ ). One patient recorded a lower stenosis decile as a result. Inter-observer agreement for PSV and EDV in both positions correlated excellently ( $r=0.97, 0.95, 0.95$  and  $0.88$ ) with minimal mean differences.

### CONCLUSION:

Changes in haemodynamics reduces velocity criteria accuracy and may impact management decisions in patients who are borderline for intervention. Scientists should consider this measurement error when grading stenoses with patients seated.

## Is Blue-Dop an accurate screening tool for determining the presence of Peripheral Arterial Disease?

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Ankle-brachial pressure measurements (ABPIs) are increasingly used in community to assess for the presence of peripheral arterial disease (PAD). Results are both operator and equipment-dependent as well as being limited by patient compliance and arterial calcification.

BlueDop through a complex mathematical analysis of the transmitted Doppler waveform provides a cuff-free method of measuring ABPIs. The aim of this study was to compare ABPIs measurement using Blue-Dop and Falcon-Pro.

A total of 142 patients were studied. There were 44 females and 98 males. Age ranged from 29-91yrs with a mean of 68yrs. Almost one-third were current smokers and just under a third were diabetic.

We excluded calcified vessels from analysis leaving 225 limbs for comparison. We compared the higher of the two ABPI measurements for each leg and defined it as normal or abnormal. The overall findings are illustrated in Table 1:

These results yield a sensitivity of 89% and a specificity of 72% for BlueDop with a positive predictive value of 63% and a negative predictive value of 93%. Overall accuracy was 78%.

These findings support the role of BlueDop as a screening tool for PAD. Further work is required to determine its role in the presence of arterial calcification.



## Crural-to-Crural/ Pedal bypasses: a reasonable alternative in challenging cases and times

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### Introduction:

Distal and pedal bypasses origination from femoral and popliteal artery as inflow has been well documented. The aim to assess outcomes using Crural vessels as inflow for Crural and Pedal bypasses.

### Methods:

Retrospectively analysis of all patients who underwent Crural-Crural/Pedal bypasses (2015-2022). Primary end points were 30-day mortality, limb salvage and graft patency rates.

### Results:

A total of 41 cases presented with critical limb ischemia. Mean age 66 years (40 -87). Indication was; Ischemic rest pain (3), tissue loss (15), with gangrene (21) Acute on chronic ischemia in 1 and trauma in 1. The incidence of Diabetes mellitus, chronic kidney disease and Ischemic heart disease were 90%, 39% and 50% respectively. Two needed Immediate Hybrid II angioplasty to the plantar arch ending with ruptured anastomosis and 1 had failed bypass attempt due occluded runoff, All 3 were excluded from analysis. 12 cases were performed under Local anesthetic. The 30-day mortality was 0% and limb salvage rate was 100%.

Primary and secondary patency rates at 1 year were 57% and 83%.

### Conclusion:

Crural-Crural/Pedal bypass is a feasible and reliable option in selected patients. Medium term results showed good outcome with good patency and high limb salvage rates.

## An audit to determine whether patients at Cambridge University Hospitals receive two forms of carotid imaging pre-operatively when carotid endarterectomy is being considered, in line with the European Society for Vascular Surgery 2017 Clinical Practice Guidelines

Miss Emily Alderson<sup>1</sup>

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European Society for Vascular Surgery (ESVS) guidelines recommended patients who undergo carotid endarterectomy (CEA) receive two forms of pre-operative carotid imaging. This audit aimed to assess compliance with the ESVS pre-CEA imaging guideline at Cambridge University Hospitals (CUH), identify reasons for non-compliance and implement strategies to improve.

Patients who underwent CEA between 1st January 2019 and 31st December 2021 at CUH were retrospectively identified. Pre-operative carotid imaging data were collected from each patients' hospital record and percentage compliance with the guideline was calculated. Reasons for non-compliance were explored. Strategies to improve compliance were developed and implemented. A re-audit of patients receiving CEA between 1st July 2022 and 31st December 2022 measured the efficacy of interventions.

86.3% of patients in the initial audit complied with the pre-CEA imaging guideline. There was no singular explanation for non-compliance. Therefore, universal points and key clinicians in the patient pathway were identified to enable the development of a multifaceted intervention. There was 100% guideline compliance in the re-audit, this was a statistically significant improvement compared to the initial audit ( $p=0.006$ ).

Implementation of a multifaceted CEA pathway intervention successfully improved guideline compliance at CUH without requiring changes to staffing, working pattern or equipment.

# The impact of contrast-enhanced ultrasound on 5-year outcomes in patients under EVAR surveillance

Mr Joao Carreira<sup>1,2</sup>, Mr Usman Ammar<sup>2</sup>, Prof. Georgios Antoniou<sup>2,3</sup>, Prof. Frank Bowling<sup>2,3</sup>, Dr Steven Rogers<sup>2,3</sup>

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## Introduction:

In EVAR patients, computed tomography angiography (CTA) and contrast-enhanced ultrasound (CEUS) are different imaging modalities utilised for advanced definitive diagnostics when duplex ultrasound suspects a presence of endoleak or remnant aneurysm sac growth.

## Methods:

Retrospectively comparison over a 5-year period of patient's whom received either CTA-first versus a CEUS-first imaging as definitive diagnostics when suspected endoleaks or growth is identified. Outcomes were, early, mid, and late re-intervention, survival rate (all cause and AAA), rupture, and sac behaviour.

## Results:

Data was available for 178 patients (CEUS=129) with 42% still to reach 5-years post definitive diagnostics. Age ( $86\pm 6.6$  vs  $87\pm 7.5$ ), gender (female 15.5% vs 20.4%) and traditional cardiovascular risk factors were comparable across CEUS and CTA groups respectively. AAA-related mortality was not statistically different between groups. CEUS had a lower all-cause mortality (CEUS=36%, CTA=45%) but this was not significant. Re-intervention rates were not statistically different between groups (32% vs 31%) but CEUS identified significantly more type 2 endoleaks (73% vs 41%).

## Conclusion:

Both groups had comparable all-cause, AAA-related mortalities and reintervention rates. Higher CEUS detected type 2 endoleaks, but similar reintervention rates, may represent a cost saving through reduced need for CTA as some patients are streamlined to 6-monthly duplex surveillance.

# Service evaluation of an ultrasound service for renal artery stenosis

Miss Alexandra Croucher<sup>1</sup>, Mr Ben Freedman<sup>1</sup>, Dr Jonathan Dick<sup>1</sup>

<sup>1</sup>King's College Hospital NHS Foundation Trust, London, England

## Introduction:

The STAR, ASTRAL and CORAL randomised control trials are a weight of evidence in favour of medication alone over revascularisation for the vast majority of patients with native renal artery stenosis (RAS). The lack of evidence supporting intervention combined with an anecdotal low positive finding rate and even lower intervention rate justified a service evaluation with a view to improving referral criteria for renal artery duplex scans.

## Methods:

All renal artery duplex scans performed in 2022 were retrospectively reviewed and analysed by outcome and referrer specialty. Positive findings were defined by a maximum PSV of >1.8m/s and/or damped intrarenal waveforms.

## Results:

Out of 930 performed scans: 651 were negative; 45 could not assess for RAS due to poor views of the renal arteries and kidneys; 190 found no severe stenosis but could not exclude moderate stenosis; and 42 were positive. Of these patients, only two had angioplasty. The largest contributing referring group was Renal Medicine (27%), followed by General Internal Medicine (24%), Cardiology (10%), and Acute Internal Medicine (<10%).

## Conclusion:

There is potential to streamline the service by improving patient selection for renal duplex scans. Referral criteria which selects for patients phenotypes that improve after revascularisation could be introduced.

# A Comparison of Duplex Ultrasound and Computed Tomography Angiography in the Assessment of Internal Carotid Artery Stenosis Classification and Plaque Morphology: A Single-Centre Audit

Ms Lizzie Washak<sup>1</sup>

<sup>1</sup>Guy's and St Thomas' NHS Foundation Trust, ,

Background: Accurate and timely carotid imaging is essential for effective stroke prevention. This study aims to assess the agreement between Duplex Ultrasound (DUS) and Computed Tomography Angiography (CTA) when evaluating Internal Carotid Artery (ICA) stenosis and plaque morphology classification and whether DUS operator expertise affects agreement.

Methods: 300 ICA from 150 patients who received DUS and CTA over a 24-month period were retrospectively analysed. The degree of ICA stenosis and plaque morphology descriptions were collected from imaging reports. Stenoses were graded by the North American Symptomatic Carotid Endarterectomy Trial criteria and classified as non-significant (0-49%), significant (50-99%) or occluded (100%).

Results: The study showed strong Kappa agreement ( $k=0.83$ , 95% CI:0.76-0.89) between DUS and CTA in stenosis classification and minimal Kappa agreement ( $k=0.40$ , 95% CI:0.29-0.51) in plaque morphology classification. Eleven DUS users had varying agreement ( $k=0.52-1.00$ ). There was no significant difference in agreement between experienced and less experienced users ( $k=0.81$ , 95% CI:0.73-0.89) and ( $k=0.80$ , 95% CI:0.67-0.92) respectively.

Conclusion: The detection of significant and non-significant ICA stenoses assessed by DUS strongly agrees with CTA, whilst evaluation of plaque morphology has poor agreement. Overall, departmental carotid DUS imaging is being performed adequately at all skill levels and to standards comparable in published literature.

## A local evaluation of the fistula intervention timeline

Miss Jeny Anton<sup>1</sup>, Mr Ben Freedman<sup>1</sup>, Mr Raghvinder Gambhir<sup>1</sup>

<sup>1</sup>King's College NHS Trust, London, U.K.

### Introduction:

Fistulas are essential in maintaining a kidney patient's life, however they often require intervention to maintain patency. Current guidelines recommend early treatment of failing fistulas as delays in intervention can lead to loss of access. Our aim was to establish waiting times between identifying significant stenosis or thrombus on duplex scan to intervention.

### Method:

Our study retrospectively reviewed all patients with a red-coded fistula report by the Vascular Lab in 2022 to then establish waiting times for an intervention.

### Results:

We identified 293 red-coded reports in 2022. Of these, 203 (69%) patients received an intervention and the average waiting time for an intervention was 27.7 days. 7 (3%) patients received an intervention on the same day as the red-coded report.

90 (31%) patients didn't receive any intervention due to a number of reasons such as unsuitability for any intervention, still had reasonable volume flow or the fistula blocked before elective surgery. In fact 16 (18%) patients with no intervention progressed to a thrombosed fistula.

### Conclusion:

Although early intervention is recommended, patients are currently waiting a long time for treatment and therefore improving the time taken between identification of stenosis and treatment might reduce the number of thrombosed fistulas.

## VS Oral Abstracts (Aortic, Trauma)

VO59

### Implementation of a standardised 23-hour EVAR pathway for eligible patients can decrease length of stay and improve costs

Miss Maria Nicola<sup>1</sup>, Miss Anna Pouncey<sup>1</sup>, Mr Edmund Charles<sup>1</sup>, Mr Guy Martin<sup>1</sup>, Dr Manuel Gomes<sup>2</sup>, Professor Janet Powell<sup>1</sup>, Mr Colin Bicknell<sup>1</sup>

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#### Background

23-hour EVAR is feasible, yet it has not been widely adopted in the UK. In this study, we aim to assess eligibility and quantify the effects of a standardised 23-hour EVAR pathway on length of stay (LOS) and cost.

#### Methods

We conducted a 23-hour EVAR pilot where admission/treatment protocols were implemented for eligible patients. Results were compared with EVAR data from patients undergoing EVAR during 2017-2018. Demographic, operative, perioperative and cost data were collected. Key outcomes were LOS (primary); eligibility; and cost (secondary outcomes).

#### Results

13 patients met the eligibility criteria for the 23-hour pilot. The historical cohort included 35 patients who underwent elective endovascular repair. Of these patients, 19 (52.8%) met the eligibility criteria for 23-hour EVAR admission. Compared to controls, planned 23-hour cases had a significantly shorter median LOS (1.3 [IQR 0.7] vs 3.0 [IQR 3.0] days;  $p < 0.05$ ). The acute hospital median cost of EVAR was 27.5% lower (£12,682 [IQR £5,755] vs £17,493 [IQR £7,258];  $p < 0.05$ ).

#### Conclusion

With approximately 1200 eligible patients yearly across the NHS, 23-hour EVAR can significantly decrease LOS, improve acute costs and increase AAA repair capacity.

VO60

## The association between 17 CardioPulmonary Exercise Testing (CPET) parameters and mortality following AAA repair.

Mr Adam Haque<sup>1</sup>, Dr Angella Bryan<sup>1</sup>, Dr Tanviha Quraishi-Akhtar<sup>1</sup>

<sup>1</sup>University Of Manchester/Manchester University Nhs Foundation Trust, Manchester, United Kingdom

### Background

Cardiopulmonary Exercise Testing (CPET) is an established method of risk stratifying patients prior to abdominal aortic aneurysm (AAA) repair. Published data thus far suggests absolute figures for peakVO<sub>2</sub>, Anaerobic Threshold (AT) and Ventilatory Equivalents for CO<sub>2</sub> (VE/VCO<sub>2</sub>) are predictive of peri-operative and long-term survival. However, there are numerous other parameters which should be predictive but have not yet been researched. Furthermore, the traditional use of absolute values is questionable when expected parameters are dependent on age, sex, height, weight and ethnicity.

### Methods

CPET data from 1500 patients who had undergone AAA repair over the last 15 years across 2 hospitals were analysed to assess for association with peri-operative and long-term survival, including both absolute and relative values. A ROC analysis was also performed on the traditionally-reported CPET measures to inform the predictive absolute values.

### Results

15 of 17 CPET parameters were significantly associated with 30-day mortality, 9 with 90-day mortality, 13 with 1-year mortality and 15 with 3-year and 5-year mortality. 30 day mortality was best predicted by peakVO<sub>2</sub> of 14.65ml/kg/min, AT of 10.45ml/kg/min and a VE/VCO<sub>2</sub> of 34.5.

### Conclusion

CPET data extraction should be more extensive to properly risk-stratify patients prior to AAA surgery.



VO61

## The safety and efficacy of elective endovascular aneurysm repair in octogenarians: A systemic review and meta-analysis

Mr Sebastian Vaughan-Burleigh<sup>1,2</sup>, Dr Rachel Leung<sup>1</sup>, Dr Faaraz Khan<sup>1</sup>, Mr Dominic PJ Howard<sup>1</sup>

<sup>1</sup>Oxford University Hospitals NHS Foundation Trust, , United Kingdom, <sup>2</sup>Musgrove Park Hospital, Somerset NHS Foundation Trust, , United Kingdom

**Aims:** Prevalence of AAA increases with age. Randomised trials confirming the efficacy of EVAR recruited few elderly patients, whereas in current clinical practice EVAR is commonly performed on octogenarians. This review will synthesise the evidence on the safety of elective EVAR in octogenarians and contribute to shared informed decision-making between patients and surgeons.

**Methods:** We performed a literature search in line with PROSPERO guidelines. Random-effects Mantel-Haenszel meta-analysis of 30-day and longer-term mortality, 30-day post-operative complications, and aneurysm-related mortality was performed comparing octogenarians with younger patients.

**Results:** 40 studies and data from the Thames Valley Vascular Network were included in the meta-analysis, totalling 242,687 non-octogenarians and 93,670 octogenarians. Post-EVAR 30-day mortality was higher in octogenarians (1.07% younger vs 2.28% octogenarians, OR 2.24 [2.07-2.42]  $p < 0.001$ ). Octogenarians experienced twofold higher annual mortality (OR 1.87-2.40 annually, all  $p < 0.001$ ) and higher post-EVAR complications (OR 1.75-2.83, all  $p < 0.001$ ).

**Conclusions:** Octogenarians experience higher but acceptable peri-operative morbidity and mortality compared to non-octogenarians. Higher mortality continues into long-term follow-up with over double the mortality amongst octogenarians at three years compared to younger patients, and many octogenarians may derive marginal or no survival benefit from EVAR. Precise patient selection and maximally informed decision-making are essential in the elderly population.

## Longer term outcomes in patients treated for JRAAA by Open Surgery and FEVAR at a single unit.

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### Intro:

Fenestrated Endovascular Aortic Aneurysm Repair (FEVAR) is a useful treatment option in patients with juxtarenal aneurysms (JRAAA) or infrarenal aneurysms (IRAAA) unsuitable for EVAR. It is often used in patients unsuitable for Open Repair (OR). This study delineates clinical outcomes in patients undergoing FEVAR and OR.

### Methods:

A retrospective review of consecutive patients undergoing FEVAR or OR at a single, tertiary, vascular unit between 2012-2021. Patients with research quality data, undergoing FEVAR or OR for elective aneurysm repairs were included.

### Results:

83 patients were managed with FEVAR and 73 patients were managed with OR. Pre-intervention demographics can be seen in Table 1. Treatment indications for FEVAR included IRAAA unsuitable for EVAR (30%), JRAAA (41%), pararenal (23%) and paravisceral (6%) aneurysms. The 30-day re-intervention rate was 9.6%; longer term re-intervention rate was 24%. Sac regression post intervention was achieved in 45% of patients. The mortality rate was 51% at a median of 4.25 years post intervention (IQR:0.91–5.93 years). Of 73 patients who underwent OR, the overall mortality rate was 27% at a median of 5.2 years (IQR2.11–9.10 years).

### Conclusion:

Outcomes in patients undergoing FEVAR are heterogenous. Further analyses of this data will help to delineate which patients benefit from FEVAR.

VO63

## A decade of experience in management of acute Type B Aortic Dissection

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### Introduction

Acute Type B Aortic Dissection (TBAD) is a medical emergency with controversy surrounding the optimal treatment strategy. This study aims to report outcomes of a United Kingdom (UK) tertiary aortic centre over a ten-year period.

### Methods

All patients treated for acute TBAD at our centre between 2012-2022 were retrospectively identified. Demographic, clinico-pathological and clinical outcome data were obtained for analysis.

### Results

Total of 255 acute TBAD patients were identified with a mean age of 66+-16 and 31% female sex. 197 (77.2%) patients presented with acute uncomplicated TBAD. Endovascular intervention was performed on 107 (39.6%) patients; 37 hyperacute (<24 hours); 44 acute (1-14 days); 17 subacute (15-90 days); 9 chronic (>90 days). 148 (58%) of patients were managed conservatively with anti-hypertensive therapy. There was no difference in all cause mortality between endovascular and conservative management, 1 year cumulative survival rate of 89.5+-5.8% for endovascular treatment versus 85.1+-5.3% in conservative group (p=0.401) and 5 year cumulative survival 70.3+-6.1% for endovascular and 70.3+-7.3% in conservative group (p=0.861). Mean patient follow up period of 2.8+-2.4 years.

### Conclusion

Acute TBAD is associated with significant morbidity and mortality. Further work is required to delineate which patients may benefit most from endovascular intervention or conservative management.

## REPAIRS Delphi: A UK and Ireland Consensus Statement on the management of infected aRtErial PseudoAneurysms secondary to groin Injecting dRug uSe

Miss Caitlin S MacLeod<sup>1,2</sup>, Mr John Nagy<sup>1</sup>, Dr Andrew Radley<sup>1,2</sup>, Professor Faisal Khan<sup>2</sup>, Dr Nik Rae<sup>1</sup>, Mr Michael Wilson<sup>3</sup>, Mr Stuart Suttie<sup>1</sup>, REPAIRS Delphi Collaborative<sup>4</sup>

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There is no published consensus on the optimal management of infected arterial pseudoaneurysms secondary to groin injecting drug use. Operative management options remain contentious. The UK has one of the highest rates of illicit drug use in Europe, with recent rises in drug-related harms. This study was designed to establish consensus on this topic to promote better management of these patients.

A 3-round Delphi process was undertaken surveying consultant vascular surgeons in the UK and Ireland using an online platform. Seventy-five vascular units were invited to participate, with 1 consultant providing the unit consensus practice. Round 1 responses were thematically analysed to generate statements for round 2. Participants evaluated statements using a 5-point Likert scale. Consensus was achieved at a threshold of  $\geq 70\%$  agreement/disagreement. Statements failing consensus were modified for round 3.

Round 1 received 64 (85.5%) responses, round 2 59 (78.7%) and round 3 62 (82.7%). Round 2 comprised 150 statements and round 3 24; 73/75 (97.3%) units contributed. Ninety-one statements achieved consensus agreement, and 15 consensus disagreement. Statements covered sequential management from diagnosis/imaging, antibiotics/microbiology, surgical approach, wound management, follow-up and additional considerations.

This comprehensive consensus statement provides a strong insight into the standard of care for these patients.

VO65

## Abdominal aortic aneurysm surveillance in the over 80s: Time for change

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### Background

Evaluation of our regional AAA surveillance database supported a selective surveillance approach in patients with a first-time diagnosis of AAA aged 80 years and above. We extended this further to all patients with AAA at the age of 80.

### Methods

A retrospective review of regional AAA surveillance database for all patients above the age of 80. Data collected included patient age, sex, date of scans, initial and latest size of aneurysm, time under surveillance, total number of scans and outcome. Minimum follow up was established.

### Results

632 patients were identified undergoing 3,508 scans. Eighty patients reached threshold (12.6%) with only 18 undergoing repair (3%). 18.6% were discharged from surveillance and 25% died while on surveillance. No patient between the ages 80-<85 years with AAA <3.5cm at the age of 80 and between 85-<90 years with AAA <4cm at the age of 85 proceeded to have an intervention.

### Conclusion

195 scans were performed for every 1 repaired AAA in octogenarians. Clinical assessment at the age of 80 would help filter those that gain most benefit from surveillance. A second review at the age of 85 is advised for further filtering and better use of resources.

VO66

## The Collaborative Acute Aortic Syndrome Project (CAASP): defining diagnostic pathways and their impact on outcome

Mr Aminder Singh<sup>1</sup>, Dr Jim Zhong, Dr Nawaz Safdar, Dr Ganesh Vigneswaran, Mr Sandip Nandhra, CAASP Collaborators

<sup>1</sup>Cambridge University Hospitals, ,

To identify factors associated with longer time to hospital presentation (TTHP) and subsequent survival outcomes in acute aortic syndrome (AAS).

This national multicentre, collaborative study was coordinated by VERN and UNITE partnered with The Aortic Dissection Charitable Trust. Consecutive patients diagnosed on imaging with AAS between 01/01/2018-01/06/2021 were enrolled and followed-up for 6 months.

619 patients from 15 hospitals were included. Median age (IQR) 71 (58-80) years, 63% male and 80% Caucasian. The most frequent AAS was type-A dissection (42%), followed by type-B (35%). 41% had complicated AAS.

Mode of presentation included emergency ambulance(76%), self-presentation(15%) and primary care referral(3%). The median TTHP was 3.1 (1.8-8.6) hours. Mode of presentation, deprivation index, absence of sudden onset chest pain, history of bicuspid aortic valve or cardiac surgery all significantly increased TTHP ( $p<0.05$ ). 60% were managed conservatively and 38% had surgical intervention.

The 30-day mortality rates for type-A and type-B dissections were 34% and 17%. Higher age, aortic pathology, TTHP, presence of complicated AAS and increased length of ICU stay were significantly associated with higher 30-day mortality ( $p<0.05$ ).

CAASP identified factors associated with increased TTHP and 30-day mortality. This can be used to optimise diagnostic pathways with the aim of improving patient outcomes.

VO67

## Gender-differences in CPET parameters used to risk-stratify patients prior to AAA repair

Mr Adam Haque<sup>1</sup>, Miss Stacie Hodge<sup>1</sup>, Dr Angella Bryan<sup>1</sup>, Dr Tanviha Quraishi-Akhtar<sup>1</sup>, Mr Jonathan Ghosh<sup>1</sup>

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### Background

Most research that informs clinical practice in Abdominal Aortic Aneurysm (AAA) is skewed by higher proportions of male participants than female. Risk-stratification through cardiopulmonary exercise testing (CPET) is similarly skewed but the accepted values which inform clinical decision making are universal. This is despite normal female physiology lending itself to lower values than those seen in males. This is important as outcomes in females appear to be worse in males and therefore decision making needs to be well-informed. We compared mean CPET parameters in males and females with AAA.

### Methods

We compared CPET data between females (n=240) and males (1257) across 15 years from 2 Vascular Centres in the United Kingdom. Statistical analyses were performed using the student t-test.

### Results

Mean peakVO<sub>2</sub> was 13.1ml/kg/min in females compared to 16.5ml/kg/min in males (p<0.001), anaerobic threshold (AT) was 9.98ml/kg/min vs. 11.7ml/kg/min (p<0.001) and ventilatory equivalents for CO<sub>2</sub> at AT (VE/VCO<sub>2</sub>) was 35 vs. 34 (p<0.001). Gender-differences between peakVO<sub>2</sub> when reported as % of predicted maximum were non significant, 70.24% vs 68.0% (p=0.104)

### Conclusion

Appreciation of gender-differences in CPET physiology is of the utmost importance when risk-stratifying patients in AAA, with the use of relative values, rather than absolute, appearing more appropriate.

VO68

## AAA Screening Delays- A National Review from 2017-2023.

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The national AAA screening programme (NAAASP) offers ultrasound scans to all men at 65. Aneurysms found  $\geq 5.5$ cm are referred for aortic surgical intervention. The target time for intervention following referral is 8 weeks. The NAAASP set an acceptable (60%) and achievable (80%) target. We aim to investigate the current outcome rates for screening, establish delay causes and evaluate factors behind hospital related delays.

The sample consisted of all men referred from the NAAASP for vascular surgery from 2017-2023 (n=5138). Data was presented as frequencies and free text box entries from each screening centre and was stratified for delay cause and hospital factor. Categorisation by financial year and NHS England region was conducted for analysis.

Overall reduction in AAA screening outcome rates of 45.2% were found.

Largest delay causes included 'Hospital Factors' (33.1%) and 'Patient Comorbidities' (33.6%). Regional analysis showed significant differences.

Several 'Hospital Factor' delays were identified, the largest being Covid.

Covid negatively impacted outcomes by 55.1%, likely due to changes in national guidance on aneurysm surgery threshold size to  $>7$ cm and screening cessation

Current AAA screening time to intervention outcomes are below acceptable standards and Covid had a significant negative impact on AAA screening with significant regional differences.



## Understanding vascular trauma in the UK: Vascular Interventions and Surgery in Trauma Audit (VISTA)

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### Background:

Exsanguination is the leading preventable cause of death following trauma, with extremity vascular injury a risk factor for limb loss. VISTA aimed to describe the current UK incidence, contemporary management and outcomes from vascular trauma.

### Methods:

A multicentre, six-month prospective audit of vascular trauma at 27 UK Major Trauma Centres by the National Trauma Research & Innovation Collaborative and Vascular & Endovascular Research Network.

### Results:

We analysed 350 injuries (n=302 patients) and 200 vascular interventions. The median time to theatre was 185 (113–410) minutes and a vascular consultant was present at 122 (61%) cases. In total, 36 (18%) endovascular interventions (n= 23/36 [64%] aortic stents) vs. 164 (82%) open surgical procedures were recorded including: 82 (50%) extremity and 4 (2%) carotid. Major amputations (n=16) were primary (3%) vs. secondary (5%). All cause mortality was 11%, and 8% in non-brain injured patients.

### Conclusion:

Surgical outcomes for vascular interventions following trauma are not captured by any UK-wide registries. National datasets are required for quality improvement and to establish evidence-based key performance indicators for life and limb salvage following vascular trauma.

VO70

## Long-term outcomes following repair of a ruptured abdominal aortic aneurysm treated at a single tertiary vascular centre.

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Aim:

Examine long-term outcomes following repair of a ruptured abdominal aortic aneurysm (rAAA).

Methods:

rAAA patients undergoing intervention at our centre between 2006-2020 were identified. An 'EVAR-first' strategy was generally adopted in suitable patients. Demographics, type of intervention and death during follow-up were recorded.

Results:

From 338pts treated, standard infrarenal EVAR was used in 182pts and open repair in 156pts. EVAR patients had more ischaemic heart disease, but there were no other differences in co-morbidities, age or biological sex at the time of intervention.

30d-survival was better following EVAR (85% vs. 60%,  $p<0.05$ ). All-cause mortality was comparable between EVAR and open repair over the course of study (median 3yrs; range 0-16yrs, Figure 1). In patients alive after 30d, open surgery patients had better survival (HR:1.63, 95%CI:1.16 – 2.28, Figure 2). EVAR demonstrated survival benefits over open surgery in patients >80yrs (HR:2.52, 95%CI:1.62 – 3.92).

Conclusion:

Standard EVAR is unsuitable in around half of rAAA patients. EVAR offers favourable 30d-survival compared with open repair, but these diminish over time. Patients alive at 30d have improved survival following open repair, which may be due to selection bias. Open repair of rAAA remains an important skillset to maintain for vascular services.

VO71

## Outcomes of large-bore percutaneous access to the first versus third segments of the axillary artery during aortic procedures: updates from the SUPER-AXA and PAXA international registry

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Introduction. Investigating technical safety and outcomes of 1st vs 3rd axillary artery (AXA) segment percutaneous access.

Methods. All patients receiving percutaneous AXA (PAXA) access in 11 centers from 2008-2021 were included. Efficacy endpoint was percutaneous technical success; safety endpoints were stroke and access complications. Endpoints were analyzed, comparing first (AXA1) versus third (AXA3) segment puncture sites.

Results. 412 percutaneous AXA accesses were included: 172 (42%) in AXA1 and 240 (58%) in AXA3. During 279 (71%) F/BEVAR procedures, a  $\geq 12F$  internal diameter sheath was used in 76% cases. Open conversion rate was 1%, no major vascular complications occurred, with only 1 major non-vascular complication noted. Primary closure failure was documented in 18 AXA1 (11%) and 32 AXA3 accesses (13%), treated by covered (8.3%) or bare-metal (2.7%) bailout stenting, with 100% stent patency at 12 months. Stroke rate was 4.4%. An introducer sheath internal diameter  $\geq 12F$  was independently associated with both access complications ( $p < .001$ ) and stroke ( $p = .005$ ). After adjustment for covariates, site of access catheterization was not linked to success rate (OR .537, 95% CI .011-1.22 for AXA3,  $p = .104$ ).

Conclusion. PAXA access experiences infrequent local complications, solvable by complementary endovascular interventions. First and third AXA segment access both had excellent outcomes.

## Treatment Decision Making for Treatment of Abdominal Aortic Aneurysm: Does Sex Play a Role in Surgical Selection?

Miss Anna Louise Pouncey<sup>1</sup>, Dr Luis Rebolledo<sup>2</sup>, Mr Edmund Charles<sup>1</sup>, Miss Maria Nicole<sup>1</sup>, Mr Colin Bicknell<sup>1</sup>, Prof Mandy Ryan<sup>2</sup>, Prof Janet Powell<sup>1</sup>

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### Background:

Women are ~25% less likely to receive an abdominal aortic aneurysm (AAA) repair. This study explored whether patient sex, or alternative attributes, (which, differ by sex,) influence the likelihood of surgical selection.

### Methods:

In-depth interviews with vascular surgeons and Delphi-consensus were used to identify attributes and levels for a discrete choice experiment: sex, age, AAA size, anaesthetic risk, hostile AAA neck/access anatomy, and patient anxiety. Aortic surgeons were recruited and asked to indicate treatment preference ((1) repair vs. not, (2) endovascular vs. open) for 16 scenarios. Data were analysed using logistic regression, adjusting for multiple choice observations.

### Results:

182 surgeons completed 3254 scenarios. Repair was selected for 67.9% of cases, 60.2% (1339/2223) of which were endovascular. AAA size (OR 1.26 (95%CI:1.24-1.29) and female sex (OR 2.32 (95%CI:1.87-2.88) increased the likelihood of surgical selection. Increasing age (OR 0.95 (95%CI:0.95-0.96), per-year), severe anaesthetic risk (OR 0.36 (95%CI:0.27-0.48)) and hostile anatomy (OR 0.45 (95%CI:0.33-0.60)) reduced the likelihood of surgical selection. Patient anxiety was not significant. Women were more often deemed suitable for endovascular (vs. open) repair (OR 1.50 (95%CI:1.31-1.73)).

### Conclusion:

Female sex, in isolation, did not reduce the likelihood of surgical selection, but significantly increased surgeon's preference for less invasive (endovascular) repair.

VO73

## Turndown Abdominal Aortic Aneurysm outcomes and survival in contemporary UK practice

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### Objectives

Assess the survival of patients who had been turned down (TD) for repair of an abdominal aortic aneurysm (AAA).

### Methods

Retrospective review of prospective maintained TD database of patients turned down across a vascular network service from Dec 2015 to June 2023. Data on AAA size, age at TD, survival and cause of death are reported as median with IQR where appropriate. Data censored for unknown outcomes and non-atherosclerotic aorto-iliac aneurysms.

### Results

372 patients TD with data for analysis. 181 alive (48.7%) age 83.1 years, AAA size 5.7cm with post-TD survival 30.6 months; 191 deceased (51.3%) age 85 years, AAA size 5.8cm with post-TD survival 15.4 months. See demographic data Table 1.

Verified cause of death data were available for 103 patients (53.9%) available in Table 2. The dominant causes of death include malignancy (35.9%), cardiovascular/ respiratory disease (34%) and rupture AAA (21.4%). Aneurysm size >7cm at TD appears predictive of rupture (Table 3). Figures 1 and 2 present KM survival plots for AAA size and all cause mortality respectively.

### Conclusion

Median survival post-TD was 20.6 months. All cause mortality was 51.3%; Malignancy, Cardiovascular and respiratory disease account for 70% of known causes of death. AAA >7cm appears predictive of rupture mortality <15 months of TD.

VO74

## A contemporary analysis of quality of life after aortic aneurysm repair

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**Background:** There is a paucity of quality of life (QOL) data pertaining to aortic aneurysm repair. We captured QOL data using aneurysm-specific patient-reported outcome measures after open repair (OR) and both standard infra-renal EVAR and branched/fenestrated repairs (F/BEVAR).

**Methods:** Two disease specific questionnaires were administered pre- and post-operatively: Aneurysm Dependant Quality of Life (AneurysmDQoL) and Aneurysm Symptom-Related Questionnaire (AneurysmSRQ).

**Results:** 153 patients [127(83%) male, age 75(IQR 69-79) years] were recruited. 33(22%) patients underwent OR, 69(45%) F/BEVAR and 51(33%) infra-renal EVAR.

Overall, AneurysmDQoL improved after repair with median AWI score increasing from -2.0 pre-operatively to 0.9, 1.1, and 0.7 at 6-weeks, 6-months and 1-year post-operatively, respectively (P=0.001). Median AneurysmSRQ scored was 19 pre-operatively, increasing to 27 at 6-weeks, before falling to 17.5 and 16 at 6-months and 1-year, respectively (P=0.001). Patients having OR were less impacted by symptoms at 6 months (OR=9, F/BEVAR=17.5, infra-renal EVAR=22, p=0.045) and one year (OR=6, F/BEVAR=16, infra-renal EVAR=22, p=0.001). OR and F/BEVAR patients had improved QOL at 1-year (P<0.05), whereas no improvement after infra-renal EVAR was seen.

**Conclusion:** These findings are important for providing personalised care, informing patient selection and deciding on mode of repair. They provide the impetus for a larger prospective clinical study.

VO75

## Longitudinal Sarcopenia Prevalence in Patients Undergoing Complex Endovascular Abdominal Aortic Aneurysm Repair

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Background: Sarcopenia is linked with adverse surgical outcome. There is limited understanding of the interaction between muscle mass and fenestrated aneurysm repair (FEVAR) outcomes; especially longitudinally as reported in this study.

Methods: Skeletal muscle area at the lumbar vertebral level-3 was measured (at baseline, 90-days, 1-year, 2-years and 3-years) for FEVARs between 2007-2022 at Newcastle Hospitals. Clinical, complication and survival data were evaluated over time.

Results: 184 patients (88.6% males, median 74.3years-of-age [IQR 69-78]) underwent FEVAR for infra-renal (53.7%), and juxta-renal and thoraco-abdominal aneurysms (46.3%). Hospital stay was 5-days (IQR 3-8), follow-up 42months (IQR 24-72) and survival 4.8years(IQR 2.2-7.2).

Sarcopenia was found in 11.4% pre-operatively, increasing to 18.5% at 90-days post-FEVAR (P=0.001) and recovering over a 3-year period (15.8% year-1, 12% year-2, and 8.7% year-3). Pre-operative sarcopenia (P=0.001) was the only predictor for post-operative sarcopenia but did not affect post-operative outcomes and/or complications.

Cox regression survival analysis revealed that 3 month, 1-year and 2-year sarcopenia levels (P=0.02), chronic kidney disease (P=0.008, HR 2.6, CI 1.28-5.32) and pre-intervention haemoglobin levels (P=0.007, HR 0.98, CI 0.97-1.1) were significant predictors for 4-year survival.

Conclusions: Muscle mass appears to deteriorate post-FEVAR and takes two years to recover. Post-operative sarcopenia negatively influences survival following FEVAR.

VO77

## The Importance of Specialist Multidisciplinary Management for 'Type B' Acute Aortic Syndrome

Mr Razhan Ali<sup>1</sup>, Mr Steve Tang<sup>1</sup>, Mr Sui Wu Tee<sup>1</sup>, Mrs Asfa Hussain<sup>1</sup>, Mrs Rosie Darwood<sup>1</sup>, Mr Tom Wallace<sup>1</sup>

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### Introduction

The National AAD Pathway Toolkit outlines key principles for improving outcomes. Yet, there remains no coding for 'Type B' Aortic Dissection (TBAD) identification. Our unit uses evidence-based MDT management protocols, and we sought to establish how this approach is performing.

### Methods

All CTAs from 2018-2021 were screened for keywords related to AAD. Type A dissections and TBADs already under surveillance were excluded. Demographics, management, and clinical outcomes up to two years were assessed.

### Results

58 Acute TBADs (30 complicated, 28 uncomplicated) were identified. All cases were initially managed in a critical care setting, and followed evidence-based MDT protocols.

Table 1 outlines key demographic and outcome data. During the index admission, 14 of 30 complicated cases underwent TEVAR, with a further 5 in the next 6 months.

No uncomplicated cases underwent intervention in the index admission; 7% (n=2) had later TEVAR for aortic expansion. Figure 1 demonstrates all-cause mortality up to 2 years.

### Conclusions

Our unit's protocols, employing intensive medical management for all, and prompt endovascular interventions for complicated cases, give more favourable outcomes than published series. These promising results demonstrate an effective integrated, MDT strategic approach in improving patient outcomes. ICD coding will facilitate comprehensive national case ascertainment.



VO79

## Routine surveillance of frail octogenarians with AAA is not appropriate

Mr Steve Tang<sup>1</sup>, Dr Jing Yi Kwan<sup>1</sup>, Mr Razhan Ali<sup>1</sup>, Mrs Lee-Ellen Fawcett<sup>1</sup>, Dr Rebecca Anthony<sup>1</sup>, Mr Tom Wallace<sup>1</sup>

<sup>1</sup>Leeds Teaching Hospital NHS Trust, ,

### Introduction

Incidental AAA discovery is common in octogenarians, who are then often enrolled onto a trust-based surveillance programme. Our in-hospital surveillance programme has followed the NAAASP protocol, however recent work demonstrated this to be generally inefficient in older cohorts; this study aims to identify the impact of frailty on appropriateness of surveillance and intervention.

### Methodology

Cross-sectional analysis of all patients on active AAA surveillance between 2018–2020. Outcomes included AAA size, frailty status and fate of the patients.

### Results

681 patients were identified on active surveillance; 48% were octogenarians.

Octogenarians had larger aneurysms compared to those under 80 (41mm vs. 39mm,  $p=0.010$ ), while median aneurysm growth rate was no different between the groups (1.1mm vs 1.0mm per annum,  $p=0.466$ ). A higher Rockwood Clinical Frailty Score (CFS) was observed in the octogenarian cohort (5 vs. 4,  $p<0.001$ ).

28 patients had an aneurysm repair during the time period (median age = 76; median CFS = 3) but only 8 were over 80, with median CFS = 4. No octogenarians with CFS>5 had intervention.

### Conclusion

Frail octogenarians, are unlikely to derive benefit from AAA surveillance. CFS $\geq$ 5 seems an appropriate screen to identify patients for consideration of proactive advanced planning and discharge from services.

VO80

## The A-HeAD Study: A retrospective review of the effects of socio-economic deprivation on modifiable preoperative health behaviours and outcomes after aortic aneurysms repair.

Sarah Sillito<sup>1</sup>

<sup>1</sup>Newcastle Hospitals, ,

Social Deprivation is associated with health inequalities and poor clinical outcomes.

Outcomes for aneurysm surgery are not well understood. A-HeAD explores the association of Abdominal Aortic Aneurysm (AAA) surgery and socio-economic status (SES) on postoperative outcome.

All elective AAA repairs performed at a tertiary vascular centre between January 2015 and January 2020 were analysed. SES was determined by index of multiple deprivation (IMD). Primary outcome was overall survival by Kaplan-Meier. Cox-proportional hazard analyses were conducted.

Patients (n=472) were divided into two groups (IMD 1-3 (n=171) and IMD 4-10 (n=301)). Gender ratios were comparable, with similar AAA size and other co-morbidities. IMD 1-3 participants were younger (72.4(8.1) vs 74.6 (7.8), p=0.011), had higher smoking rates (61.4% vs 19.6%, P=0.03).

There was no difference in survival based upon IMD. IMD 1-3 patients spent longer in level 2/3 care (2(2-3) vs 1(1-2), P=0.022) and experienced more re-admissions (14% vs. 6%. P=0.003). Patients without COPD were twice as likely to survive (HR 0.54 (0.31-0.94 P=0.03).

IMD was not associated with poor outcome. Smoking was more prevalent in lower IMD groups. As COPD was associated with increased likelihood of death, pre-operative optimisation can be targeted towards higher risk groups.

VO81

## Prevalence and Impact of smoking on perioperative outcomes after elective abdominal aortic aneurysm repair

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### Introduction

This study investigated the prevalence and impact of smoking on perioperative outcomes after elective abdominal aortic aneurysm (AAA) repair in the UK.

### Methods

The National Vascular Registry was interrogated for adults undergoing elective vascular surgery from 2014 to 2021 for prevalence of smoking over time. Cox proportional hazards and multivariable logistic regression models were used to compare outcomes between smoking status in adults undergoing AAA repair, adjusted using the British Aneurysm Repair score.

### Results

Overall, 59,811 patients were identified (17% non-smokers, 58% ex-smokers, 25% smokers). The prevalence of smoking did not change significantly over time for patients undergoing vascular surgery, with significant variation between hospitals (range 8-41% smokers). For 26,916 patients undergoing AAA repair, in-hospital mortality was not significantly different between smoking status groups. Smoking was associated with increased overall and respiratory complications, limb ischaemia, post-operative confusion, and critical care admission compared to both ex-smokers and non-smokers; as well as increased risk of bowel ischaemia and return to theatre compared to non-smokers. (Figure 1)

### Conclusion

In contrast to the declining trend in the general population, the prevalence of smoking remain high in patients undergoing vascular surgery, with significant variation between hospitals. Smoking was associated with increased complication rates.

## Fully automatic volume segmentation of the descending thoracic aorta, visceral abdominal aorta and visceral vasculature via computed tomography images with deep learning approaches versus physician controlled manual segmentation.

Miss Anna Louise Pouncey<sup>1</sup>, Mr Ed Charles<sup>1</sup>, Miss Caroline Caradu<sup>2</sup>, Me Eric Ducasse<sup>2</sup>, Prof Janet Powell<sup>1</sup>, Me Colin Bicknell<sup>1</sup>

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Background: Computed tomography angiography (CTA) imaging is a valuable but labour-intensive tool for treatment of complex- and thoraco-abdominal aortic aneurysms (cAAA/TAAA). This study examined the ability of fully automated software to assess the descending thoracic aorta, abdominal aorta and visceral arteries compared to clinician-observers.

Methods: Quantitative comparison of fully automatic volume segmentation (FAVS) versus independent physician-controlled manual segmentation (PCMS) on a dataset of 20 preoperative CTAs. Dice similarity coefficient (DSC), Jaccard Index (JI), sensitivity, specificity, volumetric similarity (VS), Bland-Altman limits of agreement (BA-LoA) for proximal visceral diameter, (excluding duplicate renals,) and comparison of branchpoint co-ordinates (x,y,z) were calculated between methods and physicians.

Results: Volumetric comparison between FAVS and PCMS (DCS median 0.93 (IQR:0.03), JI 0.87 (IQR:0.05), sensitivity of 0.98 (IQR:0.02), specificity 0.99(IQR:0.00), VS 0.94(IQR:0.03)), was comparable between physicians (DCS median 0.92 (IQR:0.07), JI 0.85 (IQR:0.12), sensitivity of 0.97 (IQR:0.05), specificity 0.99(IQR:0.00), VS 0.95(IQR:0.04)). 93% (5/71) of visceral vessels were correctly identified by FAVS (x -0.63 (IQR:2.81) vs (0.00 (IQR:0.54), y 0.49 (IQR:0.06) vs 0.00 (IQR:1.61), z 3.32 (IQR 5.04) vs 0.50 (IQR:2.00), mm) with reasonable BA-LoA (FAVS 0.786mm (SD±2.80) vs PCMS 0.521 (SD±1.54), mm).

Conclusions: Fully automatic volume segmentation may enable faster, more detailed assessment of patients with a cAAA/TAAA.

VO83

## Prediction of Survival 5-years after Elective Repair of Abdominal Aortic Aneurysm Using a Machine Learning algorithm.

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<sup>1</sup>James Cook University Hospital, ,

The aim of this study was to construct and validate a Bayesian algorithm to predict survival in the first 5-years following elective repair of AAA.

Patients who underwent elective repair of AAA from 01/01/2008 to 31/03/2018 were reviewed. All patients were assessed using preoperative cardiopulmonary exercise testing and contrast enhanced CT scan of aorta. Following elective repair of AAA patients were followed up for at least 5-years. A Bayesian classifier was developed and validated to predict survival for at least 5-years following repair of AAA.

729 patients (men:655, women: 74) underwent elective repair of AAA of whom 194 (26.7%) died during the first 5-years. The sensitivity and specificity of the Bayesian classifier for prediction of survival in the 5-years following surgery was 89.4% (95% CI: 84.8–95%) and 62% (95% CI: 56.5–66%), yielding an accuracy of 82.1% (95% CI: 76.4-87%), PPV: 0.867, NPV: 0.679. Area under ROC=0.81.

A Bayesian classifier based on readily available clinical data can successfully predict survival in the first 5-years following elective repair of AAA.

## What's the denominator? – An 8-year audit of ruptured aortic aneurysm outcomes, including rates of conservative and palliative management

Mr Henry Bergman<sup>1</sup>, Mr Arjun Sharma<sup>2</sup>, Mr Tristan Lane<sup>3</sup>

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Background: Ruptured Aortic Aneurysm (rAAA) is a surgical emergency with rapid onset and poor survival. Expedited diagnosis and surgical repair are required to prevent exsanguination. Decisions regarding appropriateness and mode of intervention are made quickly and intuitively. Frequently there is limited assessment of fitness and little opportunity to discuss with family. Extensive literature compares outcomes of endovascular and open repair, however there is little discussion of the denominator – the patients undergoing non-operative palliative management. Without this, reported outcomes are confounded by case-selection.

Methods: An audit of the electronic patient record identified all rAAA's between 01/2015-12/2022. Demographics, treatment strategy, mortality, pre-operative imaging, transfusion requirement and inpatient stay were interrogated.

Results: 243 rAAA's were identified. Management was with open-surgery (42%), endovascular-surgery (36%) and palliation (22%). Over the 8-year period caseload marginally decreased. Open repair was associated with higher mortality, longer inpatient and ITU stay, and larger transfusion requirement than endovascular repair. 10% of palliative rAAA's remained alive at 1-year.

Conclusion: Overall aneurysmal disease is declining. Although interventional outcomes are widely reported, approximately 20% of the caseload is palliated. This denominator should be reported alongside conventional outcomes to address the bias of case-selection and set a standard of how aggressively to intervene.

VO85

## National Consultant Information Programme (NCIP) to compare outcomes for patients undergoing elective EVAR and open abdominal aortic aneurysm repair (oAAA) (April 2017 – March 2020)

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<sup>1</sup>Addenbrooke's Hospital, ,

### Introduction

NHS England's NCIP tool uses hospital episode statistics (HES) data to understand national variations in surgical procedures within teams and amongst individuals, with the purpose of driving improvement in outcomes for patients.

### Methods

This work uses NCIP data to understand and compare outcomes for patients undergoing elective EVAR and oAAA repair including 30-day readmissions, 90-day mortality, one-year mortality.

### Results

8,113 EVAR and 3,324 oAAA procedures were carried out 01 April 2017–31 March 2020 on patients older than 16.

10.7% [10.02%-11.36%] of EVAR patients had an all-cause readmission within 30 days compared to 9.0% [8.06%-10.00%] of open AAAs patients.

2.3% [1.9%-2.6%] of EVAR patients died within 90 days of their procedure compared to 3.9% [3.2%-4.6%] of open AAA patients.

5.8% [5.3%-6.3%] of EVAR patients died within one-year of their procedure compared to 6.0% [5.2%-6.8%] of open AAA patients.

No England provider was found to have statistically significant outcomes compared with the national rates for either procedure.

### Conclusion

Patients undergoing elective EVAR procedures had higher readmission rates. Open AAA repair was associated with higher mortality rates, although with minimal difference in one-year mortality. This is the first time that the UK national data for longer term outcome measures has been reported.

VO86

## Recurrent symptomatic stenoses and reintervention following endovascular and open revascularisation for chronic mesenteric ischaemia in 104 patients over a 14 year period

Mr Joel Norton<sup>1</sup>, Mr Kenan Kebay<sup>1</sup>, Mr Keith Hussey<sup>1</sup>, Mr Wesley Stuart<sup>1</sup>, Mr Maaz Syed<sup>1</sup>, Professor David Kingsmore<sup>1</sup>

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Introduction:

The natural history of recurrent stenoses and reinterventions following endovascular (ER) and open (OR) revascularisation for chronic mesenteric ischaemia (CMI) has not been clearly defined.

Methods:

A retrospective single-centre cohort study of 104 patients undergoing ER/OR for CMI at a tertiary referral vascular centre between 01/01/2009-17/05/2023.

Results:

Seventy-seven arteries underwent ER in 73 patients (nine angioplasty, 68 stents). Two ER failed intraoperatively, with one conversion to OR. Twenty-six symptomatic restenoses/occlusions occurred in 35% (25) of patients.

Forty arteries underwent OR in 32 patients (1 thromboembolectomy, 31 bypasses). Eleven symptomatic restenoses/occlusions occurred in 34% (11) of patients.

27% (19) of ER underwent reintervention revascularisation as did 25% (8) of OR. There were 43 reintervention laparotomies among 28% (20) of ER, and 13 among 34% (11) of OR patients.

Symptom resolution was attained by 64% (39) of clinic discharges in the ER cohort, and 62% (16) of the OR cohort. 18% and 13% of those represented with mesenteric ischaemia in the ER/OR cohorts, respectively.

Three and five year survival rates were 38%/45% and 29%/44% in the ER/OR cohorts, respectively.

Conclusions:

Symptomatic restenosis/occlusion rates, reintervention rates, and long-term outcomes were comparable between cohorts. Primary ER did not preclude from subsequent laparotomy.



VO87

## Outcome of patients turned down for abdominal aortic aneurysm surgery over a decade

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### Introduction

To examine the outcome of patients turned down for elective abdominal aortic aneurysm (AAA) surgery in a tertiary vascular centre.

### Methods

A retrospective review of a registry of patients turned down for elective AAA surgery in a regional tertiary vascular unit from May 2011 to March 2023. Patient demographics, turndown rationale, cause of death and survival time were examined.

### Results

There were 365 patients with AAA > 55mm turned down in the study period. Median age 83.4 years (IQR=8.6) and median AAA diameter 61mm (IQR=10). Turndown rationale included patient choice (n=106), advanced malignancy (66), dementia (61) and other comorbidities (n=132). 77.5% were deceased (n=283), all-cause mortality median survival time was 474 days (IQR=738). 34.6% (n=98) died from ruptured AAA compared to non-rupture causes (n=185), with no difference in the mean survival time (625 vs. 618 days, p=0.46). Larger AAA (>65mm) showed statistically significant reduction in survival time and increased risk of rupture (518 days & 46% vs 688 days & 27%, p<0.05).

### Conclusion

Patients turned down for elective AAA surgery have poor survival and majority died from non-AAA cause. This supports the clinical decision for turn down as surgical intervention may not provide survival benefit.

YO76

## Timeline audit for ruptured AAA pathway, are we following the guidelines?

Mr Yasser Ashoor, Mr Bashar Darwish, Mr Nazar Essa, Dr Nora Alzahrani, Mr Jawaharlal Senaratne

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### Background

With ruptured abdominal aortic aneurysms (rAAA) without rapid intervention, there is almost 100% mortality. Even with intervention mortality remains high and it is intuitive that more rapid access to specialist care might reduce this, though the choice of which patients are transferred lacks evidence.

### Aim

To assess the current speed of management of rAAA within Kent Hospitals.

### Methods

An audit of 50 rAAA patients from 11/2019-10/2021 was conducted. 26 patients (52%) died without intervention, 10 of them after the transfer to the vascular facility. 11 patients (22%) underwent open surgical repair and 13 patients (26%) underwent EVAR. Of those who underwent intervention (24 patients), only 11 survived. From hospital attendance to CTA and from CTA clinching diagnosis to transfer to K&CH, the median times were 95(9-1140) and 70(27-370) minutes, respectively. Median time from arrival to K&CH to theatre was 90(11-190) minutes.

### Conclusions

There are no current explicit UK guidelines on the emergency management of rAAA, with variation in practice and our audit shows room for improvement, including patient selection for referral, diagnostic tools and the conditions under which the transfer is made. Thus, we have created a pathway to improve the rapid diagnosis and transfer between the Kent hospitals.

## VS Oral Abstracts (PAD, Renal Access, Carotid)

VO1

### The natural history of disease progression following toe amputation and concomitant angioplasty: the impact of angioplasty timing

Miss Paige Simson<sup>1</sup>, Mr Matthew Hinckley<sup>2</sup>, Mr Omar Ehsan<sup>2</sup>, Mr Alex Vesey<sup>2</sup>, Mr Maaz Syed<sup>2</sup>

<sup>1</sup>University of Glasgow, Glasgow, Scotland, <sup>2</sup>University Hospital Hairmyres, East Kilbride, Scotland

#### Introduction:

The timing of angioplasty with respect to toe amputation may influence the ultimate fate of the limb. This study examines the natural history of limb threat in patients following toe amputation with respect to timing of angioplasty.

#### Methods:

A retrospective cohort study analysed all toe amputations from 2014-2022 undergoing concomitant angioplasty. Patients were categorised based on angioplasty timing: historical (>90 days), recent (<90 days), and salvage (post-amputation). The primary endpoint, a composite of limb loss and all-cause mortality, was assessed using Kaplan Meier analysis.

#### Results:

A total of 218 limbs were followed-up for a median of 419 (IQR 90-1226) days, 15% of patients required major limb amputation within 30 days of toe amputation, and 26% experienced limb loss within a year. The primary endpoint occurred at a median of 160 (IQR 25-734) days, with the salvage angioplasty group (n=98) exhibiting significantly higher incidence compared to the recent (n=80) and prior (n=40) angioplasty groups (p<0.001).

#### Conclusion:

Patients receiving salvage angioplasty faced a significantly higher risk of limb loss and death. This emphasizes the importance of performing angioplasty prior to toe amputation whenever feasible, as it may influence outcomes, potentially preventing limb loss and death.

VO2

## Impact of Age Differences in Chronic Limb Threatening Ischaemia Outcomes in Octogenarians

Mr Sai Wunnava<sup>1</sup>, Mr Krishna Ravulapalli<sup>1</sup>, Mr Yousef Yousef<sup>1</sup>, Mr Tamer El-Sayed<sup>1</sup>, Mr Sandip Nandhra<sup>1</sup>

<sup>1</sup>The Northern Vascular Centre, Freeman Hospital, Newcastle, United Kingdom, ,

Introduction: Chronic limb threatening ischaemia (CLTI) is associated with high morbidity and mortality. This study explores differences in octogenarian and non-octogenarian CLTI patients – a potentially contentious area with limited evidence.

Methods: Retrospective review of CLTI admissions to a UK tertiary vascular centre during 2020. Analysis included descriptive statistics. The primary outcome was survival (by Kaplan-Meier with secondary outcomes being major adverse limb (MALE) and cardiovascular events (MACE).

Results: 183 patients, with a median age of 72 and 55(30%) octogenarians. Fewer octogenarians were diabetic (38.2% vs 58.6%,  $P=0.015$ ), but comorbidities such as previous stroke (25.5% vs 10.9%,  $P=0.015$ ) and atrial fibrillation (36.4% vs 16.4%,  $P=0.004$ ) were increasingly common. 87.3% of octogenarians had moderate or severe frailty compared to 57.8% in those <80 ( $P=0.001$ )(by electronic frailty index).

Median survival time was 30 months with no significant difference between groups ( $P=0.406$ ).

MACE (0.00% vs 5.47%,  $P=0.10$ ) and MALE (36.4% vs 23.4%  $P=0.10$ ) were comparable. Octogenarians were less likely to have bypass surgery (5.45% vs 20.3%,  $P=0.014$ ).

Conclusions: Octogenarians have similar cardiovascular, limb and survival outcomes following intervention despite being increasingly frail and comorbid. Any hesitation to intervene is perhaps unwarranted. Quality of life or activity may be more important in this group.

## Long-term outcomes of primary femoropopliteal stents: a single-centre experience

Dr Carolina Alvim Roup Rosa, Justin Ho, Guglielmo La Torre, Hannah Taylor, Amir Helmy, Diane R Hildebrand, Nadeem A Mughal, Manjit S Gohel, Jonathan R Boyle, Mohammed M Chowdhury

<sup>1</sup>Cambridge Vascular Unit, Department of Surgery, University of Cambridge, Cambridge University Hospital Trust, Cambridge, United Kingdom, <sup>2</sup>Department of Interventional Radiology, University of Cambridge, Cambridge University Hospital Trust, Cambridgeshire, INTRODUCTION:

Endovascular stenting of the femoropopliteal segment can aid symptom control or limb salvage in symptomatic PAD. Data are lacking regarding stent surveillance programmes despite concerns over long-term patency rates.

### METHODS:

230 patients (238 limbs) with symptomatic PAD who underwent femoropopliteal stent insertion between January 2015 and April 2023, were included. Cox proportional hazards regression was used to identify risk factors associated with primary patency (PP) and amputation-free survival (AFS).

### RESULTS:

The mean(SD) total stent length for the 238 limbs was 183(111) mm, of which (26/238)10.9% were heparin-coated, and (28/238)11.8% drug-eluting. Mean(SD) age was 74.7(11.1) years. Loss of PP was seen in (78/238)32.8%, (113/238)47.5%, (173/238)72.7%, (209/238)87.8%, and (226/238)95.0% at 6 months, 1, 3, 5, and 7 years respectively. Within 6 months of stenting, (44/238)18.5% of patients had a major limb amputation and (28/238)11.8% had died.

Loss of PP was associated with diabetes (HR, 2.93; 95% CI, 1.14-7.51; P=0.025) and smoking status (HR, 1.94; 95% CI, 1.069-3.537; P=0.029). Statin use was associated with increased AFS (HR, 0.159; 95% CI, 0.022–0.767; P=0.022).

### CONCLUSION:

Femoropopliteal stenting in this cohort demonstrates poor primary patency and an association with poor outcomes. A formal surveillance programme to enable earlier intervention may improve overall and limb-specific outcomes.

VO4

## Long-term outcomes of the Secondary extension technique (SET) in the management of Dialysis Access Associated Steal Syndrome (DASS)

Mr Haytham Al-khaffaf<sup>1</sup>, Mr Hazem Elsantawy<sup>1</sup>, Mr Amr Abdelhaliem<sup>1</sup>, Mr Taher Faydi<sup>1</sup>, Mr Emad El-Areef<sup>1</sup>, Mr Huthayfa Ghanem<sup>1</sup>

<sup>1</sup>Department of vascular surgery, East Lancashire hospitals NHS Trust, Blackburn, United Kingdom

**Objectives:** To report our 22-year results of the Secondary Extension Technique (SET) in the management of Dialysis access associated steal syndrome (DASS).

**Methods:** SET entails dismantling an established Brachio-cephalic/Basilic fistula and extending it to just below the brachial bifurcation by using the same vein, to improve flow to the hand. Patients were evaluated for resolution of symptoms, patency and adequacy of needling.

**Results:** Over 22y period, 31 patients with DASS underwent surgery using SET. In one patient, the procedure could not be completed due to heavy arterial calcification. Complete symptom resolution was seen in 30 of the 31 patients (96.7%), with improvements in pain, sensori-motor disturbance and temperature. All 30 patients had a patent fistula at six-months follow up. However, at 12 months, 3 (9.6%) developed fistula thrombosis which could not be salvaged, and 2 (6.6%) developed thrombosis, successfully salvaged.

**Conclusion:** Our study shows that (SET) is an effective treatment for DASS and results have demonstrated a high level of fistula patency and a low rate of complications. It has several advantages when compared to other established treatment methods and has the versatility to be used as a method for DASS prevention as well as treatment.

## Streamlined management pathways reduce major amputations in chronic limb-threatening ischaemia

Mr John Houghton<sup>1,2</sup>, Anna Meffen<sup>1</sup>, Miss Sarah Nduwayo<sup>1</sup>, Imelda Black<sup>1</sup>, Mr Andrew Nickinson<sup>1</sup>, Amirah Essop-Adam<sup>1</sup>, Miss Sarah Jane Messeder<sup>1,2</sup>, Natasha Bryant<sup>1</sup>, Prof Laura Gray<sup>1</sup>, Tanya Payne<sup>1</sup>, Mr Harjeet Rayt<sup>2</sup>, Dr Victoria Haunton<sup>3</sup>, Mr Robert Davies<sup>2</sup>, Prof Rob Sayers<sup>1,2</sup>

<sup>1</sup>University Of Leicester, Leicester, United Kingdom, <sup>2</sup>University Hospitals of Leicester NHS Trust, Leicester, United Kingdom, <sup>3</sup>University of Plymouth, Plymouth, United Kingdom

### Introduction:

Patient characteristics and patterns of disease in CLTI have changed markedly in recent years. Limb-salvage clinics and timely revascularisation are now recommended. This study aimed to compare contemporary major amputation incidence in CLTI patients to an historical cohort.

### Methods:

Single-centre observational study (NCT04027244). A prospective CLTI cohort was recruited between May 2019 and March 2022. An historical cohort presenting during 2013-2015 (inclusive) was identified retrospectively. The primary outcome was major amputation at one-year. Analysis was by Fine-Gray competing risks models (death as the competing risk) adjusted for propensity score, presented as subdistribution hazard ratios (SHR).

### Results:

A total of 928 patients were included (432 prospective; 496 historical). Proportions of patients presenting with tissue loss (72.2% vs 71.6%;  $p=.090$ ) and rest pain (78.2% vs 81.9%;  $p=.098$ ) were similar.

At one-year 48 patients (11.1%) in the prospective cohort and 124 patients (25.0%) in the historical cohort had undergone a major amputation ( $p<.001$ ). The risk of major amputation was 57% lower in the prospective cohort compared to the historical cohort after adjustment for propensity score (SHR 0.43; 95% CI 0.29, 0.63;  $p<.001$ ) (Figure 1).

### Conclusions:

Contemporary management strategies may have more than halved one-year major amputation incidence in patients presenting with CLTI.

## Machine learning for risk and outcome forecasting in intermittent claudication

Mr Bharadhwaj Ravindhran<sup>1</sup>, Dr Jonathon Prosser<sup>1</sup>, Dr Arthur Lim<sup>1</sup>, Dr Ross Lathan<sup>1</sup>, Miss Louise Hitchman<sup>1</sup>, Mr Daniel Carradice<sup>1</sup>, Mr George Smith<sup>1</sup>, Professor Dhaval Thakker<sup>2</sup>, Professor Ian Chetter<sup>1</sup>, Dr Sean Pym<sup>1</sup>

<sup>1</sup>Hull York Medical School, Hull, UK, <sup>2</sup>Univeristy of Hull, Hull, UK

**Introduction:** There is significant variation in the management of intermittent claudication (IC), leading to variations in outcomes. We propose a machine learning(ML) model that provides personalised outcome forecasts for different management strategies.

**Methods:** The algorithm was developed to predict critical limb-threatening ischemia(CLTI), revascularisation, major adverse cardiovascular events(MACE), and major adverse limb events(MALE) at 1,2 and 5 years using an anonymized dataset of 250 patients with IC, incorporating 29 characteristics and initial treatment strategies of no treatment, best medical therapy, percutaneous transluminal angioplasty(PTA), supervised exercise therapy(SET) or PTA+SET. Algorithm performance was then evaluated using a different dataset of 250 patients. Decision curve analysis(DCA) evaluated clinical utility.

**Results:** The algorithm dynamically assigned weights to each of the characteristics and treatments to predict outcomes. Calibration curves demonstrated consistency between predicted and actual outcomes. The area under the receiver operating characteristic curve values indicated good discriminatory capacity(0.784 for CLTI,0.792 for MACE,0.772 for MALE, and 0.783 for revascularisation) regardless of the initial treatment strategy.DCA confirmed its clinical utility, outperforming traditional logistic regression.

**Conclusion:**Our ML model successfully predicts outcomes for patients with IC across a number of initial treatment strategies.It therefore has the potential to enhance risk stratification and improve patient outcomes.



## Investigating Anaemia Prevalence and its Impact on Diabetic Foot Ulcers Outcomes

Miss Celina Harmen<sup>1</sup>, Dr Alexandra Norman<sup>1</sup>, Miss Louise Hitchman<sup>2</sup>, Mr Joseph Shalhoub<sup>3</sup>, Professor David Russell<sup>4</sup>, Mr Sandip Nandhra<sup>1</sup>, Mr Tamer El-Sayed<sup>1</sup>

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Introduction: Diabetic foot ulcer (DFU) carries substantial morbidity and mortality, which could be exacerbated with anaemia. This study explores anaemia prevalence, and its impact on DFU outcomes.

Methods: DFU clinic outpatients in two UK vascular centres were followed up over 12 months. WIFI, SINBAD and IWGDF scoring systems stratified DFUs. Anaemia levels were measured against DFU clinical outcomes.

Results: 143 DFU patients were included (79% males, median age 71.5yrs [IQR 63-82]) with median follow up 12 months. 77 patients (53.8%) were anaemic, and sub-grouped to 59 mild (76.6%), 13 moderate (16.9%), and 5 severe anaemia (6.5%). Severely anaemic had longer ulcer duration (P=0.004, r=0.9).

22 anaemic patients (28.6%, P=0.001) received treatment (12 oral iron, 6 intra-venous iron, and 4 blood transfusion), leaving 80% mild, 50% moderate, and 20% severely anaemic untreated.

SINBAD and WIFI scoring varied among anaemia subgroups (P=0.0006 and P=0.002, respectively). SINBAD and IWGDF scores negatively correlated with haemoglobin levels (P=0.005, r=-0.23 and P=0.046, r=-0.17, respectively). Hospital admissions were more frequent in the anaemic cohort (55 vs. 31, respectively, P=0.003), other outcomes were comparable.

Conclusion: The majority of DFU patients were inadequately treated for anaemia, despite its correlation with DFU severity and increased hospital admissions.

## Using the National Consultant Information Programme (NCIP) to assess national variation in longer-term outcome measures for patients undergoing a lower limb bypass in England

Ms Ellie Atkins<sup>1</sup>, Ms Lucy Young<sup>3</sup>, Mr Matthew Booth<sup>3</sup>, Mr Andy Wheeler<sup>3</sup>, Mr Stephen Lewis<sup>3</sup>, Professor Sir Norman Williams<sup>3</sup>, Mr Arun Pherwani<sup>4</sup>, Mr Jonathan Boyle<sup>2</sup>

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NHS England's NCIP tool uses hospital episode statistics (HES) data to understand national variation in surgical practice at surgeon and Trust level with the purpose of driving improvement in outcomes for patients. The aim of this study was to report longer-term outcomes for lower limb bypass than are available from the National Vascular Registry (NVR).

Data were extracted from the NCIP tool for patients undergoing a lower limb bypass between April 2020 and March 2023 including 30-day readmission rate, 1-year mortality and 1-year amputation rate.

15,747 lower limb bypasses were performed during the study period. 18.7% of patients had an all-cause readmission within 30-days (range 7-34%). The NVR reports a 13.6% readmission rate for emergency lower limb bypass in 2020-2022. 12.5% (range 8-18%) of patients died within one year of their index procedure. 12.2% (range 6-20%) of patients had a major lower limb amputation within one year.

This is the first time that the national picture for longer-term outcome measures for lower limb bypass has been reported from NCIP. Large variation between Trusts and responsible surgeons was identified. The NVR likely underestimates readmission rates. Further analysis to understand the variation and where best practice can be shared is required.

## When two become none: the fate of the contralateral leg following major lower limb amputation and the association of ambulation with future limb loss.

Dr. Keegan Chua<sup>1</sup>, Ms. Allison Winarski<sup>1</sup>, Mr. Russell Jamieson<sup>1</sup>, Dr. Lynne Hutton<sup>2</sup>, Ms. Rachael Forsythe<sup>1</sup>

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Major lower limb amputation (MLLA) causes life-altering changes in mobility and poor life expectancy. This study aimed to examine contralateral MLLA rates following primary MLLA and its association with ambulation status.

In a retrospective review of consecutive patients undergoing MLLA at a tertiary hospital over 18 months, outcomes data included proportion, cause and time to contralateral MLLA. The Special Interest Group in Amputee Medicine (SIGAM) score was used to assess ambulation, with outcome comparisons in low- versus moderate/high ambulation using chi-square and regression analysis.

162 patients (mean age  $67.6 \pm 11.6$  years, 75.9% male, 63.0% with diabetes) underwent below- (56.2%) or above-knee (43.8%) amputation, with a 12-month survival of 86%. During follow up (median 22 months (IQR, 15, 28)), 38 (23.5%) patients underwent contralateral amputation at a median time of 11 months (IQR, 5, 33.75), primarily due to chronic limb-threatening ischaemia (47.2%, n=17) or diabetic foot infection (27.8%, n=10). Low ambulation was associated with a significantly increased risk of contralateral amputation compared to moderate-to-high ambulation ( $X^2=4.35$ ,  $p=0.04$ ;  $R^2=0.47$ ,  $p=0.03$ ).

Patients requiring MLLA continue to have a high risk of contralateral MLLA (24%) or death (14%) within 12 months. Poorly ambulating patients are a high-risk cohort for subsequent MLLA.

VO10

## Short-term longitudinal Quality of Life in Chronic Limb-Threatening Ischaemia; results from the FrailTI (Frailty in chronic Limb Threatening Ischaemia) Study

Mr Blaise Hickson<sup>1</sup>, Mr Ashwin Sivaharan<sup>2</sup>, Mr Tamer El-Sayed<sup>2</sup>, Professor Miles Witham<sup>3</sup>, Mr Sandip Nandhra<sup>2</sup>

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### Background:

The impact of Chronic Limb Threatening Ischaemia (CLTI) on Quality of Life (QoL) is not well understood. This study explores QoL in patients with CLTI and the ability to perform activities of daily living (ADLs) using the FrailTI dataset.

### Methods:

Baseline and 90-day quality of life (by EQ-5D) and activity of daily living (by Nottingham Extended ADL (NEADL)) was evaluated as part of FrailTI; a UK multi-centre, prospective, observational study, funded by the National Institute for Health Research (NIHR). Full ethical approval (21/PR/0750) was granted on 13/07/2021.

### Results:

84 participants (6 UK centres) were included. The greatest improvements were observed in usual activities and pain management following treatment (Figure) with declines in self-care and anxiety and depression. There was no statistical difference between EQ-5D score (0-100) baseline and follow-up (p-value = 0.568). NEADL revealed a mean decrease of 7 (IQR - 16 to 2) over 90-days. There was an association between NEADL and EQ-5D.

### Conclusion:

The QoL impact of CLTI, uniquely explored here, must be considered as it is associated with recovery. Improving pain management (not necessarily by revascularisation) can improve activity. The loss of independence is associated with a decline in quality of life.

VO11

## Pain Relief in Major Amputation (PRIMA): A randomised clinical trial comparing pre-incision 'single-shot' nerve block and continuous perineural catheter for those undergoing a major lower limb amputation

Mrs Lauren Shelmerdine<sup>1</sup>, Mr Ashwin Sivaharan<sup>1</sup>, Dr Alexandra Norman<sup>1</sup>, Ms Noala Parr<sup>1</sup>, Ms Samantha Mallon<sup>1</sup>, Dr Richard Bentley<sup>2</sup>, Dr Martin Jones<sup>2</sup>, Dr Ian Baxter<sup>2</sup>, Mr Sandip Nandhra<sup>1</sup>

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Background:

Improving pain is a JLA priority for both vascular and anaesthetic groups following major lower limb amputation(MLLA). The results of a 'pre-incision nerve-block' RCT are presented.

Methods:

This prospective, RCSEd funded, single-blind, randomised controlled trial(RCT) compares a single-shot(SS) block to perineural-nerve-catheter(PNC) infusion for 7-days. Patient data (recruited 07/2021-01/2023) included baseline demographics, medication and comorbidities. The primary outcome was the visual analogue scale(VAS) at day 3. Secondary outcomes included daily pain-scores(using VAS), post-operative nausea and vomiting(PONV) scale (from day 1 to 7), length-of-stay, engagement with physiotherapy, and quality of life(EQ5D).

Results:

37 patients were randomised(1:1). The groups were matched for age, gender, body-mass-index, baseline frailty score, and most comorbidities (except diabetes, over-represented in the SS group( $p=0.005$ )). There was no significant difference in VAS between the groups at Day 3( $p=0.2$ ). Similarly, there was no significant difference in mean VAS, POSS and PONV score over 7 days or levels of engagement with physiotherapy and EQ5D. The anaesthetic time was significantly longer for the PNC group( $p<0.05$ , 99.7mins vs 62.3mins).

Conclusion:

Our RCT suggests that there is no significant difference in between single-shot (SS) block and perineural-nerve-catheter(PNC) for short-term MLLA outcomes. Analgesic and phantom-limb pain data is being analysed.

VO12

## The impact of hyponatraemia on perioperative outcomes in chronic limb-threatening ischaemia

Miss Ananyaa Jain<sup>1</sup>, Mr Henry Bergman<sup>2</sup>, Miss Diane Hildebrand<sup>3</sup>

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### Introduction

Hyponatraemia, a common electrolyte abnormality, is associated with adverse outcomes in cardiovascular conditions including myocardial infarction. Despite this, hyponatraemia remains unexplored in peripheral arterial disease and chronic limb-threatening ischaemia (CTLI). This study investigated the association between hyponatraemia and clinical outcomes in CTLI patients.

### Method

A retrospective audit of electronic patient records was performed on 3508 CTLI patients in a single tertiary Vascular unit between 01/2015-12/2022. Serum sodium levels were recorded on admission and discharge, and pre-specified outcome measures included: mortality (30-day, 90-day, 1-year), amputation (major and minor), rate of revascularisation, and inpatient stay duration.

### Results

The prevalence of hyponatraemia was 32.1% on admission and 32.7% on discharge. Hyponatraemia on admission correlated with higher 30-day mortality (5.68% vs 3.06%,  $P=0.003$ ), 90-day mortality (9.86% vs 6.26%,  $P=0.0002$ ) and 1-year mortality (20.6% vs 15.16%,  $P<0.0001$ ). Additionally, it was associated with a higher incidence of all amputation types (Minor:18.03% vs 14.86%,  $P=0.0176$ ) (Major:24.07% vs 15.45%,  $P<0.0001$ ). Hyponatraemia on discharge was associated with a higher incidence of major amputations (24.13% vs 15.34%,  $P<0.0001$ ).

### Conclusions

This study reveals hyponatraemia as a common and high-risk electrolyte derangement for Vascular patients. Hyponatraemia at admission is associated with higher mortality and at any timepoint with increased limb-loss rates.

VO13

## A prospective cohort study of CLTI management in a single UK arterial centre with 1-year follow-up.

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<sup>1</sup>Bradford Teaching Hospitals Foundation Trust, Bradford, UK

### Introduction

Modern UK vascular services must be equipped to deal with an ever more complex CLTI population. This study aims to evaluate a single-centre experience of all CLTI referred within 1 year.

### Methods

All patients referred with confirmed CLTI from November 2020 to November 2021 were included prospectively. Data points were collected from electronic records.

### Results

In total, 328 patients presented with CLTI, tissue loss being present in 240 (73%). Revascularisation was performed in 260 patients (79%) - endovascular-first 175 (53%); open surgery-first 85 (26%). Primary major limb amputation (MLA) occurred in 16 patients (5%), and 49 (15%) were palliated. At 1-year follow-up, amputation-free survival was achieved in 176 patients (54%). Survival analysis comparing endovascular- vs open surgery-first strategies found no significant difference in amputation-free survival. Adverse outcomes at follow-up were largely driven by mortality - 118 (36%) died during the follow-up period, with only an additional 27 (8%) undergoing index limb MLA.

### Conclusions

The current UK CLTI population is heavily comorbid and presents with advanced disease. Their prognosis is poor with only half alive without an amputation at 1 year. Contemporaneous CLTI service evaluation and engagement with primary care will be necessary to drive improvements in UK vascular centres.

VO14

## COST anaLYsis of Target Lesion Revascularization (TLR) in patients with femoropopliteal in-stent-restenosis or occlusion: the COSTLY-TLR study

Ms Sarah Jane Messeder<sup>1,2,3</sup>, Ms Bhavisha Patel<sup>2,3</sup>, Mr Giovanni B. Torsello<sup>3</sup>, Ms Yamel Cardona-Gloria<sup>3</sup>, Mr Giovanni F. Torsello<sup>3</sup>, Ms Isabelle V. Herzeele<sup>3</sup>, Ms Nicola Troisi<sup>3</sup>, Mr Emiliano Chisci<sup>3</sup>, Mr Giacomo Isernia<sup>3</sup>, Mr Fino Gianluigi<sup>3</sup>, Mr Stefano Fazzini<sup>3</sup>, Mr Raphael Coscas<sup>3</sup>, Mr Andrés Reyes Valdivia<sup>3</sup>, Mr Sergio Gordillo<sup>3</sup>, Mr Mario D'Oria<sup>3</sup>, Mr Sandro Lepidi<sup>3</sup>, Ms Mercedes Guerra Requena<sup>3</sup>, Mr Konstantinos Stavroulakis<sup>3</sup>, Mr Athanasios Saratzis<sup>1,2,3</sup>

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### Introduction:

This multicentre series aimed to precisely define and report the costs associated with a target lesion revascularisation (TLR) procedure in patients with femoropopliteal in-stent-restenosis and/or occlusion (ISR).

### Methods:

A multicentre retrospective observational study across 13 hospitals in Europe recruited consecutive patients with femoropopliteal ISR between January 2017 and December 2021. Primary outcome was overall cost of the TLR procedure from hospital presentation until discharge. Secondary outcomes included re-intervention, major lower limb amputation rate and mortality.

### Results:

482 TLR procedures were identified with the majority for Rutherford Stage 5 (58%). Distal popliteal artery involvement affected 84% and  $\geq 1$  below the knee artery occlusion in 41%. Plain balloon angioplasty was undertaken most (91%) followed by bare-metal-stenting (62%). 43% of patients were admitted to intensive care (median 2 days IQR 1-17). Mean inpatient ward cost for all procedures was €399 ( $\pm 300$ ). Mean intra-operative costs including salary-incurring costs for all procedures was €21,917 ( $\pm 2,110$ ); €23,337 ( $\pm 8,920$ ) open procedures; €22,806 ( $\pm 3,977$ ) hybrid and €12,903 ( $\pm 3,108$ ) endovascular. Technical success rate was 70%, re-intervention rate 8%, 30-day major amputation rate 4% and 30-day mortality 1%.

### Conclusion:

This is the first pragmatic study to highlight the significant costs associated with a TLR procedure for femoropopliteal ISR.



VO15

## Patient acceptability to the COMPASS trial recommendations following symptomatic carotid endarterectomy (CEA)

Dr Tom Eveson<sup>1</sup>, Miss Lucinda CRUDDAS<sup>1</sup>, Mr Daryll Baker<sup>1</sup>

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### Introduction

The COMPASS trial demonstrated low-dose Rivaroxaban and Aspirin provide greater protection against cardiovascular events than Mono-antiplatelet therapy (MAPT) alone. As this involves extra medications, patient acceptability is assessed following CEA.

### Methods

Following CEA, the views of 65 patients on Compass were compared with 55 on MAPT. Views on medications were assessed using the Beliefs about Medicine Questionnaire (BMQ) and drug adherence using the Sidorkiewicz scoring system. Side effects and new cardiovascular events were determined.

### Results

Both groups were a similar age (mean 69.8±/8.4y) and gender (M:F 2:1). Preoperative co-morbidities (hypertension, ischaemic heart disease, heart failure, diabetes, renal failure and smoking) were similar, as were intervention indications (TIA or stroke). There was no difference between Compass and MAPT in BMQ for “Necessity” (20v20), “Concerns” (10 v11) or “Necessity–Concerns differential” (7v9) ( $p>0.05$ ). Drug adherence was similar with a median showing “Good drug adherence”. The incidence of minor (bruising) and major (melena) bleeding complications was similar. The number of new strokes and PAD was similar. There were more cardiac events with MAPT  $p<0.01$  (2-v-10 cases).

### Conclusions

Patients’ views on medications and drug adherence are similar on Compass as MAPT. This demonstrates no patient resistance to changing to Compass to further reduce cardiovascular events.

VO16

## Intravascular ultrasound-guided treatment of chronic limb threatening ischaemia leads to improved amputation-free survival rates

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<sup>2</sup>Department of Interventional Radiology, Guy's And St Thomas' NHS Foundation Trust, ,  
Background

Intravascular ultrasound (IVUS) aids in accurate vessel sizing and intra-procedural identification of residual lesions and dissections. We evaluated medium-term outcomes of IVUS use in the treatment of patients with chronic limb threatening ischaemia (CLTI) due to infrainguinal disease.

### Methods:

Prospectively collected data from all IVUS-guided infra-inguinal interventions in CLTI patients between 2019 and 2021 were analysed. Outcomes measured included (1) IVUS identified lesion leading to further intervention and (2) primary patency and amputation free survival (AFS).

### Results:

A total of 81 patients were included with a median age of 73 years and 30% were females. IVUS identified a flow-limiting dissection in 15 (19%) patients that had not been identified on angiography; all (100%) leading to bail-out stenting. IVUS also led to further treatment in 26 of 34 (76%) flow-limiting stenoses. When compared to femoral/popliteal lesions, AFS was not worse for patients with crural (hazard ratio 1.22 [0.41-3.56], P=0.72) or multi-level (HR 1.24 [0.53-2.92, P=0.62]) disease. (Figure-1)

### Conclusion:

Intra-operative IVUS effectively identifies and treats haemodynamically significant residual stenosis/dissection in complex infra-inguinal endovascular procedures leading to improved medium-term amputation-free survival rates.

VO17

## The association between completion of supervised exercise therapy and long-term outcomes in patients with intermittent claudication, concomitant sarcopenia and cardiometabolic multimorbidity

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<sup>1</sup>Hull York Medical School, Hull, UK

**Introduction:** The combination of intermittent claudication(IC), cardiometabolic multimorbidity(CMM) and sarcopenia is associated with worse outcomes than IC alone. This study aimed to identify whether the completion of SET attenuates these adverse outcomes in this cohort.

**Methods:**This registry analysis included consecutive IC patients with concomitant CMM and sarcopenia, who were referred for SET from 2014 to 2017. Sarcopenia was assessed using the L3-skeletal muscle index (L3SMI) from CT scans in the preceding 18 months by two independent raters. Outcomes of interest were progression to chronic limb-threatening ischemia(CLTI), major adverse cardiovascular events(MACE), and major adverse limb events(MALE). Survival and Cox-regression analyses were performed.

**Results:**Eighty-two patients with a combination of IC, CMM and sarcopenia were included. Of these, 56 declined or prematurely discontinued SET and 26 completed SET. Baseline characteristics and L3SMI did not significantly differ between groups. Cohen's kappa coefficient for L3SMI measurements between observers was 0.6. Completion of SET was associated with slower progression to CLTI(HR:0.23;95%CI:0.07-0.69;p=0.02) and a reduced risk of MALE(HR:0.21;95%CI:0.057-0.775;p=0.02). However, there was no reduction in the risk of MACE(HR:0.88; 95%CI:0.423-1.629;p=0.73). Models demonstrated good predictive accuracy(Harrell's C-index>0.6).

**Conclusion:**Completion of SET was associated with significant improvements in adverse limb outcomes in patients with IC, concomitant sarcopenia and CMM.

VO18

## Sex Differences in Patients with Chronic Limb Threatening Ischaemia – A Bypass vs. Angioplasty in Severe Ischaemia of the Leg Prospective Cohort Study Analysis

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### Introduction

Multiple studies have reported that females with chronic limb threatening ischaemia (CLTI) suffer poorer outcomes. Our aims are to describe the sex-related differences in all comers with CLTI in the prospective study linked to BASIL-2.

### Methods

Patients presenting to an academic vascular unit between 2014 and 2018 with CLTI had baseline characteristics recorded and were followed for a minimum of 4.4 years. Outcomes were analysed based on sex. The primary outcome was overall survival (OS). Secondary outcomes included first initial management, amputation free survival (AFS) and limb salvage (LS). Patient consent and ethics was gained.

### Results

Data was collected on 471 patients (311 male, 160 female). There were significant differences in baseline demographics (higher rate of diabetes, smoking habit, more previous minor amputations, and more tissue loss in males however, age at presentation was higher in females). There was no difference in OS (HR 0.97 95% CI 0.77-1.22, p=0.8), AFS or LS despite a difference in management at first presentation (p=0.03), in that women were more likely to be managed conservatively than men.

### Conclusion

Despite significant differences in demographics, disease presentation and management between consecutive patients with CLTI based on sex there was no impact on survival or limb-based outcomes.

VO19

## The oxygenation status of calf and foot musculature predicts inadequate revascularisation in patients with limb ischemia

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Background:

Management of CLTI relies on clinical signs and non-functional assessments. Calf muscle oxygenation, measured by BOLD MRI, correlates with the severity of limb ischaemia. We aimed to develop BOLD for the foot and to determine calf/foot oxygenation after limb revascularisation.

Methods:

T2\* BOLD MRI of the foot and calf at 3.0T were carried out prior to and up to 14 days after revascularisation. Gradient (Grad), measured on T2\* curve, indicated muscle oxygenation. Changes in calf/foot oxygenation were correlated with limb outcomes.

Results:

48 patients [30 male, median age 73(59-88)] underwent pre-intervention foot BOLD scanning, with good inter-scan ( $P<0.0001$ ) and inter-user ( $P<0.0001$ ) reproducibility for Grad. CLTI patients had lower foot Grad than claudicants ( $P<0.0001$ ). 61 patients [40 male, median age = 68 (60-85)] had pre and post intervention BOLD of the calf and foot. Patients with unsuccessful revascularisation had a lower fold change in calf Grad ( $P<0.0001$ ) and foot Grad ( $P<0.03$ ). BOLD of the Calf [sensitivity=82.14% (64.14%-92.12%), specificity=75% (46.77%-91.11%),  $P<0.0001$ ] was superior to the foot [(n=21, sensitivity 100% (79.61%-100%), Specificity 66.67% (3%-94.08%),  $P=0.0051$ ] for predicting outcomes after revascularisation.

Conclusion:

BOLD MRI is a reliable tool for assessing oxygenation in the calf and foot muscles of patients with limb ischaemia.

VO20

## RANDOMisation Screening for drug-coated or drug-eluting device randomised Trials amongst patients undergoing endovascular femorOPopliteal procedures (RANDOM-STOP study)

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Introduction:

Paclitaxel demonstrates promising results in randomised controlled trials (RCTs) for femoropopliteal disease, however, patient enrollment is often highly selected. This study aimed to assess the proportion of patients undergoing endovascular therapy for femoropopliteal disease who would be eligible to take part in the seven major RCTs assessing paclitaxel-based devices.

Methods:

Between January and December 2021, all consecutive patients who underwent endovascular procedures for symptomatic femoropopliteal disease in 16 European centres were retrospectively screened and included. The primary outcome was individual patient eligibility for inclusion into at least one of the seven RCTs. Reasons for exclusion (clinical and/or radiological), as well as in-hospital mortality and morbidity, were additionally reported.

Results:

1567 consecutive patients (959 male, 61%), corresponding to 1567 lower limbs, were included. Most patients (1009 patients, 64.39%) were treated for chronic limb-threatening ischemia (CLTI). A total 1280 patients (81.68%) were not eligible for inclusion in any of the evaluated RCTs. Of them, 741 (47.29%) were excluded due to clinical and 1125 (71.79%) due to radiological criteria.

Conclusions:

The analysed RCTs assessing the efficacy/effectiveness of paclitaxel-based endovascular therapies do not seem representative of the patient population with femoropopliteal disease receiving endovascular therapy in routine practice.

VO21

## A detailed investigation of the wound, ischaemia, and foot infection score in all-comers with chronic limb-threatening ischaemia.

Mr John Houghton<sup>1,2</sup>, Anna Meffen<sup>1</sup>, Miss Sarah Nduwayo<sup>1</sup>, Imelda Black<sup>1</sup>, Mr Andrew Nickinson<sup>1</sup>, Amirah Essop-Adam<sup>1</sup>, Miss Sarah Jane Messeder<sup>1,2</sup>, Natasha Bryant<sup>1</sup>, Prof Laura Gray<sup>1</sup>, Tanya Payne<sup>1</sup>, Mr Harjeet Rayt<sup>2</sup>, Dr Victoria Haunton<sup>3</sup>, Mr Robert Davies<sup>2</sup>, Prof Rob Sayers<sup>1,2</sup>

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### Introduction:

This study aimed to investigate the relationship of Wifl stage with baseline frailty, disability, and quality of life (QoL), in addition to one-year major amputation, in patients with CLTI.

### Methods:

Single-centre prospective cohort study (NCT04027244) recruited CLTI patients between May 2019 and March 2022. Frailty, disability and QoL assessments were performed at baseline. The primary outcome was major amputation at one-year. Analysis was by Fine-Gray competing risks models (death as competing risk) presented as subdistribution hazard ratios (SHR).

### Results:

432 patients were included. Breakdown of Wifl stages was: 52 (12.0%) stage 1, 112 (25.8%) stage 2, 107 (24.7%) stage 3, 92 (21.2%) stage 4, and 71 (16.4%) had incomplete Wifl scores. Increasing Wifl stage was associated with increasing prevalence and severity of frailty ( $p=.002$ ) and greater disability ( $p<.001$ ). QoL scores were similar for each Wifl stage. Amputation incidence for individual Wifl scores was largely consistent with stage classification (Table 1). Increasing Wifl stage was independently associated with higher risk of major amputation (SHR 2.00; 95%CI 1.34, 3.00;  $p=.001$ ).

### Conclusions:

Wifl classification is predictive of major amputation at one-year in CLTI patients. Whilst Wifl classification is associated with both frailty and disability, it is not associated with QoL at baseline.

VO22

Using the National Consultant Information Programme (NCIP) to assess national variation in patient outcomes undergoing Major Lower Limb Amputation (MLLA) in England over a 3 year period (April 2020 to March 2023) in contrast to National Vascular Registry (NVR) data.

Miss Helen Sутtenwood<sup>1</sup>, Miss Lucy Young<sup>2</sup>, Mr Andrew Wheeler<sup>2</sup>, Mr Stephen Lewis<sup>2</sup>, Professor, Sir Norman Williams<sup>2</sup>, Mr Jonathan Boyle<sup>3</sup>, Mr Arun Pherwani<sup>1</sup>

<sup>1</sup>University Of North Midlands Hospital, Stoke , UK, <sup>2</sup>National Consultant Information Programme (NCIP), , UK, <sup>3</sup>Cambridge University Hospitals NHS Foundation Trust, Cambridge , UK

Introduction

NCIP uses multiple data sources including Hospital Episode Statistics (HES) to understand national variation in discrete episodes of surgical practice and procedures driving improvement. Less granular metrics derived from NVR also audits patient outcomes.

Methods

NCIP data assessed outcomes for adult patients (>16 years) undergoing MLLA (OPCS-4 X09) including 30-day readmissions, longer-term 180-day mortality, higher level amputation revision, and below knee (BK) amputation proportions. NVR identifies similar data metrics but shorter-term 30-day mortality risk-assessed data.

Results

13,650 all-cause MLLA carried out between April 2020 - March 2023 across 68 providers in England, in contrast to 9497 NVR patient episodes over 3 years. 15.4% of patients had all-cause readmission within 30 days in contrast to 9% from NVR. 18.1% of patients died within 180 days of their procedure in contrast to 6.4% NVR 30-day mortality. Above knee (AK) ratio to BK ratio is >1 with significant national variation similar to NVR outcomes. 2.5% of patients received higher-level revision amputation within the index hospital admission.

Conclusion

An initial all-encompassing national study identifying more detailed variations in patient outcomes. Vast differences between trusts and responsible consultants were identified. Further analysis is required to understand variations in greater detail and share best practice.



VO23

## Comparison of clinical outcomes in patients with infra-popliteal disease selected for bypass surgery or angioplasty

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### Introduction:

In the BASIL-2 trial, amputation free survival (AFS) was better in those undergoing endovascular treatment with chronic limb threatening ischaemia (CLTI) and infra-popliteal (IP) disease. Our aims are to determine if similar outcomes are observed at a single centre based on National Vascular Registry (NVR) data.

### Methods:

We compared data from 817 consecutive patients (bypass 289 vs. endovascular 528) who had IP revascularisation for CLTI between 2010 and 2023. The median follow-up was 4.4 years. The primary outcome was amputation free survival (AFS) with secondary outcomes of overall survival (OS) and limb salvage (LS).

### Results:

Patients selected for endovascular treatment were older and had higher proportions of comorbidity and were more likely to present with tissue loss. AFS was worse in those undergoing endovascular treatment (HR 0.72, 95%CI: 0.58-0.91, p=.007, see figure) which was mainly driven by a worse overall survival (HR 0.50, 95%CI: 0.39-0.64, p<.001). Interestingly, limb salvage was better in those undergoing endovascular treatment (HR 1.54, 95%CI: 1.05-2.26, p=.03).

### Conclusions:

In patients selected for IP revascularisation at our centre there was a survival advantage in those undergoing surgical bypass for CLTI secondary to IP disease. Careful patient selection remains key in obtaining good results from intervention.

## Shear Load In-shoe Plantar Sensing/sTRain analysEs And Mapping in diabetic foot ulcers: Results of the SLIPSTREAM study

Mr Alexander David Jones<sup>1,2</sup>, Miss Sarah Crossland<sup>3</sup>, Professor Jane Nixon<sup>2</sup>, Dr Heidi Siddle<sup>4</sup>, Professor Peter Culmer<sup>3</sup>, Mr David Russell<sup>1,2</sup>

<sup>1</sup>Leeds Vascular Institute, Leeds Teaching Hospitals, Leeds, United Kingdom, <sup>2</sup>Leeds Institute of Clinical Trials Research, University of Leeds, Leeds, United Kingdom, <sup>3</sup>Leeds School of Mechanical Engineering, University of Leeds, Leeds, United Kingdom, <sup>4</sup>Leeds Institute of Rheumatic and Musculoskeletal Medicine, University of Leeds, Leeds, United Kingdom  
Strain Analysis and Mapping of the Plantar Surface (STAMPS) is an innovative system using a plastically deformable insole and random speckle pattern, developed to measure peak plantar shear strain (SMAG) in patients with diabetes.

SMAG was compared in patients with either a recently healed DFU, or diabetes and low risk for ulceration (NICE NG-19). Participants walked 20 steps with the STAMPS insole within a standardised shoe (Ninewells boot, Chaneco inc) and 10m with the Novel Pedar<sup>®</sup> pressure measurement insole as a gold-standard comparator. Measurements were repeated thrice. Outcomes were overall and regional SMAG and peak plantar pressure (PPP).

Twenty patients with DFU and 14 at low risk were recruited. Mean SMAG within the DFU and low risk groups were 25.88% (95% CI 20.29–33.01) and 14.43% (95% CI 10.44–19.95), with mean PPP 395.97kPa (95% CI 357.35 – 434.59) and 321.82kPa (95% CI 274.15–369.49) respectively. Within the DFU group, SMAG was elevated at DFU sites compared with non-DFU sites; 12.8% (95% CI 9.18–17.87) versus 8.46% (95% CI 7.51–9.52).

Patients with a prior DFU exhibit elevated SMAG at DFU sites, and elevated overall strain compared with low risk patients, suggesting it as a possible risk factor for DFU formation.

VO25

## Specialist CLTI clinics as an alternative to admission; a 1 year experience.

Mr Assad Khan<sup>1</sup>, Susannah Howard<sup>1</sup>, Mr James Forsyth<sup>1</sup>, Mr Paddy Coughlin<sup>1</sup>, Mrs Rosie Darwood<sup>1</sup>, Mr Tom Wallace<sup>1</sup>

<sup>1</sup>Leeds Vascular Institute, Leeds, UK

### Introduction

In line with the PAD QIF, we implemented CLTI clinics at our unit and present our first year results with 12-month F/U.

### Methods

Prospective observational study comparing all CLTI patients assessed in a thrice-weekly CLTI clinic (OP) against CLTI emergency inpatients (IP) undergoing revascularisation. Outcomes included MACE/MALE, discharge destination and 12-month AFS. Patients were propensity-matched based on age, sex, frailty, Wifl score.

### Results

277 patients were included (OP = 149 IP = 128). Groups were well-matched for age, sex and frailty on admission, but inpatients presented with a greater severity of CLTI. Outpatients were half as likely to experience MALE (OR 0.476 p=0.01 95%CI 0.263–0.864), four times less likely to be amputated (OR 0.253 p=0.01 95%CI 0.081–0.794), over four times more likely to be discharged home (OR 4.545, p=0.001 95%CI 1.870–11.051). Outpatients were more likely to experience 12-month AFS compared to inpatients (72% vs 56 p=0.008), but this was driven by a reduction in major amputation (9% vs 26% p=0.000) with no difference in mortality (20% vs 23% p=0.559).

### Conclusion

A well-resourced CLTI clinic can provide favourable limb-salvage outcomes to all manner of CLTI patients and is a viable alternative to acute admission

VO26

## Prevalence of Frailty and Sarcopenia in Chronic Limb-Threatening Ischaemia: Associations, Clinical Outcomes, and Multimorbidity in the FraiLTI (Frailty in chronic Limb Threatening Ischaemia) Study

Mr Ashwin Sivaharan<sup>1</sup>, Mr Blaise Hickson<sup>1</sup>, Mr Tamer El-Sayed<sup>1</sup>, Professor Miles Witham<sup>2</sup>, Mr Sandip Nandhra<sup>1</sup>

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### Background:

Frailty, sarcopenia, and multimorbidity are typically associated with ageing; patients with chronic limb-threatening ischemia (CLTI) share many of these conditions. The Frailty in chronic Limb Threatening Ischaemia (FraLTI) study aimed to understand these interactions.

### Methods:

FraLTI is a UK multi-centre, prospective, observational study, funded by the National Institute for Health Research (NIHR) and supported by VERN. Full ethical approval (21/PR/0750) was granted (13/07/2021).

The primary outcome is identification of prevalence rates of frailty, sarcopenia, poly-pharmacy and multimorbidity. Secondary analysis explored any associations between frailty and sarcopenia, with clinical outcomes of amputation free survival (AFS).

### Results:

Of 84 patients from 6 centres, 43 (51.8%) were frail by Clinical Frailty Scale and 49 (62.0%) by Fried Phenotype. Grip strength (M<27kg, F<16kg) elicited 27 (32.5%) as sarcopenic. There was a significant association between sarcopenia and frailty (44.2% frail, 20.0% not frail) ( $p=0.03$ ). Polypharmacy (57 (67.9%)) and multi-morbidity (67 (79.8%)) rates were high. There were no significant relationships between frailty or grip strength and AFS.

### Conclusion:

This observational study shows that frailty and sarcopenia are highly prevalent, alongside multimorbidity and poly-pharmacy in those with CLTI. This supports the need for dedicated comprehensive management when treating CLTI and research to improve sarcopenia.

VO27

## Cost Effectiveness and Quality of Life Benefits of Carotid Endarterectomy (CEA) in Patients with Symptomatic Carotid Stenosis: The real-world experience,

Ms Marta Madurska<sup>1</sup>, Mr Peng F Wong<sup>1</sup>, Mr Reza Mofidi<sup>1</sup>

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The objective of this study was to examine the effects of performing timely CEA on cost-effectiveness, and quality of life measures in patients with symptomatic carotid stenosis.

Patients who underwent CEA in a regional vascular centre between January 1, 2006, and 31 June 2023, were identified from the National Vascular Registry. Risk of stroke on medical therapy alone was calculated using the Oxford stroke risk calculator for each patient. Costs associated with CEA were obtained from the NHS reference costs. The cost-utility of performing CEA was compared with medical treatment using a decision analytic Markov process. This model examined the lifetime costs and health benefits of CEA versus standard medical therapy.

974 patients underwent CEA (Men: 671, Woman: 303) for symptomatic carotid stenosis. Median symptom to surgery time was 15 days (IQR: 10-26). Five-year absolute stroke risk reduction with CEA was 18.35 percent. CEA improved quality adjusted life expectancy by an additional 0.53 QALY compared with medical treatment. The incremental cost-effectiveness ratio of CEA was £9460 per QALY gained for symptomatic patients with significant ICA stenosis.

CEA in patients with symptomatic carotid stenosis is associated with favourable incremental cost-effectiveness ratios and quality of life benefit compared with medical therapy.

## PERCEIVE: PrEdiction of Risk and Communication of outcome following major lower limb amputation – a collaborative study. Development of a logic model.

Mr Brenig Gwilym<sup>1</sup>, Philip Pallmann<sup>2</sup>, Cherry-Ann Waldron<sup>2</sup>, Emma Thomas-Jones<sup>2</sup>, Sarah Milosevic<sup>2</sup>, Lucy Brookes-Howell<sup>2</sup>, Debbie Harris<sup>2</sup>, Ian Massey<sup>3</sup>, Jo Burton<sup>3</sup>, Phillipa Stewart<sup>3</sup>, Katie Samuel<sup>4</sup>, Sian Jones<sup>5</sup>, David Cox<sup>5</sup>, Annie Clothier<sup>1</sup>, Hayley Prout<sup>2</sup>, Adrian Edwards<sup>6</sup>, Christopher Twine<sup>7</sup>, David Bosanquet<sup>1</sup>

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### Introduction

The PERCEIVE study quantitatively and qualitatively explored risk prediction and communication when major lower limb amputation (MLLA) is considered. The aim of the present study was to develop a logic model that outlines a pathway to developing intervention(s) intended to improve shared decision-making with patients where MLLA is considered as a treatment option.

### Methods

The inputs for the logic model were the results of the quantitative and qualitative PERCEIVE studies, and a data synthesis workshop. The data synthesis workshop consisted of patients, carers, and healthcare professionals discussing the PERCEIVE study results and how shared decision-making for MLLA could be improved.

### Results

Decision aid, question prompt, improving risk prediction models, peer-to-peer support, healthcare professional education, and video information were highlighted as potential interventions to improve MLLA shared decision making (outputs). This was supported by both patient/carers and healthcare professionals. Suggested processes to measure impact from these outputs included quantifying rates of intervention, use of interventions suggested above, and observer/patient rated shared-decision-making.

### Conclusions

The logic model co-produced by patients and healthcare professionals describes interventions to improve shared decision making for MLLA and highlight the outcomes to consider when evaluating them.

## Intraoperative intravenous ketamine reduced risk of phantom limb pain post major limb amputation

Dr Sarah Chew<sup>1</sup>, Dr Melody Koo<sup>2</sup>

<sup>1</sup>Monash Health, Melbourne, Australia, <sup>2</sup>St Vincent's Hospital, Melbourne, Australia

### Introduction

Phantom limb pain post major limb amputation can result in significant morbidity for patients. Ketamine administered post operatively has been shown to be effective in reducing post operative pain. The objective of this study is to review if intraoperative ketamine reduced incidence of post operative phantom limb pain in patients undergoing major limb amputation.

### Methodology

This was a retrospective cohort study conducted in a tertiary centre. Records of patients who underwent major limb amputation under the Vascular Surgery unit from July 2016 to December 2021 were retrospectively analysed. Intraoperative analgesia and post operative phantom limb pain were analysed using simple logistic regression. The most prevalent indication for major limb amputation were diabetic foot ulcer (53.6%) followed by critical (33.0%) and acute limb ischemia (5.0%).

### Results

181 patients underwent major limb amputation during the study period. 109 patients (60.2%) received intraoperative intravenous ketamine whilst 72 patients (39.8%) did not. Patients who received intraoperative intravenous ketamine had a lower risk of developing post operative phantom limb pain (OR= 0.48, 95% CI: 0.25 to 0.91, p=0.024).

### Conclusion

This study suggests that intraoperative ketamine reduced the risk of developing phantom limb pain post major limb amputation. Further research into its mechanism is warranted.

## VS Oral Abstracts (SRS, Training, Audit)

VO30

### Management of Diabetic Foot complications in Theatre: The DEFINITE Study

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<sup>1</sup>Hull York Medical School, Hull, UK, <sup>2</sup>The Vascular and Endovascular Research Network, N/A, N/A

#### Background

Diabetic foot complications often require surgical interventions to control infection and accelerate healing. This study aims to compare operative practices with guidelines and explore the impact of deviation.

#### Methods

DEFINITE was an international multicentre prospective audit of in-theatre operations for diabetic foot complications. The primary outcome was adherence to International Working Group on the Diabetic Foot guidance and Global Vascular Guidelines. Secondary outcomes were 90-day healing, amputation and mortality.

#### Results

754 operations across 33 centres in 7 countries were included. Pre-operatively, 17.2%(130/754) of limbs were assessed using recognised wound classification systems and 50.6%(383/754) with vascular imaging. 94.0%(457/486) of suspected/confirmed infected limbs were prescribed antibiotics. Intraoperative soft tissue sampling occurred in 47.9%(233/486) of suspected/confirmed infection cases, with bone sampling in 72.5%(358/494) with suspected/confirmed osteomyelitis. Clean instruments were used for sampling in 54.9%(267/486) of suspected/confirmed infection cases.

At 90 days 35%(363/754) healed, 8.1%(61/754) underwent ipsilateral major lower limb amputation(MLLA) and 6.4%(48/754) died. Predictors of non-healing were no vascular imaging during admission( $p=0.005$ ) and <4 weeks of antibiotics for suspected/confirmed osteomyelitis( $p<0.001$ ). Vascular imaging during admission predicted MLLA risk( $p=0.008$ ).

#### Conclusion

Several weaknesses were identified in the perioperative management of diabetic foot complications. The DEFINITE study team will engage with multidisciplinary stakeholders to address these.



VO31

## The impact of Covid 'Recovery' on the timeliness of revascularisation in Chronic Limb-Threatening Ischaemia

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Chronic Limb-Threatening Ischaemia (CLTI) requires rapid intervention, and the Vascular Society recommends CLTI outpatients are revascularised within 14 days of referral. This retrospective study of 78 CLTI patients referred to a large vascular centre's 'Hot clinic' compared the time to intervention during 3 months at the height of the Covid-19 pandemic with 4 months during post-pandemic recovery (Figure 1).

The median time from referral to intervention increased 10-fold, from 7 to 71 days. This resulted from increases in both time to clinic appointment (median 4 days vs. 11 days) and time from clinic appointment to intervention (median 4 days vs. 50 days). In 2022 patients requiring a CT angiogram waited a median 5 days for this. In 2022 only 24 (49%) of referrals ultimately underwent intervention as outpatients, due to requiring admission directly from clinic, re-presenting as emergencies while awaiting intervention, or being medically unfit for any revascularisation. Between 2020 and 2022 outpatient CLTI referrals increased from a mean 1.72 per week to 3.91 per week, a 2.3-fold increase.

Increased referrals, combined with reinstatement of elective services and prioritisation of Covid-19 backlogs, without increasing capacity for CLTI patients has had a detrimental effect on the timeliness of potentially limb-saving interventions.

## A Systematic Review and Meta-Analysis of the Impact of Vascular-Geriatric Care Models on short-term outcomes for Vascular Surgery Inpatients

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**Introduction:** Vascular surgeons are treating progressively older, frailer and more medically complex patients. Care models including both surgeons and geriatricians have improved perioperative outcomes in orthopaedics. This meta-analysis investigates the impact of “vascular-geriatric” services on short-term inpatient outcomes.

**Methods:** Search strategy included PubMed, Scopus and Embase databases, conference abstracts and clinical trial registries. All study methodologies comparing outcomes before and after the introduction of a dedicated vascular-geriatrics service were eligible. Meta-analyses compared the relative risks of mortality, complications and 30-day readmission using a random-effects model.

**Results:** Eleven studies with 7702 patients were included, 3600 before geriatrician intervention and 4102 after. Models included outpatient comprehensive geriatric assessment, geriatric liaison and geriatrician-surgeon co-management. Geriatrician involvement significantly decreased mortality risk (7 studies, RR 0.66, 95% CI 0.46-0.95, p=0.02) and risk of cardiac (4 studies, RR 0.43, 95% CI 0.26-0.72, p<0.001) and infective complications (RR 0.52, 95% CI 0.40-0.68, p<0.001, I<sup>2</sup>=0%). However, it did not significantly 30-day readmission risk (9 studies, RR 0.95, 95% CI 0.84-1.05, p=0.31).

**Conclusions:** This is the first meta-analysis comparing “vascular-geriatrics” to traditional care. Dedicated geriatric intervention can significantly improve peri-operative outcomes in frail, comorbid vascular patients. Further studies are needed to investigate the most effective design of geriatrician-surgeon partnership.

VO33

## Please Sir, I want some Lead: Availability of Basic Radiation Protective Equipment for Vascular Trainees in the East of England

Miss Jade Whing, Miss Mimi Li, Mr Ayoola Awopeta

Recent studies highlight the increased incidence of breast cancer amongst female orthopaedic surgeons. In light of this, ESVS recommends axillary protection for female endovascular operators. Standard tabard-style lead gowns do not offer adequate protection to the axilla or upper outer breast. Use of inappropriately-sized lead garments may cause physical strain, and also provides inadequate radiation protection.

We aimed to establish availability of Basic Radiation Protective Equipment (BPRE) to vascular trainees within our region.

East of England vascular trainees were surveyed, 80% of respondents, and 100% of female trainees have worn inappropriately-sized leads during their training. 83% of female trainees wear inappropriately-sized gowns on a weekly basis, 100% on a monthly basis. 70% of respondents suffer discomfort from inadequately-sized leads. 0% of trainees reported availability of axillary protection.

90% of respondents have never had their own measured BPRE. Reasons for denying trainees access to BPRE included the rotational nature of training and financial constraints. Only 50% of trainees had personal dosimeters.

Vascular Trainees have inadequate access to BPRE, thus exposing trainees to potential health risks from occupational radiation. Urgent guidance should be issued to ensure all trainees are supplied with personalised BPRE and adequate monitoring of their radiation exposure is undertaken.

VO34

## A survey of the contemporary management of Acute Limb Ischaemia Salvage

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**Introduction:** Acute limb ischemia (ALI) is a critical condition requiring urgent management. This study aimed to provide a global survey of contemporary management of ALI.

**Methods:** An international survey was conducted over 3 months using the JCIS online survey tool through mailing lists and social media.

**Results:** 37 responses were captured from Europe (UK, Italy, and Greece), the USA, and New Zealand. 65% of respondents manage > 30 ALI cases annually.

51% of respondents preferred open surgery for ALI management, while 5% preferred endovascular, and 40% used both approaches equally. Open surgery was preferred due to confidence in outcomes and concerns about embolization and bleeding associated with endovascular interventions. Approximately 14% of respondents suggested lack of endovascular evidence, and 5% reported lack of local endovascular expertise.

29% supported the endovascular approach as minimally invasive, while 18% believed it offered faster recovery. 42% reserved endovascular for unfit patients and poor outflow cases.

10% adopted a selective approach depending on aetiology, clinical severity, and predicated endovascular outcome. Hybrid availability and leading clinician preference were the key deciding factors for 5% of respondents.

**Conclusion:** The survey results indicate variation in ALI management, likely due to lack of strong evidence.

## Evaluating the evidence for the impact of human factors science on operative performance in vascular surgery

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Human factors science and ergonomics (HFE) has been included in surgical projects as diverse as system redesign, adverse event analysis and team training. A greater understanding of which HFE elements are active in the operative setting is required to inform surgical education, improve individual and team performance, and enhance patient safety.

A systematic search of PubMed, Embase, MEDLINE, and PsycInfo databases was conducted following PRISMA guidelines. MeSH terms and keywords included “human factor\*” “perform\*”, and “vascular surg\*”. Eligible studies were organised according to the five Chartered Institute for Ergonomics and Human Factors (CIEHF) categories for analysis.

A total of 14 studies were included. All five CIEHF categories were represented [Table 1]. The most frequently occurring HFE element considered was ‘workplace design and assessment’. Measurable effects of physical, cognitive and organisational factors were reported on: work-related musculoskeletal disorders were prevalent, and operative team selection could influence outcomes. Methods to leverage HFE when introducing novel tools and technology are described.

Human factors science/ergonomics is interwoven through every aspect of vascular surgery. Research evidence should be integrated into surgical training to enhance outcomes via optimising: (i) team selection; (ii) environmental factors; and strategies to mitigate the physical and psychological effects of operating.

## Needs analysis to inform human factors training for vascular surgery trainees in the United Kingdom

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Performance and safety in surgery can be optimised by leveraging techniques from human factors science/ergonomics (HFE). This study aims to inform the design of targeted HFE training for vascular surgery (VS) trainees by: (i) gathering baseline data regarding knowledge and experience of HFE amongst VS trainees; and (ii) identifying priority characteristics for an education programme.

A cross-sectional exploratory survey was developed using the Checklist for Reporting Results of Internet E-Surveys and was distributed to ST3 VS trainees. Descriptive and inferential statistics were reported; free text was thematically analysed. Key subjects identified were explored in focus groups with ST5 trainees. Inductive thematic analysis was used to code the transcripts.

Twenty-eight of 35 (80%) trainees responded to the survey. Five (18%) offered an acceptable definition of HFE. With regards to training, a majority answered that it is 'very important' that it is included in a study budget and that it should involve simulation. The focus groups were conducted in three groups of eight trainees. Regarding future HFE training, themes identified were: current time pressures and workload; multidisciplinary simulation; and clinically relevant performance-enhancing content [Figure 1].

There is an unmet need for an accessible, engaging, and applicable HFE education programme for VS trainees.

## Assessing external validity of randomised control trials (RCTs) in vascular surgery: A systematic review of characteristics of patients recruited to RCTs and comparison to the National Vascular Registry

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To practice evidence-based medicine we use results from randomised control trials (RCTs), which should represent the patient population encountered in clinical practice. Our aim was to compare the characteristics of patients recruited to RCTs involving vascular index operations (carotid endarterectomy, aortic aneurysm repair, infrainguinal bypass and major amputations), with those recorded in the National Vascular Registry (NVR) across England and Wales.

We extracted demographic information from publicly available NVR reports (2014-2020) for characteristics of operated patients. Our systematic review (PROSPERO: CRD42021247905) included all RCTs where patients underwent an index operation. Rayyan.AI, Excel and GraphPad Prism were used for screening and analysis.

We extracted NVR demographic information for 198,151 patients. The search generated 7188 results, 522 full length texts were analysed. 306 studies (74 UK-based) with 57,737 patients formed the final cohort.

Demographic factors were not sufficiently reported across RCTs (Table 1), limiting comparison and generalisability of RCT results to patients encountered in daily clinical practice. The reporting of baseline population results improved over time with more rigorous requirements, yet scope for improvement remains.

Complete reporting of patient baseline characteristics should be a requirement for all studies. Future RCTs need to represent patient populations more comprehensively.

VO38

## Assessing the trend of best medical therapy in symptomatic patients undergoing carotid surgery (ATOMIC study)

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### Introduction

Symptomatic patients with 50-99% carotid stenosis should be commenced on dual-antiplatelet therapy (DAPT) and lipid lowering therapy (LLT) to reduce risk of perioperative and late cardiovascular events including stroke[1].

### Design

260 symptomatic patients who underwent carotid intervention from 01/01/17–31/12/21 in a major regional vascular unit were analyzed. Trend of antithrombotic therapy (ATT) and LLT from point of admission, post-surgery and 1 year post procedure were analyzed to identify time points and subgroups requiring optimization.

### Methods

All data were retrospectively retrieved from electronic hospital records linked to real-time primary care data.

### Results

From admission to post-surgery, the proportion of patients on ATT (65% vs 95%,  $p < 0.001$ ) and LLT (70% vs 91%,  $p < 0.001$ ) significantly increased (Fig.1). At admission, only 12% of patients were prescribed DAPT and 53% were prescribed high-intensity statin. Patients without preexisting vascular disease were significantly less likely to be prescribed ATT (98% vs 63%,  $p < 0.001$ ).

At one year, 45% of patients had LDL-C  $> 1.8$ mmol/L (target level), of whom only 32% were on maximum-intensity statin.

### Conclusion

Whilst post-operative optimization of best medical therapy (BMT) is performed well, further pre-operative optimization is needed. Patients without other vascular disease are less likely to be commenced on BMT and should be prioritized.



VO39

## Validation of a 14-item quality-of-life questionnaire for chronic wounds (Wound-QoL-14) in patients with diabetic foot ulcers at a vascular centre in England

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### Introduction:

5 million people in the United Kingdom (UK) have diabetes mellitus and up to 35% will develop foot ulceration (DFU) in their lifetime.<sup>1</sup> Current measurement tools for assessing QoL in patients with DFU have limited evidence for their psychometric properties.<sup>2</sup> The aim of this study is to validate Wound-QoL-14 in patients with DFU.

### Methods:

Patients with DFUs completed 3 quality-of-life questionnaires: Wound-QoL-14, the Diabetic Foot Scale – Short Form (DFS-SF), and EQ-5D-5L at baseline (T0) and two other timepoints (1 week – T1, 6-8 weeks – T2). Psychometric analysis was done to assess validity, reliability, and responsiveness using SPSS v28.

### Results:

90 patients participated in this study (mean age 62.5 years, 80.0% male, 58.9% current/ex-smokers, 30.3% had peripheral artery disease). Convergent validity with EQ-5D-5L was adequate; correlation coefficients between like domains were 0.499-0.534, p-values<0.001. Cronbach's alpha for internal consistency was >0.60 for domains and overall (T0,T2). Spearman's rank for reliability (T0,T1) was 0.77 (p<0.001). For patients with complete data (n=48), Wound-QoL-14 was not adequately responsive to changes in wound size.

### Conclusion:

Wound-QoL-14 is reliable and may be valid in this patient population; however, a larger sample size is needed to make robust conclusions on validity and responsiveness.

VO40

## Vascular Anastomosis Course for Core Surgical Trainees (VACT)

Miss Natalie Condie<sup>1</sup>, Miss Nina Al-Saadi<sup>1</sup>, Ms Reni Mathew<sup>1</sup>, Miss Virginia Summerour<sup>1</sup>, Mr Andrew Garnham<sup>1</sup>, Mr Michael Wall<sup>1</sup>

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On completion of Core Surgical Training(CST) trainees are expected to have an understanding of emergency and elective vascular conditions and experience of vascular suturing.

We used the post-graduate virtual learning environment(PGVLE) developed by Health Education England West Midlands in combination with practical sessions to provide a vascular anastomosis course for core surgical trainees(VACT).

VACT is a one-day course consisting of lectures on vascular surgery and trauma and practical stations covering embolectomy, inlay grafting, end-to-side anastomosis and patch repair. Pre-course video material and a survey were distributed to participants via the PGVLE platform. Post-course feedback was collected anonymously on PGVLE with an automated certificate distributed after completion.

27 trainees attended the course. 25(93%) of trainees completed the post-course feedback. Three had been on a previous vascular course and 15 said they would consider applying for vascular specialty training.

Figure 1 demonstrates the number of trainees who felt confident in each area before and after VACT. 100% of attendees would recommend this course to their colleagues.

Feedback from VACT was extremely positive with comments requesting further similar courses. With an increasing need for vascular surgeons it is essential we provide CSTs with the skills required to pursue a career in vascular surgery

VO41

## Your patients need a hybrid facility now!

Mr James Scott<sup>1</sup>, Mr Thomas Grigg<sup>1</sup>, Mr Qais Wahdan<sup>1</sup>, Mr Ian Wei Lim<sup>1</sup>, Professor Shah Nawaz<sup>2</sup>

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### Background:

Increasing number of patients with peripheral arterial disease (PAD) are being treated by hybrid procedures (NVR), combining open and endovascular strategies. Hybrid approach has the advantage of reduced morbidity and mortality (compared to a more extensive open only approach) and extending the indications of treatment.

Hybrid procedures are ideally done in a dedicated hybrid suite, however many vascular units in the UK do not possess such facilities. The alternative of performing these procedures either in the angio-suite or operating theatre has many disadvantages, but the biggest hurdle is scheduling from competing endo or open only procedures, resulting in delays. As stated in PAD guidelines 2022 patients undergoing open surgery must be considered for endovascular alternatives and if appropriate sufficient access to a hybrid suite must be in place.

### Aims:

We wanted to demonstrate these delays to strengthen the case for a hybrid facility

### Methods:

We identified all hybrid cases from the hospital infoflex system, between 2021 and 2023, and noted the time from decision to intervention.

### Results:

See table.

### Conclusion:

We have demonstrated serious delays for hybrid procedures at both sites.

The case for providing a hybrid facility is well made.

VO42

## Transmetatarsal amputation: An 8 years retrospective chart review of its Outcomes.

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<sup>1</sup>University Hospital Hairmyres, , Scotland

Background: Trans-metatarsal amputations (TMA) preserve patients' ability to walk but are associated with poor healing rates. This study aims to evaluate the clinical outcome following TMA and associated factors affecting the prognosis.

Methods: A single-centre, retrospective study was conducted in all patients who underwent TMA over an 8-year period. The primary endpoint was a composite of major limb amputation and all-cause mortality. Prior revascularisation and routine blood tests on the day of surgery were also studied.

Results: Out of 24 patients, three-quarters (n=18) retained their limb post-TMA. Two-thirds (n=16) of the patients underwent prior revascularisation. After 82 months follow up period, one-third (n=7) had major amputation and mortality rate of 16% (n=4) reported. No significant difference in outcome between patients requiring revascularisation and those with well-perfused feet was observed, however our sample size was small. Higher white cell count (p= 0.009) were associated with progression to major limb amputation and lower albumin levels (p= 0.069) tends towards significance.

Conclusion: Our findings suggest that, in appropriately selected patients, TMA is associated with a higher limb preservation rate than previously reported. Low albumin and high white cell count were potential prognostic factors for limb loss.

VO43

## The Implementation of DrEaMing RCT into Clinical Practice - A QIP

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### Introduction:

Recent RCT evidence has supported the use of DrEaMing (drinking free fluids, eating at least soft diet and being able to mobilise from bed to chair with assistance of one (AO1) within 24 hours post-operatively) to improve outcomes. We present a quality improvement project in vascular surgery.

### Methods:

Prospective 6-week review of non-day case operations over 6 week period 2023 at a tertiary vascular unit. The study aimed to assess proportion of DrEaMing vascular patients and impact on length of stay (LOS) and hospital acquired infection (HAI).

### Results:

103 patients (80 men; 23 women) underwent surgery. Median age was 70 (IQR 62-74). Ninety-eight (95.1%) patients were able to drink free fluids, ninety-five (92.2%) tolerated soft diet and sixty-three (61.2%) patients mobilised with AO1. Sixty-two (60.2%) patients were compliant with DrEaMing.

DrEaMing was associated with reduced risk of Hospital Acquired infection (HAI) ( $p=0.010$ ) with only 1 DrEaMing patient (1.61%) developing HAI compared to 5 non-DrEaMing patients (12.2%).

Total LOS was 7 days for the cohort but 5.5-days for DrEaMing patients compared to 14-days in non- DrEaMing patients ( $p < 0.001$ )

### Conclusions:

The implementation of DrEaMing RCT evidence has provided a simple way to support vascular patient's return to baseline following surgery.

VO44

## Identifying and Overcoming barriers to timely intervention for CLTI patients: a single centre experience.

Dr Tasneem Pope<sup>1</sup>, Mr Conor Brines<sup>1</sup>, Ms Louise Allen<sup>1</sup>, Dr Safa Salim<sup>1</sup>, Professor Richard Gibbs<sup>1</sup>

<sup>1</sup>Section of Vascular Surgery, Department of Surgery and Cancer, Imperial College London, ,  
Introduction

The Vascular Society for Great Britain and Ireland published its Quality Improvement Framework (QIF) for chronic limb-threatening ischaemia (CLTI) in 2022. This work aims to identify and overcome barriers to timely interventions.

### Methods

CLTI patients were retrospectively reviewed and categorized as admitted or non-admitted between 01/05/2022- 01/08/2022. Barriers to care were identified and corresponding strategies developed. A second cohort was evaluated 12 months later.

### Results

Of admitted patients, 35 (75%) were suitable for intervention in the first cohort and 29 (53%) in the second cohort. Increased ward capacity and an admissions checklist developed. This saw an improvement in median time from decision to intervention of 1 day (IQR: 0-3 days) from 6 days (IQR: 3.5-9 days). (Table 1).

Of non-admitted patients, 39 patients (81%) were suitable for intervention in the first cohort and 35 patients (56%) in the second cohort. A specialist nurse was appointed to oversee and adjust the pathway based on barriers identified. This saw an improvement in median time from decision to intervention of 21 days (IQR: 10-34 days) from 38 days (IQR: 20.5-75.5 days).

### Conclusion

Our service saw an improvement in median time from decision to intervention for both admitted and non-admitted patients with CLTI.

VO45

## Frailty Assessment in Vascular Outpatients Review (FAVOUR)—single-centre prospective cohort study comparing feasibility and prognostic value of commonly used frailty assessment tools - early results.

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**Introduction:** We compared clinician assessed frailty screening to patients' perception of their frailty in a vascular hot clinic.

**Methods:** Four frailty assessments were completed: clinicians used binary 'end-of-bed' assessment, CFS and HIS FRAIL assessment and patients CFS and Frail NonDisabled Questionnaire. All patients with capacity were eligible for participation. Levels of agreement were compared with Cohen's Kappa coefficient.

**Results:** 173 patients were approached and 150 (87%) recruited. Clinicians completed frailty assessments for 147 (98%) patients and considered 85 (56%) frail according to an 'end-of-bed' assessment. The 'end-of-bed' assessment demonstrated excellent agreement when compared to Clinician CFS scores (Kappa 0.827,  $p < 0.001$ , sensitivity 98.6%, specificity 84.2%). When patients self-assessed using the CFS scale there was poor inter-user agreement between patient and clinician CFS scores (Kappa 0.170,  $p < 0.001$ ); patients reported lower frailty scores (mode 4, mean 4.30 [1.441]) than clinicians (mode 6, mean 4.39 [1.783]).

**Conclusion:** This study confirms introducing routine frailty screening in an urgent-referral vascular clinic is possible and subjective clinician opinions on frailty status correlate well with standardised measurements. However, patients perceive themselves to be less frail than clinician assessment. Short (30-day) and long-term (1-year) data collection is ongoing to determine the prognostic value of these assessments following definitive management.

VO46

## Improving Appropriateness to Vascular Hot Clinic Through Referral Form Intervention: A Quality Improvement Project

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### Introduction

During the COVID-19 pandemic, hot clinics were introduced at a tertiary Vascular unit to reinforce the provision of safe acute care. Prior evaluation of the service demonstrated disparity in the appropriateness of referrals. Following introduction of a standardised primary care referral form, this study aims to assess the ongoing appropriateness of referrals to the hot clinic.

### Methods

Data were collected prospectively from consecutive clinics from 19th December, 2022 to 22nd March, 2023. Using a bespoke proforma, method and dates of referral were collected, in addition to data of clinic. Appropriateness of referral was assessed by the decision of the consultant leading each clinic.

### Results

In total 17 clinics were evaluated with 134 patients (mean age=69.32±15.71, male:female=1.44). 50.7% (n=68) of referrals were considered appropriate. Significant association was found between the appropriateness and critical limb-threatening ischaemia or peripheral vascular disease (p=0.029) which was the main reason for referral (39.6%, n=53), whereas the inappropriateness was significantly associated with venous leg ulcer (p=0.041). Follow-up appointment was identified as the main reason for inappropriate referrals (48.4%, n=15).

### Discussion

The appropriateness of referral did not improve compared to cycle 1 (60.9%, n=123). Updated guidelines with the use of intermediate clinics may help streamline the referral pathways.



VO47

## Comparing the effect of using virtual reality versus simulation in the management of acute surgical scenarios on academic buoyancy levels

Miss Manal Ahmad<sup>2,3</sup>, Miss Mi-Tra Tran<sup>1,2</sup>, Mr Kirtan Patel<sup>2</sup>, Mr Orestis Argyriou<sup>3</sup>, Professor Alun Davies<sup>2,3</sup>, Mr Joseph Shalhoub<sup>2,3</sup>

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### Background

Simulation is regularly used in surgical training to allow trainees to practice skills. Virtual reality (VR) offers immersive computer-generated medical and surgical training scenarios. Performance can be hindered by stress, self-consciousness, anxiety, fear of criticism and self-perceived poor task execution. Academic buoyancy is a learner's ability to successfully deal with short-term, minor academic setbacks and can translate into long-term academic resilience. We aimed to compare academic buoyancy between junior doctors after managing an acute surgical scenario using VR and mannequin-based simulation.

### Method

Eighteen junior doctor volunteers were recruited and randomly allocated to VR or Simulation. Participants assessed and managed a 15-minute acute surgical scenario OSCE. Their academic buoyancy scale (ABS) scores were measured pre- and post-session.

### Results

ABS scores increased for both study groups. This was statistically significant for VR participants ( $p \leq 0.01$ ), suggesting that VR may provide a more comfortable environment for trainees to hone their clinical skills. VR participants also had higher overall simulation scores than mannequin-based simulation participants, however no correlation was found between ABS scores and overall simulation scores.

### Conclusion

VR as a simulation modality benefits by improving short-term markers of confidence. Future research should establish whether spaced VR teaching sessions translate into improved long-term resilience.

VO48

## Role of geriatrician led multidisciplinary teams in identifying undiagnosed cognitive issues in frail older vascular surgery patients

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### Introduction

Post-operative delirium and undiagnosed cognitive impairment is prevalent among older adults undergoing vascular surgery and is associated with poor outcomes. Early identification by a Perioperative care for Older People undergoing Surgery (POPS) team, through a geriatrician-led multidisciplinary team (MDT) approach, can guide management, shared decision making (SDM) and discharge planning.

### Methods

Data on frailty, cognition and discharge destination was collected from electronic records of fifty consecutive patients seen by POPS vascular service at a district general hospital over a 3-month period.

### Results

Concerns around cognition were raised for fifteen patients (six preoperatively; nine postoperatively) by various MDT members including geriatricians, nurses, occupational/physiotherapists and surgeons. Mean Clinical Frailty Scale 5. Fourteen patients underwent confusion screening; eleven had brain imaging with ten having evidence of neurodegenerative change. MDT SDM led to three patients not undergoing surgery due to increased perioperative risk associated with cognitive impairment. Six patients were institutionalised at discharge, five died during admission and three died post-discharge.

### Conclusion

Transdisciplinary working through a POPS-led MDT approach unmasked undiagnosed cognitive impairment pre- and post-operatively allowing for appropriate management, timely SDM and proactive discharge planning.

VO49

## ASSIST: Validation of a novel hybrid clinician-patient remote outcome measure for diagnosis of surgical site infection

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### Introduction

Current remote methods of surgical site infection diagnosis have high specificity(96.8%) but have low sensitivity(87.8%) in diagnosis. This study evaluates the acceptability, reliability and validity of a novel hybrid clinician-patient remote outcome measure (ASSIST) for detecting SSI.

### Methods

Patients completed the Bluebelle wound healing questionnaire (WHQ) at 30 days post-surgery and submitted corresponding wound image(s). Images were reviewed by two independent clinicians. Internal consistency of the unidimensional scale was assessed. Inter- and intra-rater reliability assessments were performed. Sensitivity and specificity for SSI diagnosis at different cut-ff scores and discrimination against face-to-face CDC diagnosis were evaluated.

### Results

69 participants completed questionnaires with no missing items. The single scale showed strong Internal consistency ( $\alpha = 0.9$ ). Intra-rater reliability was good with intraclass correlation (ICC) of 0.818 (95% CI, 0.672-0.903,  $p < 0.001$ ). Inter-rater agreement was excellent (ICC 0.915, 95% CI 0.733-0.903,  $p < 0.001$ ). Sensitivity and specificity for SSI diagnosis were excellent at 91.7% and 97.6% respectively. Discrimination for SSI was high (figure 1) with an area under the receiver operating characteristic curve of 0.966 (95%CI 0.913-1.000).

### Discussion

The ASSIST measure is acceptable, reliable, and valid for diagnosing SSI. Implementation could be utilised in both patient-initiated follow-up or at pre-determined time points for post-discharge surveillance.

VO51

## Post-procedural antithrombotic therapy for vascular patients with lower limb arterial disease: An audit of current clinical practice against the European Society for Vascular Surgery (ESVS) 2023 guidelines

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### Background

The European Society for Vascular Surgery (ESVS) recently published a guidance to assist clinicians in selecting the optimal antithrombotic strategy for vascular patients. The aim of this project is to audit current clinical practice against ESVS recommendations.

### Methods

A retrospective audit was performed at a regional vascular unit (February – April 2023) examining the choice of post-procedural antithrombotic therapy for patients with lower limb arterial disease undergoing open and endovascular intervention. Data collected: patient demographic, type of intervention, post-procedural antithrombotic agent, bleeding risk, previous antithrombotic treatment.

### Results

89 patients, 48 (70.8% male) open and 41 (75.6% male) endovascular interventions were included. 22 (45.8%) patients from the open group had concurrent endovascular treatment. 21 patients (43.8%) from the open group and 1 (2.4%) from the endovascular group received antithrombotic therapy concordant with ESVS recommendation (Aspirin 75mg once daily plus Rivaroxaban 2.5mg twice daily, Class IIa, Level B). 10 patients (24.4%) from the endovascular group received second line antithrombotic treatment as per ESVS recommendation (Aspirin 75mg plus Clopidogrel 75mg, Class IIb, Level C).

### Conclusion

Antithrombotic therapy use was variable within the unit. This data will inform the development of departmental guidelines on post-intervention antithrombotic therapy to standardise and improve patient care.

VO52

## Validity, reliability and responsiveness of the WoundQoL instrument in assessment of wound-specific quality of life in patients with chronic wounds: a systematic review

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Introduction

In the UK, we don't have a validated way of measuring the impact of chronic wounds on quality of life (QoL). The WoundQoL (WQ) is a promising questionnaire which may be able to bridge this gap. This systematic review of Wound-QoL evaluated its overall performance, and considers its appropriateness for adoption into UK practice.

### Methods

The systematic review was registered with Prospero and follows the COSMIN guidance for systematic reviews of patient-reported outcome measures. Medline, Embase, CINAHL, grey literature and references were searched. All studies assessing any aspect of validity, reliability or responsiveness of WQ (defined by COSMIN taxonomy) in any language, in chronic wounds in an adult patient population were eligible for inclusion.

### Results

209 abstracts were screened with 12 studies included in the study, assessing the WQ in 1928 participants, in 10 languages and 9 countries. The WQ was found to have a high level of evidence supporting the internal consistency and construct validity of the tool, with moderate evidence to support structural validity, reliability, measurement error and responsiveness.

### Conclusions

The WQ is a promising instrument with good evidence for its use in the chronic wounds population. Further work should evaluate its performance in the UK population.

VO53

## Improving Compliance To Best Medical Therapy For Peripheral Arterial Disease: A Tertiary Vascular Centre Experience

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### Introduction

First line management for patients with PAD is cardiovascular risk factor modification. The VSGBI provides guidelines on best medical therapy (BMT). We assessed our compliance to these guidelines and attempted to improve adherence.

### Methods

Two prospective audits of all patients admitted to a tertiary vascular center with peripheral arterial disease. BMT was defined as per VSGBI guidelines. Adherence to BMT and monitoring of modifiable risk factors (HbA1c & smoking status) was measured between 2 audit cycles. Following cycle 1 a simple BMT pro forma was produced & an education session conducted.

### Results

Overall adherence to BMT increased by 40.8% between cycles. The proportion of patients on appropriate anti-platelet therapy were 88.4% and 92.6% and those on high intensity statin therapy were 80.8% and 77.8% respectively. HbA1c monitoring increased by 220.8%. Smoking status documentation increased by 71.8%.

### Conclusion

We have shown that simple methods such as a pro forma to assist and monitor BMT is vital to increase compliance. We assume that other tertiary vascular hubs have similar suboptimal adherence to BMT and encourage stakeholders within the vascular community to adhere with guidelines to improve outcomes for our patients.

## Postoperative Telemedicine is feasible and sustainable; a prospective life-cycle assessment approach to carbon footprint analysis

Dr Ross Lathan<sup>1,2</sup>, Dr Walshaw Josephine<sup>1,2</sup>, Miss Hitchman Louise<sup>1,2</sup>, Mr Bharadhwaj Ravindhran<sup>1,2</sup>, Mr Daniel Carradice<sup>1,2</sup>, Mr Smith George<sup>1,2</sup>, Prof Ian Chetter<sup>1,2</sup>, Miss Sonia Lockwood<sup>3</sup>, Miss Marina Yiasemidou<sup>3</sup>

<sup>1</sup>Hull University Teaching Hospitals Nhs Trust, , , <sup>2</sup>Clinical Sciences Centre, Hull York Medical School, , , <sup>3</sup>Bradford Teaching Hospitals NHS Trust, ,

### Introduction:

The NHS must provide a net zero service by 2045. Innovative strategies are required to quantify, evaluate and implement environmentally friendly interventions into practice. The study evaluates the feasibility and sustainability of remote post-operative follow-up using novel methodology.

**Methods:** Patients were reviewed remotely and face-to-face at 30 days post-operatively. A prospective life-cycle assessment(LCA) approach to carbon footprint analysis was used to calculate carbon emissions kgCO<sub>2</sub>e. Patient postcodes were applied to conversion factors to calculate travel emissions. Median(IQR) kgCO<sub>2</sub>e saved were presented. Carbon offsetting values are based on kgCO<sub>2</sub>e sequestered by a standardised UK variety tree.

**Results:** 31 participants(M:F 2.4, 66.7±11.7 years) were included. The median return distance for patient travel was 42.5km(7.2-58.7). Median reduction using remote follow-up was 41.2 kgCO<sub>2</sub>e(24.5-80.3) per patient(P<0.001). Using remote follow-up is equivalent to planting 1 tree for every 6.9 patients reviewed. Every readmission with SSI results in an additional 1219.93 kgCO<sub>2</sub>e.

**Discussion:** This model shows that the prospective LCA approach is achievable. Implementation of an asynchronous follow-up model is effective in substantially reducing the carbon footprint of a tertiary vascular surgical centre. Further work is needed to corroborate these findings on a larger scale and incorporate kgCO<sub>2</sub>e into cost analysis of SSI monitoring strategies.

VO55

## Comparing virtual reality versus simulation to teach the assessment and management of acute surgical scenarios

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### Background

Simulation is regularly used to allow trainees to practice skills. Virtual reality (VR) offers immersive computer-generated training scenarios, connecting users from various locations.

### Aims:

To compare the performance of junior doctors using to manage an acute surgical scenario using VR and mannequin-based simulation. We hypothesised that VR would be as effective as mannequin-based simulation in performance outcomes.

### Method

This multicentre, randomised controlled pilot study was conducted with eighteen junior doctor volunteers who were randomly allocated to VR and Eight to mannequin-based simulation. Participants completed questionnaires and a 15-minute pneumothorax scenario. Quantitative metrics included overall score, time-to-critical decisions, and academic buoyancy scores (ABS). Qualitative metrics included participants' likes and dislikes of their allocated simulation modality.

### Outcomes

VR participants scored significantly higher than simulation participants in overall scores ( $p=0.03$ ), and technical skills aspects ( $p=0.01$ ). Mannequin-based simulation participants initiated critical decisions faster and demonstrated a trend towards a faster mean time-to-completion ( $p=0.06$ ). VR participants liked how VR fostered independent learning but disliked the formulaic content and impaired communication-learning compared to simulation.

### Conclusion

VR can be as effective as simulation in training junior doctors in acute surgical scenarios. Future research should recruit a larger sample size for a full comparative randomised controlled trial.



## The Rise of Large Language Models (LLM): Can ChatGPT play a role in assessing risk of bias?

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The use of artificial intelligence and LLM such as ChatGPT and Google Bard is increasing. One potential application is in support of labour-intensive research. Risk of bias (ROB) assessment is an integral component of systematic reviews to assess included studies for possible biases. We compared ChatGPT to human assessment of papers (nested within a systematic review, PROSPERO CRD42021247905), to assess the utility of ChatGPT in ROB assessment.

N=15 papers included in the systematic review were assessed by either a human reviewer or a reviewer using ChatPDF (a web application allowing ChatGPT to interact with PDF documents). Both reviewers independently used the Cochrane ROB2 tool to record high, low or unclear ROB using Microsoft Forms. Excel was used for analysis.

Human assessment and ChatGPT made a total of 210 decisions pertaining to the ROB, summarised in Table 1. There was up to 66.67% agreement however when human and ChatGPT disagreed, the LLM incorrectly judged up to 33.37% studies as low risk. Google Bard is unable to undertake ROB assessments presently.

ChatGPT is not currently appropriate for use in a ROB assessment. Whilst it often agrees with human assessment, it is currently not accurate enough to replace human researchers when assessing ROB.

VO57

## Breaking Barriers: improving research delivery through involvement of clinical staff.

Miss Arooj Syed<sup>1</sup>, Mr Maciej Juszcak<sup>1</sup>, Mr Steven Jones<sup>1</sup>, Mr Michael Wall<sup>1</sup>, Mrs Rachel Sam<sup>1</sup>, Mr Julian Alshakarchi<sup>1</sup>, Mr Sriram Rajagopalan<sup>1</sup>, Mr Devaraj Srinivasamurthy<sup>1</sup>, Mr Chris Imray<sup>1</sup>, Mr Matt Poppelwell<sup>1</sup>, Miss Virginia Summerour<sup>1</sup>, Miss Katarzyna Powezka<sup>1</sup>, Miss Ketino Pasenidou<sup>1</sup>, Miss Helena Smith<sup>1</sup>, Mrs Lisa Kelly<sup>1</sup>

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**Introduction/Background:** Large research studies are usually delivered by dedicated research delivery teams. Efficiency of this model is generally poor due to insufficient integration of research with clinical care. We postulated that involving clinical staff directly in research delivery could significantly enhance its efficiency. To facilitate development of this model we gauged healthcare professionals' opinions on attitudes and perceived barriers towards research engagement.

**Methods:** We conducted an open Internet survey of healthcare professionals from the West Midlands. Only quantitative analysis was performed.

**Results:** The survey achieved a 100% completion rate with 252 participants including nurses (32.5%), surgeons (19.3%), podiatrists (5.2%), HCAs (5.2%), administrators (4.0%), and ODPs (3.6%). A third of respondents were based in primary care; 55% had previous or current involvement in research and 38% received training. A majority of respondents expressed an interest in participating in research delivery (71%), but would do that only if given dedicated research sessions as part of their job plan (60%). Staff workload, stress, and lack of support from the managers were identified as main barriers to research engagement.

**Conclusions:** An alternative model of research delivery is possible, but would require flexible approach. Impact on job satisfaction and staff retention should be explored.

## VS Oral Abstracts (Venous Forum)

VO88

### 5-year follow-up of a Randomised Controlled Trial of Endovenous Laser Ablation versus Mechanochemical Ablation for Superficial Venous Incompetence (LAMA Trial)

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#### Introduction

Despite a lower anatomical occlusion rate at 1-2 years; patients treated with mechanochemical ablation (MOCA) report equivalent improvements in clinical and Quality of life (QoL) measures when compared to thermal ablation. This study reports the 5-year outcomes of a randomised controlled trial of endovenous laser ablation (EVLA) vs MOCA.

#### Methods

Patients with unilateral, symptomatic superficial venous incompetence were equally randomised to either MOCA or EVLA. Reported outcomes included anatomical occlusion, clinical recurrence, need for reintervention and disease-specific QoL measured by Aberdeen Varicose Vein Questionnaire (AVVQ).

#### Results

At 5-years, 57/75 (76%) and 52/75 (69%) patients attended follow up in the MOCA and EVLA groups respectively. Anatomical occlusion following MOCA was significantly lower than EVLA (46.8% vs 91.5%;  $p < 0.001$ ). Clinical recurrence occurred in 21/47 (44.7%) following MOCA and 23/47 (48.9%) following EVLA;  $p = 0.298$ . Reinterventions were 15/71 (21.1%) following MOCA and 6/71 (8.5%) following EVLA;  $p = 0.033$ . There was no significant difference in median (i.q.r) AVVQ between groups, 3.7 (0-9) vs 3.3 (1-6);  $p = 0.786$ .

#### Conclusion

Five-year anatomical occlusion following MOCA is significantly lower than EVLA. No significant difference in QoL outcomes were observed between groups, however, the MOCA group required a higher number of reinterventions.

## A meta-analysis of thromboprophylaxis measures during travel and guidance for patients who travel after varicose vein surgery

Leona Takeuchi<sup>1</sup>, Miss Kanoklada Srikuea<sup>2</sup>, Dr Ehsanul Choudhury<sup>1</sup>, Lily Benton<sup>2</sup>, Mr Taha Khan<sup>2</sup>, Mr Stephen Black<sup>2</sup>

<sup>1</sup>King's College London, , <sup>2</sup>Guy's and St Thomas' NHS Foundation Trust, ,

**Background:** Travelling introduces a potentially increased risk of deep vein thrombosis (DVT). This may be enhanced following varicose vein surgery, but travel advice given to patients is not consistent. This aim was to establish guidelines for thromboprophylaxis during travel. **Method:** MEDLINE and EMBASE searches were conducted to identify studies investigating travel-induced DVT. Only randomised control trials (RCTs) from 1998 to 2023 were included by independent assessors. Disagreements were adjudicated by a third party. **Results:** From 951 studies, 10 were selected. Overall, DVT incidence was 1.95%, where all trials investigated flights lasting approximately 3-15 hours. Six trials focused on mechanical thromboprophylaxis (stockings), and four on pharmacological prophylaxis. There was a 10% reduction in DVT incidence using class III below-knee stockings. This contributed to a higher overall effect ( $Z = 1.95$ ,  $P = 0.05$ ) than class I stockings. There was a significant benefit when using enoxaparin ( $P < 0.002$ ) or pinokinase ( $P < 0.05$ ). There were no RCTs assessing DVT prophylaxis following post-varicose vein surgery with travel. **Conclusion:** Enoxaparin, pinokinase, and class III stockings were the most effective interventions. Varicose vein surgery has been associated with a higher risk of DVT; therefore, these patients would benefit from prophylaxis or delaying travel.

## A systematic review and meta-analysis of the current evidence for the non-operative management of post thrombotic syndrome.

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### Introduction

Operative interventions for post thrombotic syndrome (PTS) are limited to specialist centres. We present a review of the current evidence for non-operative management of PTS.

### Methods

Reviewers searched databases for full-text articles in English between 2000–2023. Treatment effects were calculated as Odds Ratios (OR) with 95% Confidence Intervals (CI).

### Results

3355 results were screened, 173 reviewed and 32 included. Cumulative incidence of PTS was lower with DOAC vs VKA ( $p=0.004^*$ ). PTS incidence was not significantly affected by low molecular weight heparins compared to VKA or placebo. PTS incidence was reduced by micronized purified flavonoid fractions (MPFF) plus rivaroxaban vs rivaroxaban ( $p<0.00001^*$ ). Elastic Compression Stockings (ECS) were favoured over placebo or no stockings (OR 0.72, 95%CI 0.39-1.34). 24 months ECS was superior to shorter durations ( $p=0.003^*$ ). Pneumatic compression resulted in shorter hospital stay vs ECS and bedrest. Six-months exercise vs control showed improvements in leg strength and quality of life ( $p=0.03^*$ ). Electrical calf stimulation combined with MPFF and ECS showed improvements in clinical severity and quality of life.

### Conclusion

The current evidence favours rivaroxaban over VKA. Compression stockings remain the subject of debate. Alternatives may provide novel avenues for treatment but more work is required to explore these further.

VO91

## The impact of body mass index on the outcomes of endovenous interventions for varicose veins

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### Background

Varicose veins (VV) treatment for high body mass index (BMI) patients is stigmatised. We aimed to assess the equity of VV interventions and outcomes in relation to BMI.

### Methods

Endovenous interventions (radiofrequency ablation (RFA) and/or foam sclerotherapy (FS)) at a single centre (January-March 2021) were reviewed. Patient outcomes were stratified by BMI. Patient satisfaction was evaluated through follow-up telephone calls.

### Results

143 patients we included (53% male), with a median age of 55 years. Of these, 88 (61.5%) had BMI<30 and 55 (38.5%) had BMI>30. Intervention rates were comparable between BMI<30 and >30 groups (RFA: 68 vs. 42, Foam: 8 vs. 4, both: 12 vs. 9, P=0.86). Recurrence rate and re-intervention rates were also similar (P=0.17 and P=0.58, respectively). One deep vein thrombosis occurred post-intervention in a patient with BMI>30. Patients with BMI<30 reported a lesser symptom improvement compared to those with BMI>30 (22.7% vs. 9.1%, P=0.04). Patients' satisfaction were however comparable between BMI<30 and BMI>30 groups (P=0.9).

### Discussion

Equitable access to VV intervention for high BMI is supported, as treatment improves patients symptoms without increased risk. A formal prospective observational study is needed.

## The anterior accessory thigh vein (AATV) should not be overlooked

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Accurate pre-operative assessment for truncal incompetence is essential if the incidence of recurrence following varicose vein surgery is to be reduced. Many recurrences are due to incompetence of the anterior accessory thigh vein (AATV) and yet some anatomical studies have said it is only present in 50% of the population.

The aim of this study was to determine the role of the AATV in venous disease. The great saphenous vein (GSV) and the small saphenous vein (SSV) were interrogated for incompetence. In addition, the presence or absence of the AATV was documented as well as whether it was incompetent or not.

Over a four-week period 110 consecutive venous scans in 194 limbs were reviewed. Primary varicose veins were the indication in 120, recurrent veins in 53 and the remaining twenty-one for other indications. 28% had no truncal incompetence while 72% had one or more incompetent trunks. The AATV was imaged in 137 limbs (71%) and thirty-eight (28%) were incompetent. The incidence of AATV incompetence was 15% in primary varicose veins but rose to 40% in patients with recurrent varicose veins.

These findings emphasise the importance of the AATV in all patients referred for venous imaging.

VO93

## Stent Configuration for Endovascular Ilio-Caval Reconstruction - A Systematic Review of the Literature

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### Introduction:

Endovascular Iliocaval reconstruction is a potential option for managing chronic venous occlusive disease. A variety of stent configurations are described. This systematic review explores the evidence behind these options.

### Method:

Systematic review (Cochrane, Medline, PubMed, Embase) according to the PRISMA guidelines was performed for studies reporting outcomes for endovascular ilio caval reconstruction.

### Results:

26119 studies were identified. 26109 ineligible studies were excluded. Of 9 included studies, there were no randomised control trials available for meta-analysis.

Multiple Techniques re-described. The limited patency data is as follows (primary, primary-assisted, secondary):

Inverted Y- 41%, N/A, 90%

Double barrel - patency data – 67%, 81.3%, 91.8%

Skip stenting – 74%, 83%, 97%

Three stent – 89.9%

No studies reported QoL data for comparison and there was heterogeneity in reported data.

### Conclusion:

There is limited evidence for a single technique being superior but configurations with 3-stents maybe offer greater patency. Clinicians should utilise their preferred method with appropriate governance and follow-up. Quality of life data is lacking as is consensus of reported data.



VO94

## A scoping review of clinical scores or grading systems for Pelvic venous disorders

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<sup>2</sup>Queen Mary University, , Malta

### Introduction:

Pelvic Venous Disorders (PeVD) are a group of conditions that are increasingly recognised but often under-diagnosed. This scoping review aims to identify current diagnostic and management tools for PeVD, facilitating the development of a validated risk stratification tool.

### Methods:

We conducted the scoping review in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses extension for Scoping reviews (PRISMA-ScR). Online databases were searched from inception up to 23rd April 2023. We included studies that implemented a scoring or grading system for PeVD and further classified these systems as either clinical or radiological.

### Results:

Of the 2970 records identified, 76 publications were reviewed in full, and 20 were included. We identified 20 distinct scoring/grading systems, with 7 (35%) being clinical scores and 13 (65%) radiological scores. For the radiological scores, the imaging modalities employed were : Duplex ultrasonography in 5 (38.5%); computer tomography in 3 (23.1%); magnetic resonance imaging in 3 (23.1%); and venography in 2 (15.4%) (Figure 1).

### Conclusion:

This scoping review identifies a diverse range of scoring and grading systems available for PeVD, highlighting an unmet need for a validated, unified tool that is crucial for effective patient screening, accurate assessment, referral, and tailored treatment strategies.

VO95

## Five-year outcomes of dedicated venous stents for the treatment of acute and chronic iliofemoral venous obstructive disease

Dr Rachael Morris<sup>1</sup>, Dr Kanoklada Srikuea<sup>2</sup>, Miss Anna Pouncey<sup>3</sup>, Dr Marios Ertocritou<sup>2</sup>, Dr Narayanan Thulasidasan<sup>2</sup>, Dr Narayan Karunanithy<sup>2</sup>, Mr Prakash Saha<sup>1,2</sup>, Mr Taha Khan<sup>2</sup>, Professor Stephen Black<sup>1,2</sup>

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### Aims

This study aimed to evaluate outcomes of dedicated iliofemoral venous stents at 5-year follow-up.

### Methods

A retrospective cohort study of consecutive patients treated at a single tertiary referral centre was carried out. Electronic records were searched to obtain demographics, intervention details, patency and clinical outcome data.

### Results

Between 2012 and 2017, 267 patients (65% female, median age 43) were treated with dedicated venous stents. Indications for treatment were acute iliofemoral deep venous thrombosis (IFDVT), (112 patients), post-thrombotic syndrome (PTS), (155 patients;) and non-thrombotic iliac vein lesions (NIVL), (19 patients). Primary (pp), primary assisted (pa) and secondary patency (sp) were 54%, 76% and 86% at 60 months, and was better in NIVL patients (pp./pa./sp. 100%) than IFDVT (58/ 83/ 85%) and PTS (46/ 68/ 84%). Villalta score improved from 15 at baseline to 7 (P<0.001) at latest follow-up for PTS and NIVL. The rate of PTS was 17% at latest follow-up for IFDVT patients, with a median Villalta score of 1 (range 0-15).

### Conclusion

This data suggests dedicated venous stents are safe, and that treatment can lead to improvement in patient outcomes. Maintaining primary patency in thrombotic patients is challenging, however secondary patency rates are acceptable.

VO96

## Change in Intervention technique of Acute Deep Venous Thrombosis (DVT) in a Tertiary Referral Centre over 9 year period

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Aims:

Various endovenous thrombectomy techniques are available in the management of patients with acute lower limb deep venous thrombosis (DVT). These include Catheter Directed Thrombolysis (CDT), pharmacochemical thrombectomy (PMT) and mechanical thrombectomy (MT). We aim to analyse the change in choice of technique in a tertiary referral centre over a 9 year period.

Methods:

A retrospective analysis was performed of a prospectively collated database of patients who underwent intervention for acute DVT. We analysed the intervention technique used between 2014 to 2023.

Results:

A total of 109 have been treated with endovenous thrombectomy since 2014. Of these, 60 (55%) were female and 49 (45%) male were with an average age of 50 and 45 years respectively. Over the 9 year period, the number of MT has increased in the last 3 years whilst the number of CDT and PMT intervention has reduced (figure 1 and 2).

Conclusion

The results show that the use of MT has increased compared to other techniques. MT has an advantage of requiring shorter length of stay, decreased nursing requirements, no need for repeated angiography and reduced bleeding complications.

VO97

## Weighing up the differences in superficial venous interventions: an international survey of venous practitioners

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### Background

Managing varicose veins(VV) remains stigmatised in higher body mass index (BMI) patients. We aimed to explore clinicians' superficial venous practice in relation to BMI.

### Methods

Through international survey (promoted through social media, VERN, and VSGBI newsletters) we elicited clinician practice based on CEAP classification and BMI.

### Results

71 responses (June-July 2023) from 15 countries with 80% public healthcare.

For CEAP 2/3, 51% regularly treat at BMI 30-40, and 21% treat at BMI>40.

For CEAP 4/5, 74% regularly treat at BMI 30-40, and 48% at BMI>40.

For C6, 83% regularly treat at BMI 30-40 and 62% at BMI>40.

In superficial vein thrombosis, 60% and 51% treat at BMI 30-40 and >40 respectively; this increases to 86% and 70% for bleeding VV.

In high BMI, endothermal is preferred (69%), followed by phlebectomy (45%), then foam (37%). 51% never offer high-tie and stripping.

Intervention is considered, if weight-loss attempted (38%), extended duration of symptoms (42%) or age<50yrs (27%).

Hesitations to offer intervention at BMI>30 are technical difficulty (83%), thromboembolism (83%) and recurrence risk (73%).

### Conclusion

VV management disparities exist in BMI>30, necessitating better understanding of the consequences of non-treatment and intervention concerns.

VO98

## Superficial Venous Arterialisation: a retrospective case series.

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Introduction:

Patients with chronic limb threatening ischaemia (CLTI) unsuitable for conventional endovascular or surgical revascularisation are treated with major amputation. Superficial venous arterialisation (SVA) presents an alternative option(1). No cases report success beyond 2 years.

Methods:

Retrospective case review of patients undergoing SVA between 2019-2023 by 2 surgeons in a regional vascular unit. The primary endpoint was limb salvage. Presentation, co-morbidities and symptom resolution were recorded. Patients were followed up clinically, and with duplex ultrasound.

Results:

Five patients underwent open lower limb SVA using the Lengua technique. Indications were tissue loss in 4 and severe ischaemic rest pain in 1 (Table 1). Median age was 68 (range 50-71), 2 were female. Median follow up was 5 months (range 1-36) with the longest ever reported follow up, 3 years. 80% were technically successful. Limb salvage rate was 40%, rest pain resolved and wounds healed in both. The other three had amputations – two transtibial one transfemoral. One patient had a functioning graft but no benefit in perfusion or pain and requested amputation.

Conclusion:

SVA offers an unconventional but simple option for limb salvage for younger, fitter patients with CLTI. Key technical considerations, pre-requisite anatomy and reasons the procedure fails are described.

VO99

## An integrated nursing service for the treatment of lower leg venous ulcers.

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<sup>1</sup>HSE, Roscommon University Hospital, Ireland

### Introduction

Approximately 80% of patients presenting with leg ulcers are venous in origin. However, lack of standardisation of care has a human and financial impact for patients and service providers. Increases in the aging population and number of patients entering older age with co-morbidities results in increases in the demand for venous leg ulcer treatments. A joint initiative between a Registered Advanced Nurse Practitioner (RANP) in Tissue viability and wound management, and a vascular consultant, identified deficits in patient care delivery and quality of life.

**Method:** This 'Sláintecare' joint initiative, established the Leg Ulcer Centre Ireland (LUCI) to deliver a pathway for the treatment and management of lower limb venous ulcers. The RANP provides a "one stop shop" for patients, offering a complete care package from diagnosis to surgical intervention - endovenous ablation, follow-up post operative care and discharge.

### Results

Audit findings include; reduced hospital admissions and waiting times; increased patient satisfaction; and, improved interdisciplinary integrated referral pathways.

### Conclusion

The RANP offers an effective, efficient diagnosis-to-end treatment service for patients. The results demonstrate improved treatment, cost outcomes and value-based outcomes for patients. The new integrated service facilitates expansion of the service and further enhancement of the nursing skills and role.

P1

## Endovascular Ilio-caval reconstruction due to Retroperitoneal Fibrosis - A noteworthy complication

Mr Lawrence Ugwumba<sup>1</sup>, Mr Tamer El-Sayed<sup>1</sup>, Miss Rana Khalil<sup>1</sup>, Mr Alex Norman<sup>1</sup>, Miss Claire Dawkins<sup>1</sup>, Mr Sandip Nandhra

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Background:

Idiopathic Retroperitoneal fibrosis is a rare chronic inflammatory condition that can lead to compression of retroperitoneal structures. This case study reports a rare complication of renal artery occlusion following ilio-caval reconstruction.

Case Summary:

A 53-year-old-lady presented with debilitating venous claudication, vulval varicosities, extensive superficial varicosities and venous skin changes (C4). She had a background of Idiopathic retroperitoneal fibrosis, left nephrectomy, right ureterolysis and CKD. CT and MR Venogram reported retroperitoneal soft tissue surrounding and occluding the IVC, renal veins, and extending into the common iliac veins.

Ilio-caval reconstruction was done with satisfactory completion venogram. However, she developed oliguria on day 1 post Op and had a CT angiogram with reported right renal artery occlusion due to stent compression and fistula between stented IVC and right renal artery.

Renal angiography and stent were done same day with technical success.

On three months Follow up, there was overall improvement of varicosities, chronic venous hypertension symptoms and satisfactory venous duplex signals. However, she remained dialysis dependent and is considered for renal transplant.

Conclusion:

A rare, interesting case in its indication for CVD management but more pertinently perhaps the complication that arose. Endovenous practitioners should be mindful of this when treating similar cases.

P2

## Patient outcomes following surgical intervention for infected femoral artery pseudoaneurysms in intravenous drug users: a 6-year single-centre cohort study

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### Introduction

An infected femoral artery pseudoaneurysm (IFAP) is a life- and limb-threatening emergency due to haemorrhage, sepsis and limited revascularisation options. This study describes the management and post-operative outcomes at a tertiary vascular centre.

### Methods

All patients with Intravenous Drug User (IVDU)-related IFAPs between 1st January 2016 and 31st December 2022 were identified using a prospectively-collected database. Primary outcomes included second operation (SO), neuropathic pain, venous insufficiency, major lower limb amputation (MLLA) and 30-day mortality.

### Results

62 patients (median age 43, IQR 40-50 years) were included. Most presented with groin swelling (82.3%), pain (66.1%) and bleeding (62.9%). Median hospital stay was 12 days (IQR 7-22). Median time from admission to index surgery was 1 day and index surgery to those requiring SO was 2 days. Treatment involved arterial ligation and debridement (95.2%) or debridement and primary revascularisation (4.8%). SO rate was 37.1%: re-look and debridement (8.1%), negative-pressure dressing (4.8%), seroma (4.8%), haematoma (1.7%), primary MLLA (17.7%) at median 3.5 days postoperatively (through-knee 1.6%, above-knee 14.5%, hip-disarticulation 1.6%). Neurological pain was 8.1%, venous insufficiency (6.5%) and 30-day mortality (1.6% following multi-organ failure).

### Conclusion

Arterial ligation and debridement formed the mainstay of IFAP treatment. Patients should be advised of a 1 in 3 risk of needing a subsequent operation and 1 in 5 risk of major amputation.



## Toward a Core Outcome Set for Intermittent Claudication: A Systematic Review of Reported Outcomes

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### Introduction:

This review aimed to compile an exhaustive list of all outcome measures reported in studies of intermittent claudication (IC) as the first step in developing a core outcome set (COS) for IC.

### Method:

Medline and Embase were searched for all studies including individuals with IC and reporting  $\geq 1$  outcome from January 2015 to February 2023. Abstract, full text screening and data extraction were performed by two investigators independently. All reported outcome measures were extracted verbatim and categorised per Dodd's domains. (COMET registration: COMIC study)

### Results:

4,382 studies were screened, and 344 were included. A total of 513 different outcomes across 33 Dodd's domains were identified. Patient-reported outcomes were reported in  $< 27\%$  of studies. 362 unique outcomes were reported by only one study. 97.3% of all outcomes were reported in less than 10% of the total number of studies. Ankle-brachial pressure index was the most frequently reported outcome. There were wide variations in the definition of commonly used outcome measures across different studies.

### Conclusion:

There is substantial heterogeneity in reported outcomes in studies of IC. Most reported outcomes are clinical/physiology oriented than patient centred. Development of COS for IC is vital to improve and standardise reporting in studies of IC.

## Outcomes following carotid intervention for carotid artery disease in patients with cerebrovascular disease in a large tertiary centre

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<sup>1</sup>Cambridge University Hospitals Nhs Trust, Cambridge, United Kingdom, <sup>2</sup>Imperial College London, London, United Kingdom

### Introduction:

Carotid endarterectomy (CEA) or carotid artery stenting (CAS) are common methods used to treat carotid artery disease in patients with strokes or transient ischaemic attacks (TIA). A review of both endovascular and open surgical management of carotid artery disease was conducted.

### Methods:

Symptomatic and asymptomatic patients with carotid artery disease undergoing either CEA or CAS between January 2015 and December 2022 were included in this retrospective analysis. Data was collected using the electronic medical records and cross-referenced with data from the National Vascular Registry (NVR).

### Results:

Seven hundred and seventy-five patients (89% CEA and 11% CAS) were identified and included in the analysis. The mean age was 69.9 (standard deviation (SD):  $\pm 10.1$ ) years and, approximately 73% of patients were males. 2.1% of CEA patients needed to return to theatre compared to none among the CAS patients ( $p=0.547$ ). Mortality at 1 year was similar for CEA and CAS ( $p=0.995$ ). At 5 years, mortality for CEA was 9.7% compared to 14.1% for CAS ( $p=0.210$ ).

### Conclusions:

This review of carotid intervention shows that, at both 1 and 5 years, mortality was similar with both carotid stenting and carotid endarterectomy.

P5

## Sex differences in outcomes following hybrid revascularisation for multi-level peripheral arterial disease

Mr Frederick Ross<sup>1</sup>, Mr Arsalan Wafi<sup>1</sup>, Mr Muzzafer Chaudery<sup>1</sup>, Miss Trixie Yap<sup>1</sup>, Miss Talia Lea<sup>1</sup>, Mr Hany Zayed<sup>1</sup>, Mr Ashish Patel<sup>1</sup>

<sup>1</sup>King's College London & Guy's & St Thomas' NHS Foundation Trust, London, UK

### Introduction

Sex disparities in outcomes have been described in aortic and carotid surgery. Hybrid revascularisation (HR) allows multi-level disease to be treated in higher-risk patients with multiple co-morbidities. This study aimed to assess differences in outcomes following HR.

### Methods

A single-centre retrospective study was conducted on all patients undergoing HR from 2012-2022. The primary outcome was amputation-free survival (AFS). Associations between sex and outcomes were analysed using univariable and multivariable logistic regression and Cox proportional hazards regression analysis.

### Results

105 (25%) women and 316 (75%) men underwent hybrid revascularisation, 183 (43.5%) were claudicants and 238 (56.5%) chronic limb threatening ischaemia (CLTI) patients. All patients underwent femoral endarterectomy and endovascular recanalisation of the iliac (280,67%), femoropopliteal (112,27%) or both (29,7%) vessels. Median follow-up was 83months. Women were older (75vs70 years), more likely to have chronic kidney disease (29.5%vs13.9%) and CLTI (66.7%vs53.2%). There were no differences in patency rates or length of hospitalisation between women and men. After adjusting for confounders women with CLTI experienced lower AFS (hazard ratio 1.60 [1.09-2.35],P<0.05).

### Conclusion

Women undergoing hybrid revascularisation for CLTI have lower amputation-free survival compared with men. Future studies should assess the reasons for these disparities and determine opportunities to improve outcomes in women.

## An expert Delphi consensus on risk factors for adverse events after endovascular aortic aneurysm repair: Tier 1 study from the International Risk Stratification in EVAR (IRIS-EVAR) working group

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### Introduction

The EVAR-IRIS project aims to identify clinically important risk factors for adverse events after EVAR (Tier 1), develop risk stratification systems (Tier 2), and propose risk-informed surveillance strategies (Tier 3). Tier 1 aimed to identify the most important risk factors which will be used to develop a model to assist clinicians in decision making including better patient selection and surveillance strategies.

### Methods

We followed a structured 3-round Delphi process whereby experts in the field of EVAR were surveyed using an online tool. Panellists rated risk factors using a 4-point Likert scale. Consensus was defined as >70% of participants agreeing/strongly agreeing or disagreeing/strongly disagreeing with a statement in each round.

### Results

Of a total of 64 individual risk factors assessed by the panellists, 37 (58%) were determined to be important. Risk factors were stratified in 4 domains: 14 (38%) of the 37 were related to preoperative anatomy, 3 (8%) related to the aortic device, 8 (22%) related to the procedure performance, and 12 (32%) related to postoperative surveillance.

### Conclusion

Clinically important risk factors for adverse events after EVAR were identified via expert consensus. Such factors will be used to develop an expert consensus-informed risk stratification and surveillance strategies.

## 1-year outcomes of Major Lower Limb Amputation: An 8-year experience of a tertiary referral center

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**Background:** Lower limb amputation is a common procedure performed for end-stage arterial disease, sepsis or trauma. Outcomes are historically poor, with high mortality, frequent revisions, a high cost of care, and generally poor quality-of-life. This review evaluates 8 years of outcomes from a tertiary Vascular referral center.

**Method:** Retrospective case-note review of the electronic patient record identified all 1568 major and minor amputations performed between 01/2015-12/2022. Outcomes were interrogated and case ascertainment compared to the National Vascular Registry.

**Results:** 30-day and 1-year mortality for major amputation was 8% and 30% compared to 1% and 15% for minor amputation. 13% of major amputations and 44% of minor amputations were revised. The majority were revised within 1-year of the index procedure, with toe, hallux and transmetatarsal amputations being at risk of multiple revisions. Early revision conferred survival benefit up to 48-months, whereafter revision was detrimental to survival. The caseload of major amputation increased over the 8-year period with gradually improving outcomes. Rates of re-ambulation and function were greater for below-knee than above-knee amputation – including work-related and high-impact sporting activities.

**Conclusion:** Amputation remains a high-risk procedure for end-stage limb disease. Revision is common and should form part of counselling and consent discussion.

## A model using Natural Language Processing for prediction of disease progression in patients with intermittent claudication

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### Introduction:

Factors that predict progression of intermittent claudication (IC) to chronic limb threatening ischaemia (CLTI) are not clear. The use of Natural Language Processing (NLP) algorithms, trained on electronic health records, allows efficient data extraction and promises a conceptual advance in prediction modelling.

### Methods:

Using MEDCAT- NLP toolkit, powered by CogStack, patients with IC were identified from electronic patient records at a tertiary vascular referral centre. Demographic information, co-morbidities, medication and procedures carried out on the patient were extracted by searching appropriate SNOMED terms. We identified occurrence of CLTI after mention of IC. Manual annotation was conducted on procedural terms to train the NLP model. The prediction model was developed using decision tree classifier from Python's sklearn package, with recursive feature elimination to ascertain the factors predictive of CLTI and mortality.

### Results:

5027 patients with IC were identified. Death occurred in 989 patients (19.7%). CLTI occurred in 140 patients (2.8%). Previous angioplasty, followed by anticoagulant use, were most predictive of CLTI (AUC 0.92). Previous number of hospitalisations predicted mortality.

### Conclusion:

The present model suggests that previous angioplasty and anticoagulant use are the main predictive factors in the development CLTI. Further validation of the model on larger datasets is warranted.

## Long-term Outcomes following Open Repair vs Fenestrated Endovascular Aneurysm Repair for Juxtarenal Abdominal Aortic Aneurysm in patients with Chronic Kidney Disease.

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The management of juxtarenal abdominal aortic aneurysms (JAAA) in patients with chronic kidney disease (CKD) remains challenging with both open and endovascular repair.

All patients with baseline CKD who underwent elective Open Repair (OR) or Fenestrated Endovascular Aneurysm Repair (FEVAR) for JAAA at a single centre from 2011-2022 were studied. Patient demographics and long-term outcomes were analysed. Kaplan-Meier survival analysis and log-rank test was performed.

Thirty-seven patients were included of which 21.6% (8/37) had OR and 78.3% (29/37) had FEVAR with a median follow up of 32 months. Mean age was 76 years (range 61-88) and 91.9% (34/37) were men. 87.5% (7/8) patients in OR group and 20.7% (6/29) in FEVAR group developed Acute Kidney Injury (AKI) post-operatively,  $p=0.001$  (95% CI 0.004 – 0.364) but only one patient from each group needed dialysis with no significant difference ( $P=0.390$ ). On long term survival analysis was no difference between OR and FEVAR for overall survival ( $p=0.154$ ), major adverse cardiovascular event (MACE) free survival ( $p= 0.474$ ) or reintervention free survival ( $p=0.430$ ).

JAAA repair in patients with baseline CKD, post operative AKI was higher with OR but there was no difference in postoperative dialysis requirement or long-term survival outcomes compared to FEVAR.

## An update of a prospective comparison study of BlueDop as a novel assessment of pedal perfusion

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**Background:** Limitations of ABPI include staff training and competency, restrictions from wounds and artificially elevated readings from incompressible vessels. “BlueDop” is a specialist probe which estimates ABPI by analysing doppler waveform at the ankle, without needing a tourniquet or the patient lying flat. The present study updates preliminary results presented at VSASM 2022 regarding the accuracy of BlueDop in assessing perfusion.

**Methods:** 175 Vascular and podiatry clinic patients had both ABPI+/-TBPI and BlueDop measurements recorded. Patient and user experience was assessed.

**Results:** 122 patients had diabetes; 95 had CLTI, and 22 reported claudication. Patients preferred the BlueDop compared to ABPI and TBPI (mean difference = 0.544,  $p < 0.001$  and 0.579,  $p < 0.001$  respectively). BlueDop ABPI showed a significant weak correlation with cuff ABPI ( $r_s = 0.39$ ,  $p = 0.003$ ) but not cuff TBPI ( $r_s = 0.22$ ,  $p = 0.4$ ). BlueDop has good predictive value to predict ABPI  $< 0.8$  (AUC=0.773) and  $< 0.5$  (AUC = 0.870).

**Conclusion:** BlueDop appears to have acceptable accuracy in diagnosing mild and severe PAD suggesting that it could be a suitable replacement when ABPI/TBPI are not obtainable.



P11

## Management and aortic reconstruction in patients with infrarenal aortic graft infection. A UK Vascular networks' 10-year experience.

Mr Ibrahim Enemosah<sup>1</sup>, Dr Gvantsa Gamtkitsulashvili<sup>1</sup>, Dr Rakan Hatem<sup>1</sup>, Dr Hannah Cowan<sup>1</sup>, Mr Benjamin Patterson<sup>1</sup>, Mr Ian Nordon<sup>1</sup>, Mr Stephen Baxter<sup>1</sup>

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### Introduction:

Aortic graft infections (AGI) are rare with no global consensus for diagnosis and management, we report our experience of management and complex in situ reconstruction.

### Methods:

Retrospective cohort study of 49 patients who developed AGI following EVAR and open aortic intervention from January 2010 to December 2020.

### Results:

Primary intervention was open aortic repair in 40(81.6%) patients (7 ruptured aneurysm (rAAA), 22 aneurysmal disease and 11 aortoiliac-occlusive disease). 9(18.4%) patients had an EVAR (3 for rAAA). AGI was identified at a median of 18 months post primary intervention. All patients were commenced on long term antibiotics, 22(45%) were unfit for explantation, 8(16.3%) were on surveillance for low grade infection, while 15(30.6%) had an explant and aortic graft in situ reconstruction, with 2(13.3%) requiring interval aortic stent prior to explant.

Femoral vein (53%) and bovine pericardium (20%) were most commonly used conduit. Post-operative 30 day mortality was 13.3%(2 patients). Survival post-explant was 69% and 65% at 2 years and 5 years respectively versus 43% and 29% in the non-operative group.

### Conclusion:

Infrarenal aortic graft in situ reconstruction is safe following AGI with a reasonable 5 year survival rate. Patient fitness assessment is pertinent due to high perioperative risk.

P12

## Primary care coding and the impact on lipid-lowering therapy prescriptions in Peripheral Arterial Disease

Miss Yasmin Mussa<sup>1</sup>, Dr Jing Yi Kwan<sup>1</sup>, Dr Penelope Sucharitkul<sup>1</sup>, Mr Nawaz Safdar<sup>1</sup>, Mr Kinshuk Jain<sup>1</sup>, Mr Patrick Coughlin<sup>1</sup>, Dr Marc Bailey<sup>1</sup>

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**Introduction:** Inaccurate primary care coding can negatively impact patients. Diagnostic and procedural ICD-10 codes recorded in GP medical records for patients with confirmed peripheral arterial disease (PAD) manifesting as claudication and chronic limb-threatening ischaemia (CLTI) were seen in secondary care vascular clinics and analysed. The aim was to identify any relationships between coding accuracy and adherence to prescribing guidelines surrounding best medical therapy.

**Methods:** 641 PAD patients from a single major regional vascular unit (420 claudicants; 221 CLTI). Prescription, diagnostic and procedural codes data were collected retrospectively from electronic medical records including primary and secondary care records. Fischer's tests were used to calculate statistical differences.

**Results:** There were no significant differences in age, sex, or comorbidities between the coded and uncoded groups, except for COPD (25% vs.15.4%  $p=0.026$ ). 68% (n=263) patients had a diagnostic code(s) (98.9% accuracy) while 70% (n=137) had a procedure code(s) (92.2% accuracy). There were significant differences in those without lipid-lowering therapies prescription in diagnostically coded vs. uncoded (7% vs. 15%,  $p=0.027$ ) (Figure 1); and in procedural coded vs. uncoded (7% vs. 14%,  $p=0.0236$ ) (Figure 2).

**Conclusion:** A large percentage of coding data is missing in this cohort and may contribute to the lower provision of LLT.

## Shared decision making in threshold Abdominal aortic aneurysm (AAA) patients- what influences the decision not to treat?

Mr Charlie Bewsey<sup>1</sup>, Dr Daniel Manners<sup>2</sup>, Mr David Birchley<sup>2</sup>, Mr Robert McCarthy<sup>2</sup>, Ms Sophie Welchman<sup>2</sup>, Ms Alison Guy<sup>2</sup>, Ms Hannah Travers<sup>2</sup>, Mr Tom Hardy<sup>2</sup>

<sup>1</sup>Exeter Medical School, EXETER, United Kingdom, <sup>2</sup>Royal Devon and Exeter Hospital, EXETER, United Kingdom

### Introduction

Limited data is available on threshold AAA patients who do not undergo intervention and their outcomes. This study is a single centre's experience of non-intervention patients.

### Methods

All patients with threshold AAA discussed at MDT were retrospectively identified through electronic patient records. Records were reviewed to identify reasons for non-intervention and outcomes.

### Results

From 2020-2023, 42% (40/96) of threshold AAA patients discussed at MDT were deemed not for intervention. Reasons included poor fitness (62%), unsuitable anatomy when considered for EVAR alone (23%) and patient choice (15%). 50% were deemed unsuitable without CPEX testing. Non-intervention patients were significantly older compared to open repair (median 83yrs vs 73yrs,  $p=0.0001$ , ) but not for EVAR (median 79yrs vs 83yrs,  $p=0.08$ ). They had significantly lower AT threshold (10.01 vs 12.09,  $p=0.29$ ), VO2 Max (16.0 vs 18.1,  $p=0.01$ ) and life gain (3.0yrs vs 10.4yrs,  $p=0.0001$ ). 3 non-intervention patients had died at study conclusion.

### Conclusions

Fitness, adverse anatomy and patient choice are the reasons for non-intervention in threshold AAA patients. Patients for open surgery were significantly younger. Non-intervention were significantly less fit and with limited life gains. Recording non-intervention patient data as part of the National Vascular Registry would allow regional trends to be identified.

## Association between atmospheric nitrogen dioxide and abdominal aortic aneurysm; is pollution protective against aneurysm growth?

Mr Liam Musto<sup>1</sup>, Dr Corry Gellatly<sup>1</sup>, Dr Calvin Jephcote<sup>2</sup>, Dr Katherine Adams<sup>2</sup>, Professor Matthew Bown<sup>1</sup>, Professor Anna Hansell<sup>2</sup>

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### Introduction

The pathogenesis of AAA is complex with both environmental and genetic factors being implicated. Air pollution is involved in the development and severity of cardiovascular disease, but it's unclear if air pollution affects growth or development of AAAs.

### Methods

Participant addresses from the UK Aneurysm Growth Study (UKAGS), a prospective cohort, were linked with annual average nitrogen dioxide (NO<sub>2</sub>) exposure data from a validated Land Use Regression (LUR) model, giving NO<sub>2</sub> concentrations (µg/m<sup>3</sup>) in 2009 with 10m grid cell resolution. Linear mixed effect (LME) growth modelling was used to explore the association with AAA growth adjusting for relevant confounders (smoking, social deprivation, and age).

### Results

Environmental data were available for 3735 participants with AAA. Mean number of surveillance scans per participant was 9. There was a statistically significant but very small association between NO<sub>2</sub> exposure and negative AAA growth, -0.008mm/year (p value 0.007) per 10 µg/m<sup>3</sup> NO<sub>2</sub>, which was less than the precision of the measurement (+/- 1.3-4.8mm).

### Discussion

While NO<sub>2</sub> exposure was statistically associated with slower AAA growth, it is unclear if this is biologically causal or due to factors such as loss to follow-up over time. Further study will examine associations with other air pollutants.

P15

## The role of the Comprehensive Geriatric Assessment (CGA) and Shared Decision Making (SDM) in patients with Abdominal Aortic Aneurysms (AAA).

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Introduction:

Shared decision making (SDM) in AAA patients should take account of all technical and patient factors. The Comprehensive Geriatric Assessment (CGA) is proven to reduce complications, length of stay and 30-day readmission after elective AAA repair. We report on how SDM with CGA affected decision-making outcomes in our patients.

Methods:

Retrospective review of AAA patients having a CGA (November 2019 – March 2023).

Outcome measures: SDM outcome, new diagnoses, fitness, mortality/cause of death during follow-up, decision regret.

Results:

336 patients were reviewed (86% male), mean age 78.5 ( $\pm$  7.01). 68% of subthreshold patients had >10 comorbidities (51 % threshold), 88% of subthreshold had > 1 new diagnosis (70% threshold).

25% subthreshold were not fit for intervention irrespective of any potential optimisation.

12% subthreshold chose 'no surveillance', 16% of threshold patients chose 'conservative management'. 0% who chose 'no surveillance' died from ruptured AAA vs 16% choosing 'conservative management'. There was one post-operative death within 30 days. 95% of patients returning post-operative questionnaires did not regret having had surgery.

Conclusion:

CGA and SDM allows early optimisation, appropriate continued surveillance, and facilitates timely discussions about conservative management. Those choosing not to have surgery primarily die from non-aortic causes, suggesting appropriate decision making.

## Complications and informed consent practice after open and endovenous varicose vein interventions

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<sup>2</sup>The Leeds Institute of Cardiovascular & Metabolic Medicine, School of Medicine, University of Leeds, Leeds, United Kingdom

### Introduction:

Half of successful vascular medicolegal claims in the UK are related to varicose vein surgery. We reviewed the incidence of complications following varicose vein interventions and the link with informed consent.

### Methods:

Casenotes of all consecutive patients undergoing varicose vein surgery by open or endovenous (EVL) approach between 01/07/2021 and 31/12/2022 were assessed. Data on postoperative complications was collected and linked with the consent process.

### Results:

271 patients underwent treatment (n=79, 29% open and n=192, 71% EVLT) and 96% had a clear discussion of procedure-related risks documented in the notes.

One patient (EVL) developed a DVT leading to a PE: they were explained and quoted this risk preoperatively. In the open group 2 patients developed wound infection and both were appropriately counselled preoperatively. Paraesthesia occurred in 6 (open) and 11 (EVL) patients: 5 and 9 patients were counselled for this preoperatively, respectively. A minority of patients were explained recurrence, and for several other recognised complications (skin discolouration/burns, lymphocele, bruising) there was no mention in the notes.

### Conclusion:

Although most patients were appropriately counselled, a small proportion experienced complications not mentioned in the preoperative encounters. Standardised practice when explaining risks could improve the overall process and prevent avoidable medicolegal disputes.

P17

## Spatio-Temporal Analysis of non-attendance for the National Abdominal Aortic Aneurysm Screening Program in Cambridgeshire, Peterborough and West Suffolk region between 2018 and 2022 and its link to socioeconomic deprivation

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### Introduction

Non-attendance for National Abdominal Aortic Aneurysm Screening Program (NAAASP) screening scans results in missed public health improvement and financial burden for healthcare. This study aimed to assess the spatio-temporal distribution of non-attendance and investigate its link to socioeconomic deprivation.

### Design and Methods

From Screening Management and Referral Tracking (SMaRT), the “did-not-attend” (DNA) rate was established for each postcode district in Cambridgeshire, Peterborough and West Suffolk from 2018-2022. Fisher's exact test was used. Optimised hotspot analysis was performed to identify annual hotspots of non-attendance. Multiple logistics regression was used to investigate the association between socioeconomic deprivation and non-attendance.

### Results

Overall, 6 364 people (26.6 %), out of 23 957 eligible men, did not attend. PE1 (n=433, 44.5 %), CB1 (n=320, 35.8 %), CB3 (n=114, 36.7 %), and CB4 (n=331, 40.2 %) were the non-attending areas with high DNA rates and high numbers of non-attenders (p value<.00075). A significant drop in the DNA rate was observed in 2020/21. While socioeconomic deprivation was closely linked to non-attendance in Peterborough, it was less evident in Cambridge.

### Conclusion

PE1, CB1, CB3, and CB4 were the non-attending regions, comprising 12.6 % of the total screened population. Socioeconomic deprivation is a major contributing factor to non-attendance.

## Are there gender disparities in outcome following carotid endarterectomy for symptomatic carotid stenosis? A meta-analysis with individual patient-level data

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**Background:** There are limited data on gender-specific outcomes following carotid endarterectomy (CEA) with conflicting results from observational studies and trials. Trials may under-recruit females affecting external-validity, whereas observational studies often focus on peri-operative outcomes. No previous meta-analyses have included all study-types, assessed both short- and long-term outcome, or included individual-patient-data (IPD) enabling adjusted-analysis.

**Method:** We performed a meta-analysis of all studies reporting stroke, myocardial infarction (MI), and mortality by gender post-CEA (30-day to 8-year follow-up), with IPD from eight studies included.

**Results:** In 35 studies (8 RCTs, 6 registries, 21 cohorts; female n=35,137, male n=67,546), postoperative stroke (OR 1.04 [95%CI 0.87-1.54]), MI (1.11 [0.93—1.34]), mortality (1.08 [0.94-1.23]), and stroke/death (1.1 [0.96-1.27]) did not differ by gender (figure 1). Results were consistent across study types, except females had stroke rates in RCTs (1.49 [1.12-1.97]). In IPD analysis (patient n=6,917), 8-year survival and 4-year stroke-risk were similar by age and gender (Image 1). In IPD adjusted-analysis, female sex was independently associated with increased postoperative stroke and/or death (OR 1.34 [1.00-1.80]; p=0.049).

**Conclusion:** There were no significant gender differences in short- or long-term outcome following CEA for symptomatic carotid disease, except a marginally higher female 30-day stroke/death rate in adjusted IPD analysis.



P19

## Outcome after turn-down for elective AAA repair: a post-2019 update.

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With the decline in AAA prevalence and the rise of cardio-pulmonary exercise testing (CPET) as well as the recent debates around the use of EVAR in the UK and the impact of the COVID-19 pandemic, we wished to determine any effect on AAA outcomes.

A retrospective review of patients placed on the turn down list from 2015 to 2023 was carried out. A total of 310 patient were turned down for elective or open repair during this time. Their records were examined for aneurysm size, CPET result and cause of death. The overall mortality of this group during the study period was 74% with one year survival of only 66% and of 29% at 3 years. Only 18.3% listed ruptured AAA as a cause of death.

Despite the gradual decrease in AAA numbers and the impact of the pandemic, the number of cases being turned down remains relatively static suggesting more reticence to operate and will be an area for further study.

As surgeons, we do not readily discuss the patients who do not undergo intervention but in the case of AAAs, this is an important area to understand to allow us to accurately and openly council our patients.

## Feasibility of home-based circuit training and community walking for intermittent claudication: Results of the WALKSTRONG trial

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Supervised exercise is recommended for people with peripheral artery disease (PAD), yet it remains underutilised. Home-based exercise is a potential alternative with reduced travel requirements. The aim was to assess the feasibility of a 12-week home-based exercise programme (HBEP) in people with symptomatic PAD.

Participants were randomised to a HBEP or usual care control. The HBEP group were given Fitbits, a personalised step goal and circuits to be completed twice weekly. Feasibility was assessed via eligibility, recruitment, attrition, safety and adherence. Exploratory analysis was undertaken for changes in walking distance, grip strength, physical activity behaviour, quality of life and inflammatory biomarkers at 12 and 24 weeks.

Of the 188 people screened, 133 were eligible (70.7%), 30 were recruited (22.6%) and one withdrew (3.33%). Six adverse events were recorded, three of which were due to study involvement. Mean adherence to the daily step goal was 53.5% (range=29.8–90.5%). 58.6% of prescribed circuits were completed, 56.4% of which were at the prescribed intensity. No significant differences were observed in secondary outcomes.

The HBEP was feasible and safe, with minimal attrition. However, adherence was similar to centre-based programmes. Education and exercise familiarisation may improve adherence in a full scale randomised controlled trial.

P21

## An Audit of MynxGrip vascular closure device after peripheral arterial intervention

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Background:

The MynxGrip is an extravascular closure device that uses a water-soluble synthetic sealant with the advantage of leaving no material within the vessel lumen. We aimed to review results of using MynxGrip for vascular closure following interventions for peripheral arterial disease.

Methods:

In this retrospective study, all consecutive patients between June 2021 and February 2023 in whom MynxGrip closure device was used were included for analysis.

Patient demographics, vessel calcification, sheath size, comorbidities and medication were recorded. Technical success and complications were the main outcomes measured.

Results:

In 303 consecutive patients MynxGrip closure device was used. 205 were males and 98 females (mean age of 75.5 years). Vessel puncture was antegrade in 212(70%) and retrograde in 91(30%). Technical success was achieved in 91.7%(278/303). Post-intervention hematomas were noted in 13.8%(42/303) of which 90.4%(38/42) were managed by manual compression. Only one patient required surgical intervention. About 45%(19/42) of hematomas occurred in the first 100 cases. Hematomas occurred in 22% of patients on dual-antiplatelets(7/33) and 13% on single antiplatelets(33/253).

Conclusion:

Our results suggest that MynxGrip is a safe vascular closure device in patients undergoing peripheral vascular interventions. Patients on dual antiplatelets have slightly higher incidence of hematomas compared to single antiplatelets.

## Transfer related factors affecting patient outcomes in acute aortic emergencies - a systematic review

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**INTRODUCTION:** Without prompt recognition and intervention acute aortic syndromes (AAS) and ruptured aortic aneurysms, can be catastrophic. This review aims summarise transfer and process-related factors that affect patient outcomes in both conditions.

**METHODS:** A search of English literature was performed according to PRISMA guidelines and registered in PROSPERO (CRD42022334334). Studies were included if they reported process-related factors or interventions and their impact on time-to-definitive treatment, morbidity, mortality, or length of hospital stay.

**RESULTS:** 1782 studies were identified, of which 14 were eligible. All were retrospective and “fair” or “poor” in quality. During the assessment phase, use of the modified aortic dissection detection risk score by first responders may increase detection of AAS. In the emergency department, shock index, ratio of false/true lumen size, modified Early Warning Score, and the vascular surgery comorbidity severity score could be used for risk stratification and to guide transfer to specialist services. During transfer, physician-staffed services improved outcomes with better blood pressure control. Travel time, distance and method of transport did not appear to significantly affect outcomes.

**CONCLUSION:** There is a lack of evidence-based prehospital management algorithms. These results show that changes to key elements in the transfer of patients could improve patient outcomes.

P23

## Inpatient infrainguinal vein graft surveillance duplex scan: How does it inform clinical outcome and is it worth doing?

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### Introduction

Most units perform duplex ultrasound surveillance (DUS) for vein bypass grafts. However, there is no accepted standard for the surveillance interval. In our centre DUS is undertaken prior to postoperative discharge . We compared clinical outcomes between abnormal versus normal inpatient DUS patient groups.

### Methods

A retrospective cohort study of patients undergoing infrainguinal vein graft bypass from January 2016 to December 2018 in a single tertiary vascular centre. Graft Patency rates and interventions at 18 months were compared for the patients with normal inpatient DUS (NDUS) and with abnormal inpatient DUS (ADUS).

### Results

One hundred and four patients underwent inpatient DUS. NDUS was identified in 62(59.6%) and ADUS in 42(40.4%) patients. Patency rates in the NDUS group was 65.5%, 68%, 68% (primary, primary assisted and secondary patency) as compared to the ADUS group (47.5%, 55.5%, 55.5%) (P = .016). The ADUS group had a significantly higher intervention rate 50% vs 16.1%(NDUS) (P = .0002) and a non-significant trend towards higher major lower limb amputation rate 14.3% vs 12.9 %(NDUS) (P= .89).

### Conclusion

An abnormal inpatient DUS is associated with lower graft patency and higher intervention rates. However this does not translate into a significantly higher major limb amputation.

## Central Hypertension and Antihypertensive Adherence in Patients with Abdominal Aortic Aneurysms

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### Background

NICE guidelines recommend treatment of hypertension (HTN) for abdominal aortic aneurysms (AAA). Control of blood pressure (BP) and prevalence of anti-hypertensive medication adherence varies. The aim of this study was to report the levels of peripheral and central BP (pBP & cBP) and anti-hypertensive adherence in a prospective multicentre study of AAA patients (NCT05376514).

### Methods

Patients >55 years old, without connective tissue disorders or atrial fibrillation, with an AAA  $\geq 3$ cm were recruited between June 2022-July 2023. Peripheral and central BP were collected using a standardised protocol. Adherence was measured using the Voils Adherence Scale.

### Results:

137 patients (110 male, mean age=75.7, mean AAA diameter=4.12cm, mean cBP systolic=124.9mmHg, mean cBP diastolic=91.3mmHg, mean number of anti-hypertensives=1.9) were recruited. Of 90 patients with diagnosed HTN, 31 (34%) had uncontrolled pBP (>140 systolic/>90 diastolic) and 48 (53%) had uncontrolled cBP (>130 systolic/>90 diastolic). Of 47 patients with no HTN diagnosis, 23 (49%) had uncontrolled cBP. Of 71 with central HTN, 32 (45%) had normal pBP. Overall adherence was 75%.

### Conclusions

There is a high prevalence of untreated peripheral and central hypertension in patients with AAA in patients with and without a diagnosis of HTN. Adherence was poor in a significant number of patients.

## Clinical features, management and outcomes of patients with mycotic aortic aneurysm in a tertiary vascular centre over a 10 year period

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Mycotic aortic aneurysms (MAA) account for a small proportion of aortic aneurysms but are associated with high mortality. We aimed to report outcomes of MAA in a tertiary centre over 10 years.

Retrospective interrogation of surgical coding databases identified consecutive patients with clinical, radiological or microbiological features of MAA. Clinical characteristics, management and outcomes were reported, including Kaplan-Meier survival analysis.

Of 37 patients with MAA (76% males, mean age 64 (SD 12), 16% with diabetes), 38% had recently documented infection. Aneurysms were most commonly saccular (54%), located in the thoracic aorta (n=8), multiple sites (n=7) or pararenal aorta (n=6), with a mean diameter of 48mm (SD 22). During follow up (62 months (IQR 12, 98)), 28 patients (76%) underwent intervention (10 endovascular, 14 open, 4 hybrid), with a reintervention rate of 25% and estimated survival of 86%, 74%, 56% at 1 month, 1 year and 5 years. 38% of deaths were aneurysm related. A documented infection or positive blood culture preoperatively was associated with increased mortality however this was not significant (p=.692). There was no difference in survival amongst patients undergoing repair vs no repair (p=.094.)

The mortality associated with mycotic aneurysms remains high, regardless of whether repair is undertaken.

## A Systematic Review of Antithrombotic Therapy in Acute Limb Ischaemia

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**Introduction:** Antithrombotic therapy is an integral part of acute limb ischaemia (ALI) management. This study aimed to systematically review the up-to-date evidence available in antithrombotic management of ALI.

**Methods:** A systematic search (PubMed, OVID, Embase, and Google Scholar) identifying Randomised Controlled Trials (RCT) and observational studies following PRISMA guidelines was conducted, to report on outcomes of ALI using different antithrombotic agents.

**Results:** 6262 studies were originally screened, after removal of duplicates 10 studies were included that fully matched our criteria. No RCT was found comparing antithrombotic agents efficacy. Pre-intervention anticoagulation was associated with a risk reduction of amputation, and improved secondary patency in ALI treated with prosthetic bypass graft. Regarding intra-arterial thrombolysis, a continuous heparin infusion showed no advantage. Low weight molecular heparin showed superiority to unfractionated heparin in ALI patients after arterial embolectomy. Low dose Rivaroxaban and aspirin are associated with decreased major adverse cardiovascular events and amputation rate following revascularisation, when compared to aspirin and placebo in ALI. Ticagrelor was not superior to clopidogrel with similar bleeding rates.

**Conclusion:** The evidence base is inconclusive to determine a standardised antithrombotic therapy for ALI management. ALI presentation and etiology might be the best current guide on the antithrombotic regime choice.



P27

## Abdominal aortic aneurysms detected via the national screening programme: an opportunity for prehabilitation?

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### Introduction:

Cardiopulmonary exercise testing (CPET) is a valuable tool which is widely used in the assessment of patients with abdominal aortic aneurysms (AAAs). This study aimed to compare the CPET results of patients with AAAs detected through national screening to those with AAAs identified via alternate means.

### Methods:

This retrospective study used prospectively collected data from patients who underwent CPET from 2014 to 2023 at a single centre. Included patients all had infrarenal AAAs which were at the threshold for repair.

### Results:

In total, 663 patients were included in this study. 621 patients were male; 124 had screen detected (SD) and 497 had non-screen detected (NSD) AAAs and 42 patients were female. The average ages of the SD and NSD groups were 69 and 76 respectively. No significant difference was observed in the anaerobic threshold (AT) and peakVO<sub>2</sub> between the SD and NSD groups. Expectedly, the AT and peakVO<sub>2</sub> were significantly lower in the female patients ( $p < 0.05$ ).

### Conclusion:

Despite the 7-year age difference between the SD and NSD groups, there was no significant difference in the patients' CPET results. This suggests that patients with SD AAAs, once screened, would benefit from enrolment in a prehabilitation program.

## Fast-Tracking Varicose Vein Treatments: a post COVID pathway for effective care

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### Background:

Standard treatment pathways for varicose veins (VV) consist of a referral, first clinic appointment, vascular ultrasound (VUS), and follow-up appointment, which impact time to treatment. Publication of the 'NHS 10-year long-term plan' and post-COVID waiting lists motivated this quality improvement project combining One-Stop Venous Clinics (OSVCs) and office-based truncal venous radiofrequency ablation/sclerotherapy (OBRFA/ST).

### Methods:

All VV referrals (2021-2022) were prospectively assessed and seen in a combined VUS/surgeon appointment: the OSVC. Suitable patients underwent OBRFA/ST. Time from referral to surgery was compared to routine practice pre-pilot, and patient satisfaction questionnaires (PSQ) conducted.

### Results:

Of 639 pilot patients, 175 (27.4%) underwent OBRFA/ST. 201 (31.5%) were discharged, 204 (31.9%) did not attend, 24 (3.8%) were unsuitable for OBRFA/ST, and 35 (5.5%) had other outcomes. Mean age was 52.1yrs; 53.8% female, 46.2% male. Mean time to intervention fell from 315 days to 61.6 days comparing routine practice to combined approach. PSQ's demonstrated: 98% patients felt well-informed, 98% felt safe, 96% had adequate pain management, 97% felt it was a responsive service and the overall satisfaction was 91%.

### Discussion:

This project demonstrated a substantial reduction in time to treatment with a combined approach and may positively influence a new pathway standard for VV patients.

## Is routine carotid ultrasound prior to cardio-thoracic surgery justified?

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The risk of stroke following cardio-thoracic surgery (CTS) is multi-factorial. Many units insist on routine pre-operative carotid imaging. The indications for staged or combined carotid endarterectomy (CEA) and coronary bypass (CABG) also remains controversial. Within our unit only patients with bilateral high-grade stenosis (>80%) or occlusion will be considered for prophylactic CEA prior to CTS. We reviewed all pre-operative carotid duplex studies for patients prior to CTS to determine the incidence of significant carotid disease in this patient cohort.

Over a fourteen-month period 290 patients were scanned. Where available risk factors were documented. Electronic patient records were reviewed to document if patients had undergone carotid endarterectomy.

Of the 290 patients, seventy-three percent were assessed prior to coronary artery bypass grafting (CABG) and 20% prior to valve replacement. The remaining 7% were a combination of both or other indications. Risk factors were as expected.

One quarter had normal carotids. Only 11 patients (3.7%) had >80% stenosis or occlusion with only three having bilateral high-grade disease, one bilateral occlusions. No patient in our study group underwent carotid endarterectomy.

These findings question the need for routine carotid imaging prior to CTS.

## Lumbar cerebrospinal fluid drains in aortic surgery

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Spinal cord ischaemia (SCI) is a serious complication of aortic surgery, caused by disruption of the blood supply to the spinal arteries. The risk is greatest during surgery involving the T8 - T12 segments. Increasing systemic mean arterial pressure with fluids or vasopressors, and reducing CSF pressure by drainage of CSF via a lumbar CSF drain (CSFD) has been shown to reduce the incidence of paraplegia after high-risk aortic surgery. CSF drains are inserted prophylactically in high-risk individuals, or as a rescue measure if signs of SCI develop post-operatively.

A retrospective audit of 14 cases where CSFDs were inserted (seven prophylactic and seven rescue drains) revealed opportunity for improvement. Many related to delays in managing neurological deterioration. Reasons for delay included lack of awareness of local guidelines, uncertainty regarding responsibility for care, lack of clear post-operative instructions, and poorly documented handover.

The results led to revision of our CSFD guidelines, including development of new pre-operative risk-assessment and handover tools, a one-page quick reference trouble-shooting guide, and an updated neurological monitoring chart. We created a training video demonstrating CSFD insertion and drainage set-up for all staff caring for patients who might require a CSFD. Feedback was overwhelmingly positive.

P31

## The natural history of Quality-of-Life in Peripheral Arterial Disease: A systematic review of reported Quality-of-Life outcomes across the continuum of lower limb arterial disease

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### Background:

Peripheral Arterial Disease (PAD) and Chronic Limb-Threatening Ischaemia (CLTI) are increasingly common conditions which can detriment Quality-of-life (QoL). Multiple generic and disease-specific metrics exist, however QoL has not been mapped to the natural history of disease progression. This may influence clinical decision making and evaluation of treatment success.

### Methods:

A systematic review was undertaken of observational studies and randomised trials reporting PAD QoL outcomes over 1-year follow-up. 36 studies were identified and reviewed. Meta-regressions were performed to investigate demographic, comorbidity and procedural factors.

### Results:

Heterogeneity of outcomes were reported for intermittent claudication with EQ-5D demonstrating no significant change, SF-36 demonstrating significant improvement and VascuQoL-6 demonstrating significant deterioration from baseline to 1-year follow-up.

Baseline QoL scores were significantly worse in CLTI compared to claudicants, however, these scores improved significantly at 1-year follow-up.

Subgroup analysis demonstrated significant negative effect of diabetes on QoL in CLTI. No effect was observed for any other demographic or co-morbidity.

### Conclusion:

QoL outcomes in PAD are sparsely reported and heterogeneous. Associations exist between disease severity categories but are not reliably reproduced between conventional questionnaires. Further longitudinal research is required to map the natural history of QoL and innovation required in how it is conceptualised and measured.

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## The impact of a pre-amputation therapy service on function and acute length of stay following major amputation

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### Background:

Lower limb amputation is a life changing surgery, which may lead to poor functional outcomes, lengthy hospital admission, need specialist rehabilitation and requires adaptive equipment to promote independence. These often cause delays in hospital discharge. A pre-amputation therapy (PAT) service was implemented to provide early therapy input to patients at risk of major amputation, aiming to reduce length of stay (LOS) and improve function.

### Methods:

Data was collected over a 12-month period from PAT referred patients between April 2022 and April 2023. LOS and functional independence, day one post-amputation and on discharge (measured using Barthel index) were compared with data from patients who hadn't been referred to PAT (controls).

### Results:

Nine patients were referred for PAT, LOS was significantly lower,  $p < 0.01$ , ( $8.1 \pm 5.2$  days) compared with ( $23.4 \pm 19.5$  days) for 46 control patients. Those referred for PAT had significantly higher Barthel scores at day one post-amputation ( $68.7 \pm 17.26$ ,  $p < 0.01$ ) and on discharge ( $91.4 \pm 7.5$ ,  $p < 0.01$ ) compared with control group respectively ( $31.67 \pm 22.40$ ;  $58.5 \pm 29.3$ ).

### Conclusion:

PAT significantly reduces acute hospital LOS and may improve functional outcomes immediately after amputation and on discharge. A larger sample and health-economic evaluation is now required to influence decision makers.

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## Mechanical thrombectomy of acute lower limb deep vein thrombosis: a single-center case series

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### Introduction

Mechanical thrombectomy devices have revolutionized the management of iliofemoral deep vein thrombosis (DVT). We report outcomes from a tertiary center using the lysis-free, increased treatment window, INARI Clot Trierer device.

### Methods

We reviewed all iliofemoral DVT cases treated over one year (2023-2023). Patients received appropriate counseling and image review. Peri-procedural Flowtrons and activated clotting time guided heparinization, with post-procedural low-molecular-weight-heparin and compression stockings. Duplex surveillance occurred at two-week intervals (+/-1 week).

### Results

Twenty patients were included (7M:13F), mean age 40.6 ( $\pm$ 16.3) years. Median duration from symptom onset to intervention was 15 days (IQR 6.5-23). 17 procedures (85%) were performed under sedation. 6 had IVC extension, and 2 were bilateral. Intraprocedural IVUS was used in 19 cases (95%), and 1 case was treated without contrast. Eight cases (40%) were stented. Twelve (60%) were same-day discharges. Primary patency was 80% (n=16) at two weeks, with one case undergoing successful re-intervention, improving patency to 85% (n=17). All patients reported improved symptoms with Villalta score <8 at follow-up.

### Conclusion

Mechanical thrombectomy is safe and effective in managing acute iliofemoral DVT. It provides the advantages of a single-session intervention without therapeutic timing constraints or risks of lysis. Formal quantification of quality-of-life is underway.

## Predicting Failure of Medical Management of Type B Intramural Haematoma

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### Introduction

The management for uncomplicated type B IMH is usually medical with antihypertensives and analgesia alongside interval cross-sectional imaging. TEVAR is performed in those who demonstrate complex disease. Failure rates of medical management alone are reported between 47-76.1%. This study aimed to identify predictors of failure of medical management.

### Method

From a UK-based dataset of non-dissecting acute aortic syndrome, patients with type B IMH were selected and their co-morbidities and inpatient management documented. Longitudinal aortic morphology data was collected from admission and interval imaging. Receiver Operator Characteristics (ROC) with highest Youden score identified cut-offs for IMH thickness associated with failure of medical management. A multivariate analysis was performed to identify predictors for failure of medical management.

### Results

94 cases of IMH were identified. 7.4% (n=7) underwent TEVAR on admission due to clinical concerns. During follow-up, 42.6% (n=40) failed medical management whilst 50% (n=47) remained conservatively managed. IMH thickness >9.95mm on admission and an increase in IMH thickness on first interval imaging were predictors for failure of medical management on multivariate analysis.

### Conclusion

An admission IMH Thickness of >9.95mm or an increase in IMH thickness on interval imaging are likely to fail medical management and may benefit from earlier surgical intervention.



## Management of Mesenteric Ischaemia at a large Tertiary Hospital

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### Introduction:

Arterial disease affecting the mesenteric vessels causing severe acute or chronic bowel ischaemia is uncommon, but leads to significant morbidity and mortality. The management of this condition can include either endovascular or open surgical revascularisation. We conducted a retrospective review of the management of patients presenting with this condition at a large tertiary centre.

### Methods:

Patients presenting with acute or chronic mesenteric ischaemia between February 2015 and February 2023 were included in this retrospective analysis. Data was collected using the electronic medical records (EMR) and, for endovascular cases, cross-referenced with data collected in the interventional radiology department.

### Results:

In total, 57 patients having revascularisation were identified (47 endovascular and 10 open). Approximately 60% of the patients were females with a median age of 70 years (interquartile range: 62 to 76 years). Kaplan-Meier estimates to 5 year showed comparable mortality rates between the two groups (38% for endovascular and 36% for open; hazard ratio: 0.82;  $p=0.755$ ).

### Conclusions:

Mesenteric ischaemia is a rare, but important condition which is managed more frequently using endovascular methods with no significant differences in mortality when compared to open surgical methods.

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## Endoscopic vein harvesting (EVH) for peripheral arterial bypass procedures for critical limb threatening ischaemia (CLTI): A pilot study

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EVH has proven its efficacy over time in coronary artery bypass (CABG) procedures worldwide, but rarely used in vascular surgery, particularly in the UK and Europe. This study assesses the utilisation of EVH in limb bypass surgery in CLTI.

Retrospective analysis of prospectively collected data over a seven months period. All patients undergoing limb bypasses for CLTI were included. EVH was performed according to a standardised protocol developed for vascular limb bypasses. Primary outcomes were technical success and 30-day EVH wound site complications. Secondary outcomes were 30-day mortality and 30-day graft patency rates.

A total of 23 patients underwent EVH. Tissue loss or gangrene was the indication in 16 patients, and rest pain in the remaining 7 patients. Figure 1 shows the type of bypasses taken in the cohort. Figure 2 demonstrates the various outcomes. Technical success was achieved in all cases. Post-operative EVH tunnel site haematoma was noted in 17%(n=4). All 4 patients were managed conservatively. There were no 30-day mortality. The 30-day primary graft patency was 100%.

EVH use in vascular bypasses is an efficient and safe procedure with no major adverse effects on the wound complications rate, mortality or graft patency. Long-term results are awaited.

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## Short and long-term outcomes for carotid endarterectomy in elderly patients with symptomatic carotid artery stenosis

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### Introduction

Stroke is a leading cause of disability and death. The role of carotid endarterectomy (CEA) in the management of symptomatic extracranial carotid disease has been well defined. However, the utility of CEA in older patients is less clear. We have explored outcomes of CEA in older people.

### Methods

This was a retrospective review of CEA in patients over the age of 80-years. Index cases were identified from National Vascular Registry returns from NHS Greater Glasgow and Clyde/Forth Valley (January 2014-July 2022). Outcome measures included peri-operative neurological events, length of stay (LOS), place of discharge, number of readmissions and mortality.

### Results

CEA was performed on 113 patients, 85% of whom had a Clinical Frailty Score of 2 or more. There were 8 post-operative neurological events and 1 death within 30-days of surgery. Median LOS was 2-days, and 104 patients were discharged to their own homes. During the follow-up period 82 patients were readmitted to hospital (a total of 2044 bed-days); 20 of these admissions were with further neurological symptoms. 2-year survival was 87%.

### Conclusion

In this series CEA has been performed in older patients with minimal morbidity and good functional outcomes. However, these patients consume significant health resource.

## Sex differences in Chronic Limb Threatening Ischaemia Outcomes

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Introduction: Chronic limb threatening ischaemia (CLTI) is associated with high morbidity and mortality. This study aimed at comparing CLTI outcomes between males and females.

Methods: Retrospective review of CLTI admissions during 2020. Analysis included descriptive statistics, Kaplan-Meier survival and clinical outcomes such as major limb (MALE) and cardiovascular adverse events (MACE). Frailty was estimated using the electronic frailty index score.

Results: Of 183 patients 33%(61) were female with a median age of 72 (IQR 62-80). Women were significantly more likely to have hypertension (67.2% vs 47.5%, P=0.018), chronic lung (39.3% vs 15.6% P=0.001) and kidney disease (50.8% vs 34.4% P=0.038). 73.8% of women were either moderately or severely frail (P=0.05).

Median survival was 30 months with no significant difference between male and female groups (P=0.391). There was no significant difference in MACE (P=0.69) or MALE (P=0.99).

Conclusions: Our findings suggest that despite most CLTI patients being male, female patients were not disproportionately adversely affected despite higher prevalence of comorbidity and frailty. Re-admission and re-intervention data is being evaluated.

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## Single centre experience of implementation of a Percutaneous EVAR Programme.

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<sup>1</sup>Belfast HSCT, ,

### Introduction

In comparison with femoral artery cutdown (cEVAR) Percutaneous access (pEVAR) further minimises invasiveness of the EVAR procedure. This study aimed to ascertain any reduction in length of stay for patients undergoing EVAR at a single centre when pEVAR was implemented as the primary access method.

### Methods

Single-centre retrospective case series of all patients undergoing EVAR between 04/01/20 – 11/05/2023. Patients undergoing EVAR for any indication other than an AAA were excluded. The decision regarding suitability for pEVAR was decided by the MDT. pEVAR was performed using the ProGlide device.

### Results

122 patients were identified following application of the inclusion criteria. 90.2% of patients were male and the mean age of patients was 74.6 years at time of surgery. A total of 90 patients underwent cEVAR and 32 pEVAR. Median length of stay for patients undergoing cEVAR was 3 days v 1 day for those undergoing pEVAR. This represents a significant reduction in length of stay ( $p=.003$ ). Percutaneous closure was successful in 30/32 cases (93.75%) with 2 cases requiring conversion to open.

### Conclusion

pEVAR is associated with a significant reduction in length of stay and the associated reduction in cost, and could be performed with a high technical success rate.

## High Intensity Interval Training In pATiEnts with intermittent claudication (INITIATE): a patient acceptability study

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**Introduction:** High-intensity interval training (HIIT) is time-efficient, feasible and tolerable for patients with intermittent claudication (IC). The aim of this study was to investigate patient perceptions of performing HIIT.

**Methods:** This qualitative study was embedded within the NIHR funded 'high Intensity Interval Training In pATiEnts with intermittent claudication' (INITIATE) study. In-depth semi-structured interviews, informed by a topic guide, were conducted with a subsample of patients who either completed, prematurely withdrew from or declined a HIIT intervention. The outcomes of interest were related to views of the HIIT programme and experiences of undertaking and/or being invited to it.

**Results:** Twenty-four interviews were performed with 11 completers and 13 decliners. No withdrawers consented to interview. Feedback suggested that the programme was difficult, but was enjoyable, well received and got easier over time. It was also suggested that the difficulty was necessary to provide a benefit and most participants reported a symptomatic improvement and were willing to complete the programme again. Some minor changes to the frequency of sessions and the length of the warm-up and cool-down were suggested.

**Conclusion:** Findings support the acceptability of a HIIT programme for patients with IC, supporting its role in a randomised controlled trial, with minor adjustments.

## Predictive factors of 12-month circuit primary patency and target lesion primary patency in arterio-venous fistulae: an umbrella review of randomised trials

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**Introduction:** Clinical practice guidelines endorse arteriovenous fistulae(AVF) as the preferred form of vascular access. Despite recent advancements, concerns persist regarding its variable patency rates. This umbrella review aimed to identify predictive factors associated with a 12-month patency in AVF.

**Methods:** Randomised control trials providing data regarding primary patency(PP) and target-lesion primary patency(TLPP) of AVF(not grafts) were included. Covidence was used for screening and data extraction, while the AMSTAR-2 rating assessed the methodological quality. Credibility assessment followed Papatheodorou's criteria. Medline, EMBASE, CENTRAL, and CINAHL were searched using a bespoke search strategy.

**Results:** Twenty four reviews that included 84 randomised controlled trials(RCTs) involving 8,372 patients were selected. Highly suggestive evidence indicates that regional anaesthesia and functional end-to-side anastomosis improves PP. Suggestive evidence supports the effectiveness of routine flow-based access monitoring, antithrombotic medication, button hole cannulation, far infrared rays, pre-emptive correction of the "at-risk" AVF and intra-operative heparin in prolonging PP. Notably, drug-coated balloon angioplasty(DCB) demonstrates highly suggestive evidence for improving TLPP. Additionally, cutting balloon angioplasty, hydrostatic balloon angioplasty, and primary stenting of cephalic arch stenosis show suggestive evidence for improving TLPP(Table 1).

**Conclusion:**

This umbrella review provides strong evidence supporting interventions that effectively prolong PP and TLPP in AVF.

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## Improving the management of patients with symptomatic carotid artery stenosis: a single-centre experience

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### Background

Guidelines recommend carotid endarterectomy (CEA) should be undertaken within 14 days of neurological symptoms(1). We aimed to assess our vascular unit's adherence to this standard.

### Methods

A retrospective analysis of symptomatic patients undergoing CEA between June 2022 and June 2023 was performed(n=71). Data collected included demographics, date of symptoms, date of CEA, perioperative outcomes and medical therapy at discharge.

### Results

CEA was undertaken following stroke (n=37; 52.1%) and transient ischaemic attack (n=34; 47.9%). Mean age was 73 years and there was a male preponderance (n=53; 74.6%). Median time from symptoms to CEA was 17 days (IQR 13-21), with 38%(n=27) treated within 14 days. 90.1% (n=64) were treated within 28 days of symptoms. Median time from symptoms to referral was 3 days (IQR 1-6) whilst median time from vascular review to CEA was 9 days (IQR 6-14). There was 1 case each of TIA and stroke peri-operatively. At discharge, 69 patients (97.2%) were on an antiplatelet, statin, and anti-hypertensives.

### Conclusions

The majority of patients underwent CEA outside the recommended timeframe, but procedural outcomes were excellent, with most patients being discharged on optimal medical therapy. Addressing the delay from vascular review to CEA may allow expedited management of these high-risk patients.



## Icosapent ethyl Eligibility in Patients with Peripheral Arterial Disease

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**Introduction:** NICE 2022 guidelines recommend icosapent ethyl (IPE) as an option for reducing cardiovascular risk in patients taking statins with triglycerides >1.7mmol/L and LDL-C 1.04-2.60mmol/L. IPE is licensed for patients with PAD. NHS England estimates that 25% to 35% of people have elevated triglycerides despite statin therapy. This study aims to assess the potential for IPE usage in our selected cohort.

**Methods:** This retrospective study included 309 claudicants and 139 critical limb-threatening ischemia (CLTI) patients from a single regional vascular centre. Data on prescriptions and lipid profile results were collected from electronic medical records. NICE eligibility guidance [TA805] was used as a reference to assess eligibility.

**Results:** 48.5% (n=150) of claudicants and 58.3% (n=81) of CLTI patients had complete datasets. Of this, 28% (n=42) of claudicants and 30.9% (n=25) of CLTI patients were eligible. A combined 21.9% (n=26) of patients would become eligible if up-titrated on their current statin therapy or simply prescribed a statin.

**Conclusion:** IPE remains an option for many PAD patients taking statins who have raised triglycerides and high cardiovascular risk. Our data highlights areas of improvement including – 1. Full lipid profile screens in all PAD patients, 2. Up-titration of existing lipid-lowering therapy regimes.

## Factors influencing long-term outcomes after Fenestrated Endovascular Aneurysm Repair

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All patients undergoing FEVAR were collected from 2011–2022. Patient demographics, past medical history, smoking status, and long-term outcomes were recorded prospectively. Predictors were determined using the log-rank test and cox-regression analysis.

A total of 119 patients were recorded, 110 (92%) male, mean age of 74 (50-88) years. Seventy-four (62.2%) patients had hypertension and 33 (27.7%) were smokers. Fifty-four (45.4%) were taking Angiotensin-Converting Enzyme inhibitors (ACEi) or Angiotensin receptor blockers (ARB). Eleven (9.2%) had an ASA score of 4. The median overall survival, re-intervention-free survival and major adverse cardiovascular events (MACE)-free survival were 84, 67.1 and 76.6 months respectively. On Cox-regression analysis there was a significant decrease in overall survival in smokers ( $p=0.007$ , 95% CI 1.23-3.76) and an increase in MACE-free survival in patients taking ACEi/ARB ( $p=0.027$ , 95% CI 0.35 – 0.94). Patients of ASA score of 4 had poor overall- ( $p=0.024$ , 95% CI 1.13-5.70) and MACE-free survival ( $p= 0.007$ , 95% CI 1.30-5.51).

Being on ACEi/ARB can potentially prevent MACE and abstaining from smoking can improve long-term survival following FEVAR.

## Can toe pressure be measured on all toes?

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### Objective

Toe pressures is often measured on the hallux. A recent study demonstrated that the hallux is interchangeable with the second toe. The purpose of this study is to examine if toe pressures on each of these first two toes are interchangeable with the other (3-5) toes. We aim to determine if there is a significant difference between these measurements.

### Methods

This is an interim report of an ongoing prospective study. Toe pressures were measured in all available toes of participating vascular inpatients from 07/2023. Bland-Altman Limits of agreement and two sample t-test was used for comparison.

### Results

A total of 26 inpatients (M:F=16:10) have been prospectively studied so far. Comparing the difference between the 3rd to 5th toes against the hallux, there was no statistical difference found (P-values 0.25,0.33,0.37) for the 3rd to 5th toes respectively. However, comparing the difference between the 3rd to 5th toes against the 2nd toe, showed no significant difference for the 3rd and 5th toes (P-values 0.41,0.43) respectively, but a statistically significant difference for the 4th toe (p=0.02).

### Conclusions

Initial results suggests that toe pressure of 3rd to 5th toes are potentially interchangeable against the hallux. However, more numbers are required to prove this.

## Outcomes following fenestrated and branched endovascular repair of complex aortic aneurysms in octogenarians: A time to event systematic review and meta-analysis

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**Objective:** Compare outcomes between octogenarians and non-octogenarians undergoing fenestrated/branched endovascular aortic repair (F/BEVAR). Primary outcomes were peri-operative mortality, survival, reintervention, aortic rupture, and aneurysm-related deaths. Secondary outcomes included peri-operative complications.

**Results:** Seven studies published 2014-2022 (1536 octogenarians and 6016 non-octogenarians) were included. There was no significant difference in peri-operative mortality but sensitivity analysis demonstrated an increased peri-operative mortality for octogenarians. The hazard of survival was significantly higher in octogenarians (HR 1.67 [95% CI 1.27 - 2.20],  $p < .001$ ). There was no statistically significant difference in re-intervention (HR 0.96 [95% CI 0.85-1.09],  $p = .057$ ). Octogenarians were at greater risk of aortic rupture during follow-up (OR 4.71 [95% CI 1.73 – 12.85],  $p = .002$ ), intra-operative blood loss (WMD 54.73 [95% CI 17.89-91.58],  $p = .004$ ), endoleaks on completion angiogram (OR 1.42 [95% CI 1.20-1.67],  $p < .001$ ), cardiac events (1.34 [95% CI 1.12-1.62],  $p = .002$ ) and endoleaks during follow-up (OR 1.40 [95% CI 1.03-1.91],  $p = .03$ ).

**Conclusions:** While the evidence is uncertain regarding peri-operative mortality, octogenarians undergoing F/BEVAR probably fare worse compared to non-octogenarians. Survival is lower in octogenarians but there was no significant difference in re-interventions despite the increased incidence of aortic rupture and endoleaks during follow-up.

## Co-morbidities not rupture are responsible for the majority of abdominal aortic aneurysm deaths in patients turned down for elective repair.

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The aneurysm size threshold commonly set for surgical intervention is 55mm. This study aimed to report the outcomes of patients who met the size threshold for intervention but were not deemed suitable for aneurysm repair.

We retrospectively analysed a prospectively kept electronic database of patients who were turned down from operative care between 2019 and 2023. We excluded patients who had undergone previous EVAR and those with aneurysm diameters of <55mm. Patients were stratified into 2 groups based on AAA size: 55mm – 64mm, and ≥65mm.

Of 224 patients, 139 patients met the inclusion criteria, with aneurysm diameters 55-106mm. 76 patients (55%) were still alive at study close. Reasons for electing against aneurysm repair included anatomical complexity (n=10), comorbidities (n=95) and patient preferences (n=19). Rupture was the confirmed cause in 36% of patient deaths, whilst comorbidities accounted for 64%. There was no statistically significant difference in the median survival based on aneurysm diameter: estimated median survival for aneurysm diameters 55 - 64mm was 891 days, compared to 662 days for those ≥65mm (p=0.1).

Comorbidity not ruptured aneurysm was the most frequent cause of death supporting the decision not to offer AAA repair. Survival was not influenced by the aneurysm size.

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## The Symptomatic Carotid Web - To Operate or Not to Operate? A case series from a regional referral unit

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### Introduction

'Carotid webs' (CW) are non-atherosclerotic intimal lesions, a form of fibromuscular dysplasia (FMD) and a rare cause of stroke in younger patients. Non-intervention risks a 50% stroke recurrence in symptomatic CW (SCW). We present a case series for one year's management of SCW and the lessons learnt.

### Methods

Patients with SCW were collated prospectively from April 2022 to April 2023. Electronic patient records were reviewed for demographics, presentation, and management.

### Results

7 patients with SCW were identified over 12 months. The gender ratio was 2 male: 5 female. Median age was 44.5 years. None had a FMD diagnosis. 2 received thrombolysis, 2 received MT, 2 received both. All were discussed at the regional Stroke MDT. 6 underwent subsequent carotid endarterectomy (CEA), 1 did not recover post-stroke. Time to surgery was influenced by stroke recovery, not following the conventional pathway. There were no post-operative readmissions.

### Conclusion

SCW are rare and have historically been managed conservatively. This case series highlights that particularly in younger patient populations these need to be investigated for. Given a high recurrent stroke risk, these patients need counselling for surgical intervention, even with delayed diagnosis and CW excision via CEA is a safe treatment option.

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## Patency and clinical usage following snuffbox fistula formation

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### Introduction

A distally placed snuffbox fistula has the advantage of enabling future radio-cephalic fistula formation, if juxta-anastomotic pathology occurs. Long term fistula use due to transplant surgery and life expectancy is unknown in this cohort.

### Methods

Patients who underwent a snuffbox fistula were retrospectively studied. 32 patients were identified and up to 5-year outcomes were reviewed.

### Results

In total 5 fistulas failed within the first year of which all went on to have a radio-cephalic fistula formed. 7 fistulas required interventional radiology and of these, 3 required a second procedure for longevity and 2 required radio-cephalic fistula formation. A total of 8 patients over 5 years required proximal fistula formation. Primary and primary assisted patency at 1 year was 59% + 72% and at 2 years was 52% + 74% of the total 32 patients. Over 5 years there were 7 patients transplanted and 8 mortalities.

### Conclusion

In a well-selected patient body, a snuffbox fistula is a good option for first-line haemodialysis. Of the patients who experienced failure all but one were able to have an Radio-cephalic fistula used to good effect. 28% of patients did not require a working fistula at 2 years due to either transplant or death.

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## A new focus of lipid-lowering therapy for secondary prevention vascular and diabetic foot patients in a pharmacist-led clinic.

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### Introduction

Patients attending vascular or diabetic foot clinics often have atherosclerotic disease and are high-risk for the recurrence of vascular events. These patients merit high-intensity lipid-modifying therapy to maintain secondary prevention targets.

### Aim

Evaluate the impact of a pharmacist led lipid optimisation clinic for secondary prevention in such patients.

### Method

Baseline audit was performed to assess lipid management and identify areas for pharmacist-led intervention. This resulted in a service covering vascular outpatient clinics and the regional diabetic foot MDT. Two virtual clinics were conducted weekly. Patients reviewed had their lipid-lowering therapy optimised.

### Results

216 patients (166 (77%) on statins), 175 were above target of non-HDL-c of 2.5mmol/l (mean 3.51mmol/l) and required optimisation which led to a significant reduction in total cholesterol, triglycerides and non-HDL-c to a mean of 2.44mmol/l. Post optimisation 92 out of 133 (69%) were at target,  $p < .001$  of being at target equivalent to an NNT=2. Calculated LDL levels show a mean reduction of 0.83 [0.68 – 0.98]mmol/l for vascular patients and 1.39 [0.78 – 2.01]mmol/l for diabetic foot patients due to the intervention.

### Conclusion

A pharmacist-led service optimising lipid lowering therapy of vascular and diabetic foot patients can achieve significant reductions in LDL-c and non-HDL-c cholesterol.



## “Unleashing AI’s potential in Vascular Surgery: A comprehensive review of data utilisation and applications with Natural Language Processing, Machine Learning, and Deep Learning”

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<sup>1</sup>The Dudley Group NHS Foundation Trust, Dudley, UK, <sup>2</sup>University of Birmingham, Birmingham, UK, <sup>3</sup>Univeristy Hospitals Birmingham NHS Foundation Trust, Birmingham, UK  
Background: AI technology, encompassing Natural Language Processing (NLP), Machine Learning (ML) and Deep Learning (DL) algorithms, have been increasingly employed in vascular surgery. Goals of this scoping review were to identify the source of data for AI algorithms creation and assess their applications. Methods: A thorough literature search (01/12/1996 – 31/12/2022) identified 342 peer-reviewed articles that met the eligibility criteria. Findings: 34 papers utilised NLP algorithms, 115 articles employed ML and 193 papers DL algorithms (Figure 1A.). AI-based algorithms were mostly utilised in aortic conditions (126 articles), followed by carotid disease (85 papers) and peripheral arterial disease (65 articles) (Figure 1B.). 216 articles used image-based data, whereas medical records and clinical parameters were utilised in 153 and 85 papers, respectively (Figure 1C.). Algorithms were utilised in prognosis prediction (123 papers), medical image segmentation (118 articles), and identification, detection, and diagnosis (103 papers) (Figure 1D.). Interpretation: NLP, that has the ability of extracting data from unstructured medical records, is of the least utilised AI technologies. The majority of data in healthcare system remains in the form of narrative text or audio recordings, providing the immense diversity of data that could be used for case identification and more accurate risk prediction models.

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## Face-to-face therapy significantly improves functional independence, reduces length of stay and promotes discharge home after major amputation

Miss Stephanie Pirrazzo<sup>1</sup>, Miss Eve Williams<sup>1</sup>, Miss Elizabeth Bouch<sup>1</sup>, Professor Frank Bowling<sup>1</sup>, Dr Steven Rogers<sup>1</sup>

<sup>1</sup>Manchester University NHS foundation Trust, ,

Background:

The provision of vascular services (2021) document recommends patients receive one hour of daily face-to-face therapy, within a gym setting, as part of their rehabilitation following major amputation.

Method:

Amount and location of therapy sessions for the first 4 weeks post-amputation surgery, length of stay (LOS), and functional independence at discharge (measured using the Barthel index) were recorded over a 4-month period.

Results:

Data for 51 patients was available. Patients received a mean of 02:41±00:49hrs of therapy per week and 0.5±0.84hrs gym sessions. Patients who received 2-3 hours (31.85±16.91) and 3+ hours (35.96±17.01) of therapy per week had a statistically significant ( $p<0.01$ ) improvement in Barthel score compared to patients receiving 0-2 hours (16.6±17.80). Average LOS was statistically significantly lower for those receiving more therapy (0-2hrs: 32.7±25.99, 2-3hrs: 23.63±12.75, 3+ hrs: 17.65±9.91 days;  $p<0.05$ ). Ninety-one percent of patients receiving 3+ hours of therapy were discharged home compared to 56% receiving 0-2 hours.

Conclusion:

Patients who receive more inpatient therapy showed larger improvement in functional independence, a lower LOS and are more likely to be discharged home from hospital.

## An audit into the impact of Compression Therapy and Pneumatic Post-Amputation Mobility (PPAM) Aid following Trans-tibial Amputation (TTA) on wound healing in the Physiotherapy setting.

Miss Laura Orr<sup>1</sup>

<sup>1</sup>Nhs Gg&c, ,

The standard time frame for satisfactory wound closure following TTA is 2 weeks [1], with most patients achieving complete healing by 6 weeks [2]. This allows patients to commence prosthetic rehabilitation within 10 days post operatively [3]. In the UK, this takes the form of compression therapy and early mobilisation with PPAM aid, improving prosthetic outcomes [4].

However there are many risk factors that can delay wound healing and most are prevalent within the amputee population [5].

Few studies have explored the effects of early mobilisation in those with a TTA with unhealed wounds. As these trials are over 10 years old [5,6], we decided to audit our complex wound management to investigate our outcomes.

An observational longitudinal study of 7 patients (Table 1) over 6 months, with residuum wounds larger than 1cm x 1cm were included. 2 were lost to follow up, therefore results report 5.

Early mobilisation with PPAM aid did not negatively impact wound healing; with all 5 participants taking 12-20 weeks to close (Figure 1).

Our results are consistent with the notion that early mobilisation remains appropriate for those with a TTA with complex wounds, where pain levels do not limit engagement with rehabilitation.

## Intermittent Claudication : A scoping review of Current Practice

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Introduction: Intermittent Claudication (IC) is the most diagnosed symptom of peripheral arterial disease (PAD). Recommended treatment included medical optimisation of risk factors and supervised exercise programmes. Recent Cochrane reviews have demonstrated broad ranges of intervention for IC, however, there remains significant gaps due to the quality of evidence included and the heterogeneity of outcomes measured, causing challenges when synthesising the outcomes to establish specific best practice guidance.

Method: A scoping review of current literature investigating the impact of various exercise programmes on functional outcomes, exercise tolerance and quality of life on those with IC was completed. Databases were searched from January 1st 2016 until 25th June 2022 for original research

Results: From 1773 potential results, 38 studies were included reporting 3101 participants. Walking in various forms was the most common intervention, with educational interventions being utilised alone or in addition to exercise. Strength training and passive stretching were also noted.

Conclusion: IC is an ongoing topic of interest, with walking still being the most frequent intervention. Use of behaviour change education has increased, supplementing healthy lifestyle choices. Studies should use standardised vascular specific outcome measures to support synthesis of results, and provide strong conclusions for best practice.

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## First year clinical outcomes for a Surgeon-Led Hybrid Vascular Service

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### Introduction

Hybrid vascular procedures combine use of endovascular and open surgical techniques and allow for the individualized treatment of multilevel vascular disease depending on lesion and patient characteristics. The GMC curriculum for vascular surgery requires trainees to achieve independent competence in endovascular and open surgical revascularization techniques. Our aim was to establish whether vascular surgeons trained under the new curriculum can provide a safe and clinically effective hybrid revascularization service.

### Methods

All hybrid cases performed between April 2022 and June 2023 at one university hospital were included. The primary outcome was technical success. Secondary outcomes included limb salvage, overall survival, renal dysfunction and re-intervention.

### Results

43 hybrid cases were performed in the study period. Technical success was 98% (n=42). Major amputation rate and overall survival were 2.3% (n=1) and 100% (n=43) at 30 days post-procedure. Re-intervention in the study period was 16% (n=7) and 7% (n=3) developed acute kidney injury post intervention.

### Conclusion

The UK vascular training curriculum prepares surgeons to provide safe hybrid services with excellent outcomes. It is important that the challenges in obtaining endovascular training are overcome to ensure patients have access to specialists who can provide the full spectrum of interventions required.

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## Post-operative wound infection rates in patients who have had major limb amputations over a 2-year period.

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### Background and aims

Lower limb amputations are associated with a 30-day mortality rate of 22% and a 5-year mortality rate of 77%<sup>1</sup>. Patients subjected to major limb amputations are at a higher risk of complications including surgical site infections (SSI). 98 patients were identified as having undergone major lower limb amputations over a 2-year period (January 2021 – January 2023). The aim of this audit is to assess the rate of SSI and quantify the associated risk factors.

### Methods

A retrospective observational study using the medical records of the 98 patients aimed to identify common risk factors for SSI: chronic kidney disease, hypertension, diabetes, smoking history, peripheral arterial disease, and nutritional status using Prognostic Nutritional Index (PNI)<sup>2</sup>.

### Results

The rate of infection was 19.4% (19 patients) with smoking status and hypertension statistically significant for SSI ( $p < 0.05$ ). Whilst PNI wasn't statistically significant, 89.4% of patients with SSI had PNI scores below 40.

### Conclusion

Smoking status and hypertension are risk factors associated with increased rates of SSI in patients who undergo lower limb amputations. The majority of these patients also have a PNI of less than 40, indicating that they were severely malnourished at the time of their amputation.

## Machine learning algorithms for the prognostication of abdominal aortic aneurysm progression: a systematic review

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**Background:** Abdominal aortic aneurysm (AAA), marked by an diameter above 3.0cm, is managed via screening, surveillance, and surgery. AAA growth is variable and rupture carries high mortality, with size and specific risk factors influencing rupture risk. Research aims to predict individual AAA growth rates for personalised care. Machine learning (ML), a subset of artificial intelligence, has shown promise in medical fields, including endoleak detection post-EVAR. Its use for predicting AAA growth requires further exploration. This paper summarises the status of ML in predicting AAA growth.

**Methods:** A systematic search of Embase, MEDLINE, Cochrane, PubMed, and Google Scholar until December 2022 was conducted, examining original articles discussing machine learning in predicting AAA growth.

**Results:** 2742 articles were extracted; seven retrospective studies involving 410 patients met predetermined criteria. Six studies applied a supervised learning approach, with diverse ML models. Most studies concluded that ML models perform better in predicting AAA growth compared to reference models. The primary predictor was maximal luminal diameter, with AAA volume, intraluminal thrombus and flow-mediated diameter as alternatives.

**Conclusion:** Applying machine learning for AAA expansion prediction has potential to enhance accuracy. Future studies should evidence clinical utility in a healthcare system context, emphasising ethical considerations and stakeholder collaboration.

## A Systematic Review of modern endovascular techniques compared to surgery for acute limb ischaemia

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### Introduction:

Acute limb ischaemia (ALI) is a vascular emergency, and surgery is considered the accepted standard but the use of modern endovascular techniques to treat ALI is increasing. We performed a systematic review of the up-to-date evidence of ALI management.

### Methods:

A systematic review (Embase, Cochrane, Medline, PubMed) according to the PRISMA guidelines was performed for studies reporting outcomes for modern endovascular techniques compared to surgery. Catheter directed thrombolysis (CDT) was excluded.

### Results:

1,282 studies were screened after removal of duplicates. 15 studies were included after review of title/abstract and full text. Meta-analysis was not performed due to the lack of Randomised Control Trials (RCT).

For pharmaco-mechanical devices, observational cohort studies reported more early complications for surgery. For aspiration thrombectomy devices, The INDIAN registry reported a high short-term technical success (94%) and a low (7.3%) reintervention rate, but no comparison to surgery. Regarding rotational thrombectomy devices, various cohort studies confirmed safety and feasibility, but have not compared outcomes to surgery.

### Conclusion:

The evidence base for the use of contemporary endovascular techniques is weak and without comparison to the current standard of care (surgery). Good quality RCT evidence is needed to guide clinicians.



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## How does Carlisle Calculator data compare to traditional anaesthetic data for MDT decision making in Threshold Abdominal Aortic Aneurysms?

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**Introduction:** Discussing risk with patients is complex when considering major surgery for abdominal aortic aneurysm (AAA). Cardiopulmonary exercise (CPEX) data is routinely used to assess fitness for AAA repair but will mean little to patients during shared decision making. Carlisle Calculator projects life gain and may be better for patients to understand benefit of repair. The aim of this study was to compare CPEX and Carlisle Calculations to ensure they give similar results in Multidisciplinary Team (MDT) decision-making.

**Methods:** A retrospective review was conducted on all patients discussed for AAA repair in MDT meetings (2020-2023), identified through EPIC. Age, CPEX data and life gain (through Carlisle Calculator) were compared.

**Results:** 55 of 105 patients had sufficient anaesthetic data identified. Comparing surgical patients to those turned down, patients undergoing surgery were significantly younger (median 72yrs vs 81yrs,  $p=0.0001$ ), with higher anaerobic threshold (average 12.09 vs 10.1,  $p=0.029$ ), VO2 Max (18.1 vs 16.0,  $p=0.01$ ) and increased life gain (10.4yrs vs 3.0yrs,  $p=0.0001$ ).

**Conclusion:** The Carlisle Calculator shows similar significant differences compared to traditional anaesthetic data. Patients may find life gain an easier concept than high/moderate/low risk surgery in terms of shared decision making.

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## Enhancing the Quality of Referrals to Vascular Surgery at a District General Hospital: A Closed-Loop Quality Improvement Project.

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This quality improvement project aimed to improve the completeness of referrals to vascular surgery from in-patient wards and the Sameday Emergency Care unit at a UK district general hospital. We implemented a comprehensive vascular surgery proforma to enhance the quality of referrals to the department.

Referrals made between 01/01/23 and 01/03/23 were assessed according to Professional Record Standards Body (PRSB) guidelines, which outlines the necessary information to be included in clinical referrals. The new proforma was introduced to all hospital clinicians, enabling them to email completed referrals to a dedicated vascular surgery inbox. To evaluate the impact of the new system, referrals were re-audited between 12/05/23 and 13/07/2023 using the same PRSB criteria.

Significant improvements were observed in the completeness of referrals, as indicated by the percentage of fulfilled PRSB criteria (Table 1). The median number of fulfilled criteria per referral increased from 2.5 to 9 (out of 10), demonstrating a substantial improvement ( $p < 0.0001$ ) (Figure 1).

Our dedicated vascular surgery referrals proforma had a significant positive impact on the completeness of referrals to the department. This change has the potential to enhance continuity of care, improve clinical prioritisation, promote patient safety, and enhance the overall efficiency of our service.

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## Endovenous treatment efficacy on symptomatic pain in superficial venous disease

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### Background:

Improvement in postprocedural pain in patients with superficial venous disease remains controversial. This study aims to evaluate the effectiveness of endovenous treatment on symptomatic pain by assessing symptom reduction.

### Methods:

This study was conducted at a private varicose vein clinic, which implemented a standardised care pathway for treating superficial venous disease across three locations in the UK. Consecutive patients (2020-2023) receiving endovenous radiofrequency ablation of truncal veins and foam sclerotherapy of varicosities under local anaesthesia completed the Aberdeen Varicose Vein Questionnaire (AVVQ) before and at 3-month postprocedure follow-up.

### Results:

A total of 1075 patients (74% female; average age 52, range: 21-86) completed the AVVQ at their one-stop pre-assessment clinic and underwent treatment. A total of 706 patients (66%) reported pain from their varicose veins before treatment, with 87% (614/706) reporting an improvement postprocedure (mean difference: -1.4, -3 to 2;  $P < 0.0001$ ). There was no correlation between vein diameter at presentation (mean diameter: 3.6mm, 1 to 13mm) with preprocedural pain ( $r = 0.011$ ,  $P = 0.35$ ), or postprocedural pain ( $r = 0.021$ ,  $P = 0.248$ ).

### Conclusion:

A significant number of patients with superficial venous disease experience pain. Vein diameter does not correlate with pain, and endovenous treatment with radiofrequency ablation and foam sclerotherapy improves pain, irrespective of vein size.

## Efficacy of a personalised activity plan for BREAKing UP sitting time in patients with peripheral artery disease and intermittent claudication (The BREAK UP study)

Dr Jemma Perks<sup>1</sup>, Mr Philip McBride<sup>1</sup>, Mr Harjeet Rayt<sup>2</sup>, Miss Tanya Payne<sup>2</sup>, Dr Charlotte Edwardson<sup>1</sup>, Dr Alex Rowlands<sup>1</sup>, Mrs Sarah Jane Messeder<sup>2</sup>, Professor Thomas Yates<sup>1</sup>, Professor Robert Sayers<sup>1</sup>

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### INTRODUCTION

The aim of this study was to investigate the concept of an 8-week personalised activity plan, using short periods of physical activity to break up sitting time in people with Peripheral Artery Disease (PAD) and Intermittent Claudication (IC); to improve walking impairment, and reduce time spent sitting.

### METHODS

This study is a single centre, single arm, before and after study, registered with clinicaltrials.gov (NCT04572737). The co-primary outcomes are time spent sitting and the walking impairment questionnaire. Normally distributed data was analysed using paired samples T-tests; non-normally distributed data was analysed using related-samples Wilcoxon signed rank tests.

### RESULTS

Twenty-nine participants completed the study. There were significant improvements in co-primary outcomes. Time spent sitting reduced by an average of 54.00 minutes per day [95% CI: -24.00 to -84.00],  $p = 0.002$  ( $n = 25$ ); and walking impairment scores improved by 0.10 [95% CI: 0.18 to 0.16],  $p = 0.016$  ( $n = 29$ ).

### CONCLUSION

An 8-week personalised activity plan to break up sitting time shows promise as a treatment for people with PAD and IC, reducing time spent sitting and improving walking impairment. This study supports the use of randomised controlled trials to develop this treatment in people with PAD and IC.

## Confidence and Competence of undertaking an Ankle Brachial Pressure Index for Suspected Vascular Disease

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**Background:** Peripheral arterial disease (PAD) affects 20% of people over 60 in the UK and can result in limb loss or early death. Thorough clinical assessment promotes appropriate escalation and management. Ankle Brachial Pressure index (ABPI) is considered the gold standard non-invasive method to assess PAD. Knowledge of the investigations for PAD is included in the undergraduate curriculum, outlined by the royal college of surgeons. Despite this, very few junior doctors routinely measure ABPI in patients presenting with suspected PAD.

**Aims:** To assess the proficiency of performing and interpreting ABPI.

**Methods:** 64 junior doctors completed a questionnaire on the indications, method, and interpretation of ABPI. Level of confidence was assessed, and free text to comment on perceived limitations.

**Results:** 93% identified that ABPI measures arterial insufficiency. However, 62.5% stated they were "not confident" performing ABPI with 13% selecting the appropriate pulses for measurement. 53% selected the correct equation. Results interpretation had 48% full correct completion. 78% identified an ABPI=0.3-0.5 indicates severe arterial disease. Conversely, 17% suggested this was "normal".

**Conclusion:** Although junior doctors are aware of the role of ABPI, many lack the confidence and knowledge to utilise it. Implementation of teaching and a subsequent re-audit is required.

## Identifying the most clinically effective exercise prescription for patients with intermittent claudication (MAXIMISE): protocol for a component network meta-analysis with concurrent cost-effectiveness analysis

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### Introduction

First line treatment for intermittent claudication (IC) is a supervised exercise programme (SEP). Guidelines for SEP prescription are vague and vary between bodies due to heterogeneity within the published literature. There remains a need to establish the optimal SEP prescription, which can inform guidelines, aid implementation and maximise outcomes.

### Aims

1. To identify the most clinically effective SEP prescription for patients with IC.
2. To identify if the optimal SEP prescription is also cost effective.

### Methods

This NIHR-funded component network meta-analysis will include all randomised control trials that compare SEPs with controls or home-based exercise programmes. It will identify the optimal SEP prescription based on the components of frequency, intensity, time and type of exercise. Primary outcomes are maximum walking distance and quality of life. A model will be developed to evaluate the cost-effectiveness of each SEP prescription combination.

### Expected Impact

Study results will lead to the development of comprehensive SEP guidelines, and updates to other international guidelines. Identification of the optimal SEP prescription will maximise the benefit obtained by patients, which can reduce further service demand. Comprehensive guidelines will also aid implementation, leading to the development of new SEP centres, increasing provision and reducing health inequalities.

## Introducing a nurse-led intermittent claudication clinic and its impact on supervised exercise programme referral, uptake and completion.

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### Introduction

In June 2021, a nurse led intermittent claudication (IC) clinic was introduced within our unit to streamline services (CLASS clinic). As part of this, all patients diagnosed with IC are invited to undertake a supervised exercise programme (SEP) as first-line treatment. This study aims to assess the impact of the CLASS clinic on SEP referral, uptake and completion.

### Methods

We completed a retrospective analysis of SEP referrals and subsequent uptake and completion before and after implementation of the CLASS clinic.

The total number of referrals between 01/06/2018-01/06/2019 and 01/06/2022-01/06/2023 were reviewed and uptake and completion rates calculated.

### Results

147 and 177 patients were referred between 2018-2019 and 2022-2023 respectively. Of these, >90% were eligible. Between 2018-2019, uptake and completion rates were 43% and 50% respectively. Between 2022-2023, these were 24% and 74%.

### Conclusion

SEP referrals increased following implementation of the CLASS clinic, though uptake decreased. This may reflect the fact that all patients are referred for SEP, regardless of where they live, which may not have been the case in consultant-led clinics. Indeed, 30% declined due to distance. Interestingly, completion rates increased, suggesting that patients may be better educated about the importance of SEP attendance in the CLASS clinic.

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## Blood transfusion in lower limb vascular surgery

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### Introduction

Vascular procedures are considered high risk for blood loss, exacerbated by usage of antiplatelets and anticoagulants [1, 2]. This quality improvement project aims to review the incidence and patterns of blood transfusion (BT) in lower limb revascularisation.

### Methods

Retrospective analysis of the transfusion data for all open lower limb revascularisation patients (n=72) over a 6 month period in a regional vascular unit. The patients were categorised on urgency and procedure type.

### Results

All emergency procedures (n=5) were embolectomies. 40% (n=2) received a BT. There were 67 non-emergency procedures; 16.4% (n=11) received a BT. Sub-group analysis showed 13.3% (n=4) of distal lower extremity bypass (LEB) patients (n=30), received a BT, whereas for proximal LEB (n=6), 50% (n=3) had a BT (Figure 1). Of the patients who had an endarterectomy (n= 31), 12.9% (n=4) received a BT.

### Conclusion

Patients who underwent emergency surgery had higher rates of BT, however for adequate statistical analysis a larger sample is needed (underway). Greater BT could be due to limited opportunity for pre-operative optimisation or due to higher operative risk. Higher rates of BT for proximal versus distal LEB, prompt focused preoperative cross-matching. A definitive QIP is ongoing.



## Assessing the familiarity and utilisation of frailty assessment tools within vascular surgery

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**Introduction:** The prognostic significance of frailty is recognised[1] but it's unclear how clinical service models have responded? We explored the opinions of the multidisciplinary vascular surgery team relating to frailty and use of frailty identification tools in current practice.

**Methods:** This national qualitative study recruited participants by email questionnaire.

Scotland-wide consultant and trainee vascular surgeons, interventional radiologists, anaesthetic consultants, nurse specialists, clinical scientists and podiatrists were targeted.

**Results:** 60 of 160 (38%) questionnaires were returned. Most respondents were consultant vascular surgeons (24, 40%) or junior doctors (16, 27%). Most (n=55, 92%) reported identification of frailty influences practice and were comfortable with the concept of frailty (89%). Fewer used frailty assessment to guide management (50%) or joint decision-making (55%). Most commonly an informal 'end-of-bed' assessment (44, 73%) or the Clinical Frailty Scale (15, 25%) is used. 62% reported no/uncertain access to geriatric assessment and 82% reported no/uncertain contribution of dedicated frailty members contributing to the vascular MDT. Reasons for failure to formally assess frailty include lack of education (43%), workload (43%), resources (33%) and tool uncertainty (15%).

**Conclusion:** Clinicians recognise frailty however current practice is over-reliant on subjective assessments. A role for future research investigating an optimal, standardised approach to assessment is identified.

[1] Welsh, S., Pearson, R., Hussey, K., Brittenden, J., Orr, D., and Quinn, T., A systematic Review of Frailty Assessment Tools Used in Vascular Surgery Research. *J Vasc Surg*, 2023. Jun 19; S0741-5214(23)01317-4. doi:10.1016/j.jvs.2023.06.010. Epub ahead of print. PMID: 37343731.

## Comparative skeletal muscle endotype in chronic limb-threatening ischaemia

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### Introduction:

Muscle dysfunction plays a significant role in CLTI. It remains unknown whether this is a causative, direct, or indirect effect of isolated muscle ischaemia, or a systemic whole-body muscle dysfunction termed sarcopaenia. To investigate, we compared the phenotype of skeletal muscle above and below the level of ischaemia.

### Methods:

Single-centre prospective cohort study (NCT04027244). Skeletal muscle biopsies were taken from above and below the level of ischaemia of the affected leg, during major lower limb amputation or infrainguinal bypass, and stored in liquid nitrogen. mRNA expression proteins involved in inflammatory (IL-6, TNF-alpha), atrophy (MAFbx, MuRF-1) and mitochondrial biogenesis (PGC-1alpha, MFN2, TFam) processes were analysed by RT-PCR.

### Results:

Seven patients were included. Wifl stages were: three (43%) stage 2, three (43%) stage 3, and one (14%) incomplete. Three (43%) had an above knee amputation and four (57%) an infrainguinal bypass.

No differences were seen in the expression of mRNA transcript above vs below affected site.

### Conclusions:

This suggests that the effects of CLTI to muscle are not restricted to the involved muscles, but that CLTI may have a wider systemic effect on skeletal muscle. The development of sarcopenia as part of CLTI progression should be considered.

## Case Report: Ectopic Thyroid Tissue Presenting as a Carotid Body Paraganglioma

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Ectopic thyroid tissue is a rare developmental abnormality, typically presenting with midline ectopia due to incomplete embryological migration via the thyroglossal duct. The presence of ectopic thyroid tissue lateral to the midline is very rare, accounting for 1-3% of all ectopic thyroid tissue. Clinically these lesions are often mistaken for other diagnoses including enlarged lymph nodes or metastatic tumours.

We present a case of ectopic thyroid tissue at the carotid bifurcation presenting as a presumed carotid body paraganglioma in a middle-aged woman. The patient presented with a slow-growing lateral neck mass which was clinically and radiologically consistent with a carotid body paraganglioma. She subsequently underwent tumour excision after which histological analysis identified ectopic thyroid tissue with no evidence of malignancy. Albeit rare, ectopic thyroid tissue is an important differential to consider in the presence of anterior triangle neck mass, and thorough investigations including scintigraphy or fine needle aspiration cytology should be considered.

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## Therapeutic Management of quadruple amputees - a comparison of two case studies of similar levels of amputation but with different challenges

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This presentation will explore the considerations and treatments required for quadruple amputees to achieve a holistic and successful rehabilitation journey. It will compare two patient journeys, who although had the same level of amputations (BTTA + BTRA), required different approaches to successfully rehabilitate. The presentation will focus on the role of physiotherapy and occupational therapy for both upper and lower limb limb loss. However, this will also include the importance of good MDT management including wound management, psychological care and team problem solving. We will also address the importance of inclusion of family members and the challenges of discharge planning ensuring their care and therapeutic needs were met.

## Transcatheter arterialisation of deep veins for no option limb salvage, a physiotherapy view.

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### Introduction

Transcatheter arterialisation of deep veins (TADV) is a new and innovative endovascular procedure for the creation of arterio-venous bypass in patients with critical limb threatening ischaemia and no other options for limb salvage. It is currently being evaluated by the PROMISE-UK study.

There is no established protocol for rehabilitation for TADV patients nor mention in the study protocol. This raised questions around time-frames of bed-rest, offloading and general mobility.

### Methods

Contemporaneous records were maintained as part of normal practice of 14 patients treated following TADV between January 2020 and May 2023. A physiotherapy regimen which evolved over time was evaluated.

### Results

Mean days to mobilisation was 2.1 days. Hospitalisation length of stay varied with a median of 17.5 days.

Mobility outcomes generally slowed from admission to discharge.

The use of peripheral nerve blocks has evolved to become our preferred analgesia.

### Discussion

This novel technology aims to deliver a limb salvage option. We have evolved our protocol for treating these patients; early mobility, expectation management, advice and exercise and the promotion of appropriate footwear and walking aids.

We aim to share this with other physiotherapists and interested surgical colleagues who may wish to undertake these procedures in the future.

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Developing a digital application designed to support communication between individuals with lower limb loss and prosthetic rehabilitation clinicians about socket comfort and fit.

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#### Background

A well-fitting, comfortable socket is vital in successful prosthetic rehabilitation. The most common referral to prosthetic clinics being socket discomfort where communication is key, but there are no tools available to capture details outside the clinical appointment.

This qualitative study aims to explore views and perspectives of prosthetic users and healthcare professionals on comfort and communication surrounding socket fittings. This will be used to co-develop a mobile/web application enabling prosthetic users to take an active role in the management of their residual limb within their daily lives.

#### Method

Using principles of a Participatory Action Cycles, a series of focus groups and interviews were carried out to co-develop the digital application in iterative stages.

- Cycle 1: exploring experiences, ideas, and initial design requirements
- Cycle 2: review wire frames developed from the cycle 1 findings
- Cycle 3: review and gain feedback on a prototype digital application

#### Results

Although PAR cycles are currently in process, preliminary findings provide key insights into 1) issues faced by both prosthetic users and clinicians, 2) expectations of socket comfort, 3) common issues with communication. This will help ensure that the end-product takes a user-led approach and meets user-needs.

(complete findings will be available)

## Effect of walking bout on walking symmetry in active people with transtibial amputation

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People with transtibial amputation (PTTA) use a prosthetic limb which may result in an asymmetrical gait, evidenced by different acceleration profiles for the centre of mass during each limb's stance.

This study aimed to determine if step symmetry changed after brisk walking bout.

Data for fourteen active PTTA were analysed. An accelerometer (MSRelectronics, MSR145) was attached to the lower back to record walking signals. Participants completed a ten-meter walk test. They then completed a six-minute walk test (6MWT). After the test, they returned to the start line and performed another the ten-meter walk test.

Data were extracted from the accelerometer and autocorrelation was used to determine the step to step symmetry. Vertical, anterior-posterior and mediolateral directions were assessed. Autocorrelation  $r=1$  indicates perfect symmetry. Paired t-test was used to determine difference before and after exertion ( $p \leq 0.05$ ).

No significant differences were found for symmetry and participants were generally within acceptable ranges

Symmetry pre-post:

ML  $r=0.68 - 0.65$ ; AP  $r= 0.81 - 0.88$ ; Vert  $0.73 - 0.70$ .

PTTA are encouraged and want to use walking as a health-related activity. By assessing asymmetrical loading, albeit for a short walking bout, we have found no evidence that walking increases risk for falls or pain.

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The effect of an adaptive trainer on an exercise group within a limb centre environment and the benefit expressed by patients; a pilot study.

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Recommended activity levels for adults each week is 150 minutes of moderate intensity physical activity and 2 days of muscle strengthening activity. Following the Covid pandemic it was evident that patients attending the centre were struggling to motivate themselves and be confident to exercise. Funding was secured from Limb Power through the Tackling Inequalities Fund and a pilot created that involved 12 lower limb amputee patients attending in groups of 4, each for 6 consecutive weeks. The course was delivered by an Adaptive Personal Trainer and modified each week depending on the needs and progress of each participant. Each participant was a limb user although exercises could be adapted if they were unable to don their prosthesis. The patients included trans tibial and trans femoral amputees both unilateral and bilateral. Also included SAKL and MPK users. At the end of the 6 sessions patients completed a feedback questionnaire. Some were willing to be filmed participating and 2 were happy to give video feedback. The presentation would include videos, a summary of exercises and clarification on the role that adaptive training can play in the treatment of lower limb amputees.



## Utilising digital healthcare to deliver a novel exercise intervention for Post Thrombotic Syndrome

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### Introduction

Patients with post thrombotic syndrome (PTS) can experience pain or heaviness when walking, known as venous claudication. Evidence suggests physical activity can improve PTS symptoms. We aimed to create a remote exercise programme for PTS, that can be delivered patients across the UK.

### Methods

A multidisciplinary working group of physiotherapists and vascular surgeons reviewed current evidence and created a targeted exercise programme which can be uploaded to a digital platform and delivered remotely.

The programme will last 12-weeks and set 150 minutes of moderate activity per week. In accordance with World Health Organization guidelines, two days will consist of strength and flexibility (SF) exercises, including lower limb focused stretching and strengthening to improve calf muscle pump function and aid venous return. Baseline assessments will be used to allocate participants to beginner, intermediate or advanced groups. Activity trackers and a digital platform will be used to deliver and monitor the programme.

### Discussion

The protocol represents a novel use of digital and wearable technology to deliver exercise to patients with PTS from a wide geographical area. An upcoming clinical study will use the protocol to assess adherence, efficacy on symptoms and quality of life for PTS.

## Identifying which cohort of intermittent claudication patients benefit most from supervised exercise therapy and potential predictors of future revascularisation

Miss Elizabeth Bouch<sup>1</sup>, Miss Suzanne Austerberry<sup>1</sup>, Professor Frank Bowling<sup>1</sup>, Dr Steven Rogers<sup>1</sup>

<sup>1</sup>Manchester Foundation Trust, Manchester, United Kingdom

### Background

NICE guidelines recommend patients with intermittent claudication receive supervised exercise therapy (SET) before revascularisation is considered. However, SET is unsuccessful in approximately 15% of patients. We compared patients who received SET with those who received SET and went onto have revascularisation to identify which patients were most likely to benefit from SET.

### Method

Retrospective data was collated for 144 patients (42 female) who received SET between 2016-2020. There were 38 people with diabetes and 48 smoked. Demographics, Pain Onset Distance (POD) and surgical intervention (prior and post completion of SET) were documented.

### Results

Patients who had >50% improvement in POD ( $p=0.06$ ) were less likely to require revascularisation but this was not significant. However, those who had a 100% improvement in POD were significantly less likely to receive revascularisation ( $P<0.05$ ). Gender, diabetes, and age did not infer likelihood of preventing revascularisation. Smokers and those who received previous intervention benefited greater from SET which had preventative effects on subsequent revascularisation ( $p<0.05$ ).

### Conclusion

People who completed SET had a significantly lower likelihood of going on to further surgery. Patients who saw a 100% or more improvement in POD were less likely to require revascularisation post SET. Smokers significantly benefited from SET.

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## Is there scope for Physiotherapy within our pre-existing upper limb prosthetic rehabilitation service?

Miss Grace Ferguson<sup>1</sup>

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Since 2016, I have been treating people with lower limb loss in Prosthetic limb rehabilitation. In 2021, our OT referred a long established transradial amputee presenting with neck pain. The feedback was so positive, it triggered an understanding there was a gap in our service. An organic evolution of this service has since developed.

After successful patient interactions, I was invited to attend fancy hands meetings. These are regional meetings which include OTs, Prosthetists and now Physiotherapists. Discussions regarding complex cases and prescription recommendation takes place. As a group we are working on developing patient information leaflets. I now collaboratively work with OT and Prosthetics to try and improve the patient journey within our upper limb service.

In order to optimise limb fitting, I facilitate functional range of motion and strength, as well as scar management. Due to the steep learning curve, I have created links with Physiotherapists from NHSE. Pilates, posture, balance and preventing overuse injuries are an essential part of my new role and I am constantly learning.

I am now an integral member in this service. There have been 32 referrals to Physiotherapy between July 2021 and March 2023 to a service that previously did not exist.

## Two unusual groin pseudoaneurysms

Dr Christine Sanadi, Dr Tayyoub Mansoor, Dr Anuj Sauhta, Dr Phoebe Lyons, Dr Matthew Larney, Dr Stephen Power, Professor Brian Manning

<sup>1</sup>Cork University Hospital, ,

Two unusual groin pseudoaneurysms

C Sanadi, T Mansoor, A Sauhta, P Lyons, M Larney, S Power, BJ Manning

**Introduction:** We present two cases of complicated groin pseudoaneurysms which became symptomatic long after the causative event resulting in late referral.

**Case 1.** A 61 year old female with a background of cardiac transplant and annual cardiac catheterizations presented with a two year history of right groin swelling. She described acute reduction in the swelling associated with lower abdominal pain and a thrill in the groin. CT and duplex ultrasound demonstrated an arteriovenous fistula at the common femoral bifurcation with a pseudoaneurysm extending from the distal right external iliac artery. There were no endovascular treatment options and therefore she had open surgery with repair of pseudoaneurysm and surgical ligation of fistula.

**Case 2:** A 69 year old female was noted to have a large left thigh swelling. An ultrasound confirmed a 10cm pseudoaneurysm arising from a branch of the proximal profunda femoris artery. A history of comminuted neck of femur fracture with intramedullary nail fixation one year previously was noted. The pseudoaneurysm was successfully treated by coil embolization of this vessel.

**Discussion:** These cases illustrate that groin pseudoaneurysms can present late and left untreated can continue to progress. An arteriovenous fistula is a rare but potentially life threatening complication.

## Agenesis, aplasia, hypoplasia? A case study of using ultrasound to identify congenital internal carotid artery agenesis.

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An absence of the internal carotid artery (ICA) is a congenital abnormality known as agenesis; usually identified incidentally through CT or MRI. There are few reported cases of agenesis by ultrasound, therefore, this case study highlights key ultrasound observations that led to further investigations in a female patient, who presented to the Emergency Department with balance disturbance and left lower limb weakness.

Carotid ultrasound suggested an absence of the carotid bifurcation, with the common carotid artery appearing to be continuous with the external carotid artery. Following image optimisation and comparison of vessel haemodynamics with the contralateral side, the ICA was concluded absent.

The patient was consequently referred for both an MRI and CT that confirmed ICA agenesis, with reports of no flow void in the left ICA, an absent carotid canal, and filling of the left MCA via cross flow from the right.

There is currently a paucity of reported ultrasound characteristics in cases of ICA agenesis. With an increased risk of intracranial aneurysms and ischemic stroke/transient ischemic attack, utilising UK carotid ultrasound guidelines and optimising ultrasound images may make it possible to conclude and report on this congenital abnormality, helping direct future patient management.

## The value of clinical assessment by vascular specialist prior to referral to vascular technology department: a quality improvement project

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Purpose: To increase the efficiency of the vascular technology department through improving the referral pathway for better utilisation of resources.

Method: Lower Limb Arterial Doppler US referrals to the Clinical Measurement Unit at a Tertiary hospital between September 2021 to September 2022 prospectively collected. All the referrals analysed by two independent investigators for suspected pathology, referral pathway and if the patients have been reviewed by a vascular specialist (Vascular Surgery Consultant, Specialist Trainee, or Nurse Specialist) and matched with the outcome of the scans.

Results: During the 12-month period, a total of 575 lower limb arterial scans were performed, 560 (97%) for suspected Peripheral Arterial Disease (PAD). Eighty-One (14.4%) of the scans for suspected PAD resulted in normal or non-clinically significant findings. Of the 298 (53%) of the patients reviewed by vascular specialist prior to referral, 19 (6.3%) were normal in contrast to 62 (23.6%) normal scans out of total 262 (47%) referrals without vascular review. Statistically significant difference. (P Value of 0.00001).

Conclusion: Clinical examination by vascular specialist can reduce unnecessary normal scans and increase efficiency and better utilisation of resources. Appropriate referral pathway and promoting education, training and improvement in clinical skills might further improve efficiency.