# RSM Venous Forum annual meeting 2018

## Oral and poster abstracts

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# Oral Abstracts

Importance of early duplex surveillance in predicting risk of re-intervention following ilio-femoral stenting for the treatment of post-thrombotic syndrome

Mr Adam Gwozdz, Clinical Research Fellow, St Thomas' Hospital, King's College London
Co-authors: Justinas Silickas, Taha Kahn, Leonardo Jones, Lawrence Stephenson, Nicholas Jackson, Anna Pouncey, Oscar Johnson, Ashish Patel, Soundrie Padayachee, Alberto Smith, Prakash Saha, Stephen Black

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Abstract body

Background
Endovenous nitinol stents for the treatment of post-thrombotic syndrome is associated with symptomatic improvement, but ~40% require re-intervention. The aim of this study was to examine whether ultrasound surveillance was sensitive for re-intervention, and whether it was possible to predict which patients had the greatest risk of re-intervention.

Methods
Consecutive patients (2012-2017) receiving a nitinol stent for post-thrombotic disease were included for analysis. Stent patency was assessed using duplex ultrasonography 24hrs, 2wks, 6wks, 3mths, 6mths,1yr and yearly post-intervention. Re-interventions were performed when there was a stent diameter reduction of >50% or occlusion.

Results
Of 194 patients treated, cumulative patency was 86% (median follow-up 2.4yrs; range 34-295wks). However, 79 (41%) patients required re-intervention to maintain patency, of which 40/79 (51%) occurred within 3wks of their procedure. Stenting across the inguinal ligament was associated with a higher risk of early re-intervention (HR 1.817; P=0.048, 95% CI [1.005, 3.285]). Re-interventions immediately followed ultrasound surveillance in 70/79 (87%) cases, and this was driven by scan results rather than symptom change. At 6wks, in-stent stenosis <30% was a strong predictor of being low risk for re-intervention at 6mths (HR 0.038; P=0.003, 95% CI [0.004, 0.322]). Conversely, patients with in-stent stenosis between 30-50% at 6wks were at high risk of requiring re-intervention at 6mths (HR 29.90; p=0.002, 95% CI [3.519, 253.989]). The anatomical location of stenosis was not a contributing factor for re-intervention.

Conclusions
Ultrasound surveillance should occur at frequent intervals up to 3wks post-procedure. Surveillance at 6wks could be used to differentiate between patients that require further surveillance before 6mths. These may include patients with in-stent stenosis between 30-50% at 6wks and patients with stents crossing the inguinal ligament.

Are there differences in post-operative pain following closurefast, radiofrequency-induced thermal therapy and endovenous radiofrequency treatments?

Ms Natasha Milinkovic, Worcester Acute Hospital NHS Trust
Co-authors: Sarah Holloway, Jeremy Newman, Isaac Nyamekye

Abstract

Aims
To date no comparison of pain outcomes after different radiofrequency (RF) ablation technologies has been made. We have compared pain outcome for 3 RF ablation technologies with differing methods of action. Venefit generates heat by the RF current heating a terminal coil to a default target-temperature (120oC), RFiTT passes RF current directly through the vein wall (between terminal poles) to generate heat (typically at 70-100oC) and EVRF delivers monopolar RF energy directly to the vein wall at a terminal polar electrode.

Methods
182 patients recruited to a randomised trial of Venefit, RFiTT and EVRF had pain-scores and analgesia requirements measured in the first 7 post procedure days. Patients were asked to record pain scores on each day onto a simple 10cm visual analogue pain chart together with the daily number of analgesics taken.

Results
There was no significant difference in pain score or tablet count between treatment groups and a significant minority of patients in each group recorded pain scores of zero (22%, 42% and 36%) and zero total tablet count (53%, 71% and 67%) for Venefit, RFITT and EVRF respectively during the first 7 days. Pain patterns for those who experienced pain showed low median pain scores (2/10) on day one dropping over two or three days.

Conclusion
Radiofrequency technology is a proven, efficacious and safe treatment modality for truncal venous reflux ablation that is associated with low pain scores. Despite their differing methods of heat delivery we found no difference in patient reported pain scores or analgesic usage after Venefit and RFITT, EVRF treatments.

Global management of venous leg ulceration: Just pre EVRA publication

Miss Francine Heatley, Department of Surgery and Cancer, Imperial College London
Co-authors: Alun Davies

Abstract

Background
Various guidelines exist worldwide for the diagnosis and management of venous leg ulcers, however these guidelines are difficult to implement and may not be followed resulting in disparate treatment of patients globally.

Methods
An online, 26 question survey was created to evaluate the current global management of venous leg ulceration. The survey was classed as a service evaluation according to the HRA decision tool and therefore did not require HRA /ethical approval. The link to the survey was

emailed globally via several vascular and venous societies to approximately 15000 participants using local, national and international mailing lists (November 2017 to February 2018).

Results
799 complete responses were received from 86 countries. The respondent physicians saw a median of 10 patients per month. The median time of referral from primary to secondary care was 6 weeks. 60% respondents arranged an ABPI on first visit and 84% performed a venous duplex, with 95% prescribing compression for those not contraindicated. Seventy-eight per cent thought that treatment of superficial truncal venous reflux by endovenous intervention or surgery benefits ulcer healing, whereas 80% thought it benefits recurrence. Fifty-nine per cent performed endovenous intervention or surgery prior to ulcer healing with 73% performing a duplex ultrasound post intervention to assess technical success.
46% agreed that they would change practice if the EVRA study results were positive, with 43% stating they would not, but 86% of those already treated prior to ulcer healing.

Conclusions
The survey showed a diversity of treatment pathways. The need to develop a robust clear pathway for patients with leg ulceration is clearly required. The latter should be informed by the results of the EVRA

## Association of concomitant disease in the profunda and femoro-popliteal veins to cumulative patency and re-intervention rates following ilio-femoral venous stenting of limbs with post-thrombotic occlusion

Mr Adam Gwozdz, Clinical Research Fellow, St Thomas' Hospital, King's College London
Co-authors: Lawrence Stephenson, Leonardo Jones, Nicholas Jackson, Oscar Johnson, Justinas Silickas, Taha Kahn, Soundrie Padayachee, Alberto Smith, Prakash Saha, Stephen Black

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Abstract

Background
Ilio-femoral stent patency is inferior in post-thrombotic disease compared with non-thrombotic venous obstruction. The aim of this study was to examine whether decreased inflow to the stent, caused by intraluminal obstructive disease, was associated with greater risk of re-intervention and inferior long-term patency outcomes.

Methods
Consecutive patients (2012-2017) receiving a nitinol venous stent for post-thrombotic disease were included for analysis. Pre-operative ultrasound was used to identify femoral vein (FV), profunda vein (PV), and/or popliteal vein (POPV) intraluminal scarring and/or residual thrombosis, and categorised into one of 3 groups: absence of disease; disease in a single inflow vessel; or disease in more than one inflow vessel. Stent patency was assessed using duplex ultrasonography post-intervention, and re-interventions performed when there was a reduction in stent diameter of >50% or occlusion.

Results
Of 164 patients treated, cumulative patency was 89% (median follow-up 2.4yrs; range 46-308wks). However, 70/164 (43%) patients required re-intervention to maintain patency (median number of re-interventions 2; range 1-6). The respective disease state of inflow

vessels are shown in Table 1. Cumulative patency and re-intervention rates were significantly worse in patients with more than one diseased inflow vessel (P=0.47, P=0.004, respectively). Disease in the FV+PV+POPV was associated with a higher risk of re-intervention (16/25 (64%); HR 2.76; P=0.009, 95% CI [1.29, 5.92]), and was a strong predictor of cumulative patency loss compared with patients that had no inflow vessel disease (18/25 (72%) HR 17.26; P=0.009, 95% CI [2.02, 147.07]).

Conclusions

Maintaining stent patency in post-thrombotic limbs is influenced by the quality of inflow vessels. Patients with intraluminal scarring and/or residual thrombosis in the FV+PV+POPV should be counselled on their increased risk of patency loss.

| | Varying degree of inflow disease n=164 |
|---|---|
| Absence of inflow disease | 52 (32%) |
| Single inflow vessel disease | 20 (12%) |
| Femoral Vein (FV) | 17 (10%) |
| Profunda Vein (PV) | 0 |
| Popliteal Vein (POPV) | 3 (2%) |
| Combined inflow disease | 92 (56%) |
| FV + PV | 9 (5%) |
| FV + POPV | 57 (35%) |
| PV + POPV | 1 (1%) |
| FV + PV + POPV | 25 (15%) |

## Are venous leg ulcers an under-recognised problem? An analysis conducted in a large teaching hospital

Mr Edward Lewis, Fifth Year Medical Student, University of Cambridge
Co-authors: Edward Lewis, Ayoola Awopetu, Paul Hyes, Manjit Gohel

Abstract

Background and aims

Leg ulcers are an increasing problem in the Westernised world. Health costs are significant and treatment suboptimal often resulting in limb amputations. Management of leg ulcers involves medical optimisation and urgent vascular surgical input. However, patients are often not identified early so we wanted to discover the prevalence of leg ulcers in our hospital.

Methods

On a single day, the 4th January 2018, the entire inpatient population of Addenbrooke's hospital, Cambridge was analysed. Using the hospital's computer system EPIC, every patient had their record searched using the term "leg ulcer". We excluded any patient who was younger than 55. Each patient's notes were reviewed to confirm an active leg ulcer and any medical comorbidities. The data collected included the ward, age and diabetes diagnosis.

| | |
|---|---|
| Population | Entire Addenbrooke's hospital inpatient population on 4th January 2018 |
| Search terms | "Ulcer" , "Leg Ulcer" and "Foot Ulcer" |
| Inclusion Criteria | >55 years of age and a current leg ulcer diagnosis |
| Recorded Data | Age, Diabetes diagnosis |

Results

Of the 979 patients in Addenbrooke's hospital, 733 (74.9%) were eligible for inclusion. Of these, 75 (10.2%) had a current leg ulcer. 39 of these had a diagnosis of diabetes, equalling 52%.

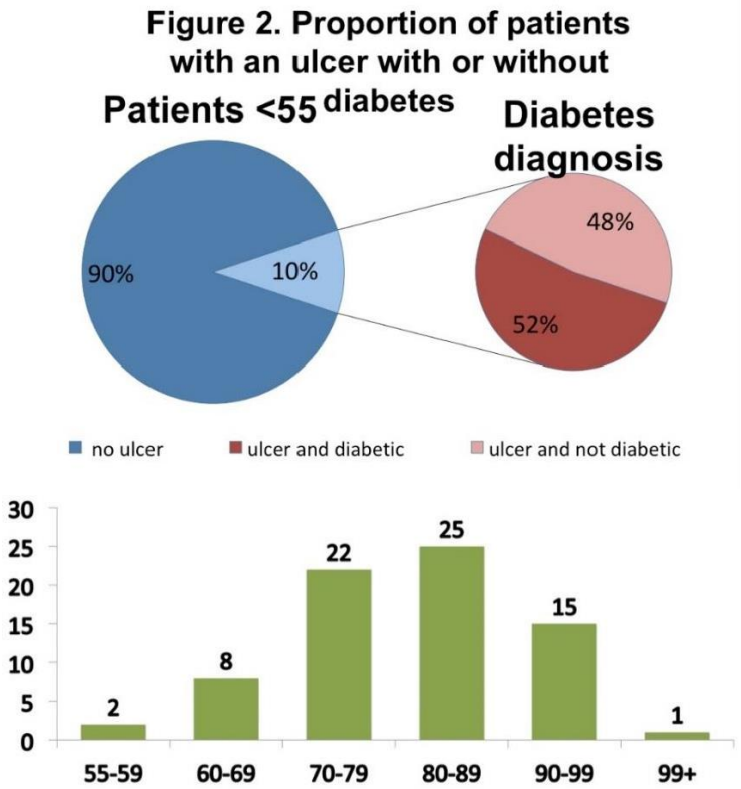


**Figure 1. Age distribution of population including in analysis**

Conclusion

Unhealing leg ulcers cost the NHS £3.2 billion/year (Guest et al 2015). We showed that diabetes contributes in up to half of our patients' ulcers. More research needs to be done to identify these patients and insure there treatment is streamlined into vascular surgery services.

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Venous disease: A research Cinderella?

Dr Aleksandra Staniszewska, Academic Foundation Programme Trainee, Academic Section of Vascular Surgery, Imperial College London
Co-authors: Sarah Onida, Marina Kafeza, Alun Davies

Abstract

Aims
The relatively recent revision of clinical guidelines has been suggested to affect the number of venous interventions undertaken within the National Health Service (Davies et al., 2016). It remains unclear whether these changes have had any impact on the trends in vascular research in the UK. This study aimed to 1) compare the number of manuscripts in venous and arterial disease published by UK institutions over the preceding 5 years and 2) correlate the vascular publication and intervention trends in the UK.

Methods
Medline and Embase databases were searched to establish the number of publications on venous and arterial disease from UK institutions between 2013 and 2017. Data on the number of varicose vein interventions was obtained from Patient reported outcome measures for elective procedures, Hospital Episode Statistics database. Information on arterial procedures, including aortic abdominal aneurysm repairs, carotid endarterectomies, lower limb revascularisation and major amputation were extracted from the National Vascular Registry reports. The number of arterial and venous publications or procedures was described using median (interquartile range), with differences compared with Mann-Whitney test.

Results
Between 2013 and 2017, 1111 publications on venous disease and 3673 publications on arterial disease were delivered by the UK institutions. Per year, the median number of publications on arterial disease was significantly higher compared to those on venous disease [683 (680-707) vs 214 (212-241), p=0.009]. In contrast, during the period between 2014 and 2016, almost twice as many procedures were done for venous compared to arterial disease [32050 (25844-32900) vs 16730 (15634-17728), p=0.034].

Conclusion
Despite performing more venous procedures, UK institutions publish more research on arterial disease.

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The characterisation and investigation of pulmonary arteriovenous malformations and cerebral abscess risk factors within a rare vascular disease: Results from a targeted 125-question, international patient survey

Ms Emily Boother, Fourth Year Medical Student, Imperial College School of Medicine
Co-authors: Claire Shovlin

Abstract

Aims

Hereditary Haemorrhagic Telangiectasia(HHT) is an autosomal dominant vascular disorder characterised by epistaxis, telangiectasia, and arteriovenous malformations(AVMs). Approximately half of individuals have pulmonary AVMs (PAVMs)(Cottin et al.,2004), and as we documented last year(Boother et al.,2017), 1 in 15 will suffer a cerebral abscess. This study aims to characterise individuals with PAVMs and to investigate both novel and our newly-identified cerebral abscess risk factors(Boother et al.,2017).

Methods

Our international, online questionnaire comprising 125 non-biased questions was advertised through global HHT networks. The questions focused on an individual's HHT and PAVM phenotype, and abscess-relevant environmental factors. Data responses have been evaluated using R.

Results

518 participants with self-reported HHT responded. 465 provided online consent and passed inbuilt validity tests. 320/465(68.8%) were female.

The burden of cerebral complication in this cohort is significant: 139/465(29.9%) described a family member with a cerebral abscess(n=59) or cerebral haemorrhage. 15(25.4%) of these individuals died due to their abscess.

232 individuals (49.9%) had PAVMs which were diagnosed due to family history(n=53), preceding medical event(n=37) or as incidental findings(n=40). 163/232(70.3%) had embolization or surgery as treatment for their PAVMs. 17/232(7.3%) had cerebral abscesses.

There was poor compliance with antibiotic prophylaxis despite recommendations(Shovlin et al.,2008). Only 52.8% reported always taking antibiotics prior to the dentist, and 40.6% had attended without antibiotics. 11.4% were unaware of the recommendation.

Conclusions

Cerebral abscesses are a significant PAVM complication, not helped by under-diagnosis of PAVMs, and lack of patient and clinician knowledge about abscess risk and association with odontogenic bacteria. Furthermore, procedural limitations (difficult to embolize <3mm PAVM feeding artery) leaves individuals at risk despite 'maximum' treatment. There is a need for better prediction tools in abscess risk reduction.

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## An evidence review determining the efficacy of Novel Oral Anticoagulants (NOACs) compared to Warfarin at reducing Venous thromboembolism (VTE) recurrence

Miss Diya Baker, Fourth Year Medical Student

### Abstract

#### Background
Venous thromboembolism (VTE) is responsible for 25,000 deaths/year in the UK. Treatment of patients with previous VTE is vital to prevent recurrence. Anticoagulants form the basis of therapy, with warfarin the mainstay of secondary prevention. However, recently developed drugs not requiring regular monitoring exist. These Novel Oral Anticoagulants (NOACs) are beginning to see use as substitutes for warfarin.

#### Objectives
This review aims to determine the difference in VTE recurrence in adult patients, without chronic coagulopathies, receiving a single NOAC (dabigatran, rivaroxaban, apixaban, edoxaban) versus those receiving standard warfarin therapy as a preventative measure, following initial anticoagulation for the acute VTE. We intend to apply our findings to the UK population.

#### Methods
NICE Evidence portal was used for guidelines and evidence summaries. Bibliographic databases (MEDLINE, EMBASE, CENTRAL and Web of Science) were used to look for systematic reviews (SR) and randomised control trials (RCTs). An strict eligibility criterion was applied, following the population in question, intervention, comparator and outcomes to include recurrent VTE.

#### Results
1184 records were initially screened for suitability and of these 17 were appraised. Records were appraised using either the AGREE II/ adapted CASP checklist. Guidelines and evidence summaries were reviewed but did not contain sufficient detail. The SR and 6 RCTs found that NOACs are non-inferior to conventional therapy (low molecular-weight heparin followed by warfarin) in reducing VTE recurrence.

#### Conclusion
Our review has found all NOACs are non-inferior to warfarin in preventing VTE recurrence. Despite limitations with cost and the lack of reversibility, the comparative convenience of NOACs versus warfarin and safety in the reduction of major bleeding events mean that they provide alternative solutions far more acceptable to many patients.

# Poster Abstracts

## Patients with inherited and acquired thrombophilia should not be excluded from ilio-femoral venous stenting for post-thrombotic occlusion

Mr Nicholas Jackson, Final Year Medical Student, St Thomas' Hospital, King's College London
Co-authors: Adam Gwozdz, Justinas Silickas, Taha Kahn, Oscar Johnson, Alberto Smith, Prakash Saha, Stephen Black

Abstract

Background
Inherited and acquired thrombophilias increase the risk of venous thromboembolism (VTE), and the antiphospholipid antibody syndrome, an acquired thrombophilia, is associated with a high risk of recurrent VTE. Ilio-femoral venous stenting in patients with thrombophilia is controversial. The aim of this study was to examine the association of thrombophilia status with cumulative patency and re-intervention rates following stenting for post-thrombotic occlusion.

Methods
Consecutive patients (2012-2017) receiving a nitinol venous stent for post-thrombotic disease with a minimum of one-year follow-up were included for analysis. Thrombophilia testing was performed when VTE occurred at a young age with weak provoking factors, or strong family history, or recurrence. Patients with strong risk factors for VTE were not tested, and excluded from analysis. Stent patency was assessed using duplex ultrasonography post-intervention, and re-interventions performed when there was a reduction in stent diameter of >50% or occlusion.

Results
Of 205 patients treated, 138 (67%) were tested for thrombophilia, and 59/138 (43%) had an inherited or acquired thrombophilia (Table 1). Cumulative patency was 88% for patients with thrombophilia, and 89% in patients without (median follow-up 1.7yrs; range 52-258wks). Additionally, 64/138 (46%) patients required re-intervention to maintain patency, of which 28/59 (47%) occurred in patients with thrombophilia, and 36/79 (45%) without. Inherited or acquired thrombophilia was not associated with cumulative patency loss (P=0.983), or a higher risk of re-intervention (P=0.382).

Conclusions
Thrombophilia assessment should be performed in patients undergoing stenting without strong provoking factors for VTE. Prolonged anticoagulation is advised in patients with acquired thrombophilias due to their increased risk of VTE recurrence. Patients with inherited or acquired thrombophilia should not be excluded from ilio-femoral venous stenting as patency outcomes are good.

The significance of the anterior accessory saphenous vein recurrence at five years

Mr Joshua Barnaby, Medical Student, American University of the Caribbean School of Medicine and Ealing Hospital
Co-authors: Evi Kalodiki, Mustapha Azzam, Emily Choe, George Geroulakos, Christopher Lattimer

Abstract

Introduction
In this single centre randomised controlled trial (RCT) 50 patients received laser to the great saphenous vein (GSV) with concurrent phlebectomies versus 50 patients who had foam sclerotherapy. The aim was to report the significance of recurrence from the anterior accessory saphenous vein (AASV) and the pattern of reflux.

Method
Reflux was assessed by ultrasound on standing. The Aberdeen varicose vein questionnaire (AVVQ), the venous clinical severity score (VCSS and haemodynamic outcomes were also assessed. Improvement was defined by an absolute change score (baseline minus five year post-treatment score). A discord outcome analysis was used to define success across the three domains.

Results
The AASV had reflux in 5/44 laser and 4/44 foam patients. The median [inter-quartile range] pre-treatment GSV diameter (mm) was significantly greater than the refluxing AASV at 5 years, 9.5 [7.5-10.5] versus 4.2 [2.8-6], p=.008 (Wilcoxon). The GSV was occluded in 8/9 while it was patent and competent in 1/9 of these cases. Both the AVVQ and VCSS improved in 8/9 patients. The venous filling index of air-plethysmography improved in 6/9. All patients had success in one or more domains with a discord outcome in 4/9. A single reflux pathway was identified in 5, with a parallel system in 2 and a triple system in 2.

Conclusion
Despite a successfully treated GSV, late recurrence from other sites like an AASV is approximately 10% after endovenous treatment. Though, it does not appear as troublesome versus the original presentation, this recurrence should be taken into account.

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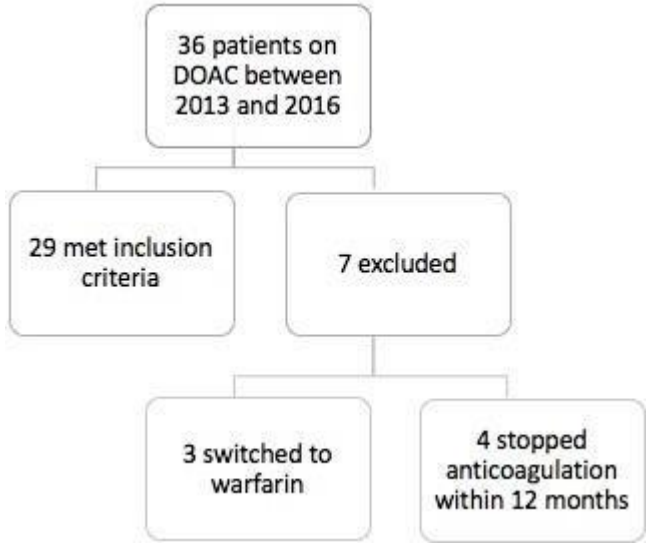
Long-term monitoring of direct oral anticoagulants: A primary care audit
Mr Damian Amendra and Akvile Nikitina

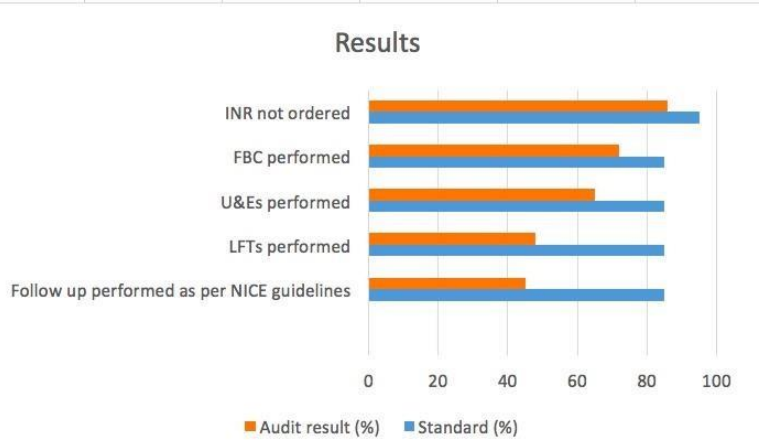
Abstract

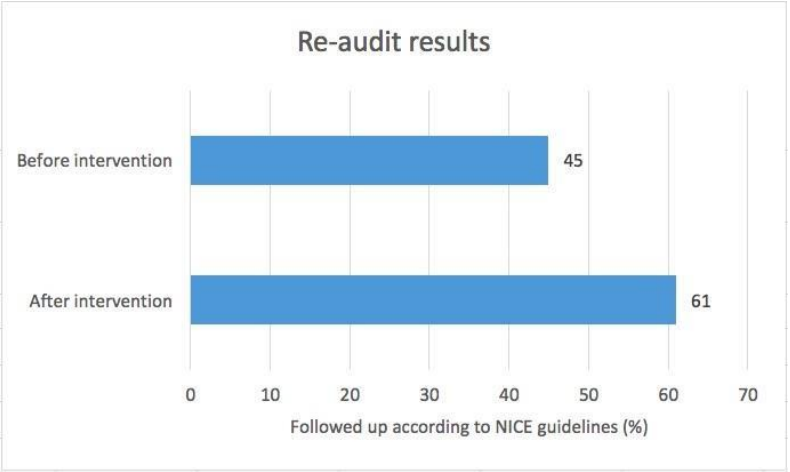
Aims
To investigate whether patients on direct oral anticoagulants (DOACs) in an urban GP practice were being monitored long-term in accordance with NICE guidelines

Methods
The NICE guidelines on anticoagulation recommends that all patients taking a DOAC for >12 months should receive monitoring of FBC, U&Es and LFTs, or more frequent monitoring in acute illness or renal impairment. A standard of 85% was agreed at a practice meeting. A SystemOne search was conducted for 'on repeat prescription medications' apixaban, rivaroxaban, dabigatran and edoxaban between 12/10/13 and 12/10/16. Laboratory investigations were analysed; patients were excluded if they had not been on a DOAC for >12 months. The findings were analysed and discussed at a practice meeting. A subsequent re-audit was undertaken three months following quality improvement interventions.




Results
29 patients met the inclusion criteria. 13 (45%) had been appropriately monitored according to NICE guidelines. Following intervention, this improved to 20/33 (61%).






Conclusions

Direct oral anticoagulants (DOACs) are a relatively new class of anticoagulants. The proportion of patients on DOACs is increasing as they replace warfarin in an ageing population. They are primarily initiated in the secondary care setting and monitored in primary care.These results suggest that patients on DOACs were not being fully investigated long-term, with the potential to result in adverse bleeding events. The instigation of a reminder on SystemOne improved performance in this area, albeit still below the set standard. As rates of DOAC prescription increase, this audit highlights the importance of long-term monitoring and an area for significant clinical improvement.

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Mid-term results of quality of life after endovascular stent placement for chronic symptomatic thrombotic and non-thrombotic ilio-femoral venous occlusive lesions: A single-centre experience

Mr Mohamed Taha, Clinical Research Fellow, Imperial College London and Assuit University Hospitals
Co-authors: Andrew Busuttil, Mary Ellis, Nicolas Burfitt, Alun Davies

Abstract

Aim
To report on midterm results on the clinical and quality of life (QoL) effects of deep venous stenting in patients with chronic obstructive venous lesions.

Methods
A prospective observational cohort study of patients (agreeing to intensive follow up) with chronic symptomatic ilio-femoral venous obstructive or stenotic lesions referred for endovascular treatment was conducted from June 2016 to January 2018. Severity of PTS and the QoL were assessed using Villalta scale, Venous Clinical severity score(VCSS) and VEINES-QOL/Sym questionnaire preoperatively and at 2 and 6 months.

Results
Eighteen patients (8 females; median age, 46.5 (17-65)) were included and all had successful recanalization and stent deployment. Primary patency was high, with only one patient (5.5%) needing re-intervention at 5 months due to partial stent occlusion, with a primary patency rate of 94.3% and an assisted primary patency of 100%. Mean Villalta score significantly decreased from baseline compared with 2 and 6 months after the procedure [9.6 and 6.5 & 5.8, respectively, $P<0.0001$], showing a significant decrease in the severity of PTS. VCSS score significantly decreased from baseline compared with 2 and 6 months after stenting [8.5 and 6.3 & 5.3, respectively, $P<0.0001$] thus showing a significant improvement of QoL. A statistically significant improvement in QoL was observed in all patients from baseline compared with 2 and 6 months after stenting [60 and 69.7 & 69.4, respectively, $P<0.05$].

Conclusion
Our results confirm the significant impact of stenting on the QoL of patients with chronic symptomatic ilio-femoral venous obstructive lesions, making it a viable treatment option.

Short stretch tape may reduce pain and pigmentation after foam sclerotherapy

Ms Emily Chloe, Final Year Medical Student, American University of the Caribbean, School of Medicine and Ealing Hospital
Co-authors: Mustapha Azzam, Joshua Barnaby, Stephen Ash, Evi Kalodiki, Christopher Lattimer

Abstract

Introduction
To improve the efficacy of foam sclerotherapy, a transparent film compression bandage was suggested. It appears to compress the varicosities, making them less visible. Less blood and flow within the vein may enhance the action of foam on venous closure. The aim of our study was to measure the effect of skin tape on varicose vein size.

Method
Consecutive patients n=28, M= 16, R leg=13, BK=19, 46 (21-85) years, had a bulging varicose vein assessed, standing, using the ultrasound transverse view. Horizontal and vertical diameters were recorded together with the depth of the vein beneath the skin. Tangential skin compression was applied using a proprietary transparent, strong adhesive medical tape. The tape was fixed on the skin across the vein, under tension, approximately half of the circumference of the leg. The same measurements were then repeated.

Result
The measurements were performed 27.3 (20.3-42.5) cm above the medial or lateral malleolus and expressed as median (inter-quartile range). Tape compression did not reduce the diameter (mm) of the vein in the horizontal or vertical view. Without tape: horizontal 4.7 (3.7-6.7), vertical 4.6 (3.7- 6.6). With tape: horizontal 4.8 (3.8-6.6), p=.629, vertical 4.7 (3.8-6.3), p=.416. However, with tape there was a 1.5 (1.3-1.8) fold increase in the depth: 1.9 (1.6-2.6) versus 3.5 (2.2-4.3), p <.0005 (Wilcoxon).

Conclusion
Surprisingly, taping made no significant difference to the size or shape of the veins. However, it significantly submerged them into the deeper tissues. This may be clinically advantageous by reducing pain and pigmentation following sclerotherapy.

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A comparison of interventions for great saphenous vein incompetence

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Abstract


This systematic review and meta-analysis updates a previous Cochrane review and aims to assess the efficacy of endovenous laser ablation (EVLA), radiofrequency ablation (RFA), Endovenous steam ablation (EVSA), ultrasound-guided foam sclerotherapy (UGFS), Cyanoacrylate (CA), Mechanochemical ablation (MOCA) and high ligation and stripping (HL/S) in the treatment of great saphenous vein (GSV) incompetence.

The Specialised Trials Register (last searched December 2017), CENTRAL (Issue 10, 2017) and clinical trials databases were searched for randomised control trials (RCTS) of EVLA, RFA, EVSA, UGFS, CA, MOCA and HL/S. The primary outcome was technical success. Secondary outcomes were complications, recurrence, post-operative pain, generic quality of life (QoL) scores, VCSS, length of procedure, duration of hospital stay and return to normal activities. Cochrane revman5 was used for data analysis.

22 RCTs were included within the review with 4392 patients randomised, a paucity of RCTs for EVSA, CA and MOCA was noted. Of the proposed outcomes only, technical success and recurrence were amenable to meta-analysis due to inconsistencies in reporting results among trials. Technical success was comparable between EVLA and HL/S (RR 1.02, 95% CI 0.95 to 1.09) and RFA and HL/S. Technical success in UGFS was found to be inferior to HL/S (OR

0.25, 95% CI 0.18 to 0.35). All studies showed RFA was associated with less post procedural pain and duration of analgesic use than EVLA. The technical success and long-term recurrence rate with UGFS was inferior to other endovenous treatments and surgery.

The ability to accurately meta-analyses interventions for GSV incompetence is impeded by a lack of RCTS for newer treatments such as EVSA and non-tumescent techniques and through inconsistences in methodologies, reporting and terminology within available trials.

## Systematic review of the effectiveness of the ASVAL technique for treatment of varicose veins and truncal reflux

Dr Thomas Richard, Foundation Year 2 Doctor, Imperial College Healthcare NHS Trust
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### Abstract

#### Background
The ambulatory selective varices ablation under local anaesthesia (ASVAL) method makes use of an alternative multifocal or "ascending" theory of varicose vein aetiology and recommends primary ambulatory phlebectomy as a treatment for varicose veins and truncal vein incompetence. A systematic review of the effectiveness of ambulatory phlebectomy or the ASVAL technique has not previously been conducted. If it is clear that this minimally invasive intervention can resolve truncal reflux, damage to the saphenous nerve can be minimised and vein can be preserved for use in future bypass surgery.

#### Methods
A comprehensive search of the literature according to the PRISMA guidelines revealed 11 original articles that were qualitatively reviewed. The primary outcome was absence from recurrent varicose veins at one year follow-up. Secondary outcomes were resolution of great saphenous vein (GSV) reflux on doppler ultrasound (DUS), change in GSV diameter, objective and subjective clinical improvement in CVD and patient reported outcomes.

#### Results
2106 limbs were operated on in 1734 patients reported in two randomised control trials (RCTs), three retrospective studies, three prospective studies and two case-control studies. One case series of 4000 patients was also included in the analysis. Recurrence of varicosities at one year ranged from 0.5% to 13.5% in patients undergoing ambulatory phlebectomy. Of 1622 limbs with diagnosed GSV incompetence before the intervention, 1114 GSVs were competent at one year (mean 68.2% (+/- 12.62%)). All studies which measured GSV diameter reported statistically significant reductions. All patients were CEAP C0 or C1 at one year follow-up (81.88% C2, 8.92% C3, 7.4% C4 and 0.12% C5 before the intervention). Complications were rare. Ambulatory phlebectomy resulted in less recurrence and fewer complications than compression sclerotherapy.

#### Conclusions
At one year follow-up, ambulatory phlebectomy

PICC-related deep vein thrombosis in patients with solid tumours: A single centre experience

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Abstract

| Cancer type | DVT (%) | No DVT (%) |
|---|---|---|
| Colorectal | 55.5 | 50 |
| Breast | 44.4 | 38.4 |
| Other | 0 | 11.5 |

Aims
PICCs (peripherally inserted central catheters) are becoming increasingly popular for the administration of chemotherapy in patients with solid tumours. Deep vein thrombosis (DVT) is a common complication of PICCs. The purpose of this study was to analyse our experience with PICCs insertion in cancer patients and investigate the incidence of PICC-related thromboembolism in our centre.

Methods
Retrospective analysis identified 87 patients with solid tumours who underwent PICC insertion between 01/01/2016 to 31/12/2016 at Milton Keynes University Hospital. The primary outcome investigated was PICC-related deep vein thrombosis. Single lumen 4Fr PICCs were placed in all patients. The incidence of thromboembolism was documented after checking reports of ultrasound Doppler of all symptomatic patients to confirm the presence of thromboembolism. Gender, age, Body Mass Index (BMI), cancer type and chemotherapy regime were matched to these patients.

Results
Eighty-seven patients were included in the analysis of which nine (10%) developed DVT. The average time from PICC insertion to thrombosis onset was 28 days (8-88 days). Gender proportion for patients with DVT was (66% female vs 33% male). Average BMI was 27 kg/m2 (23.7 - 44 kg/m2) in those with DVTs. Breast cancer and colorectal cancer were the most common cancer types in the DVT cohort (55.5% and 44.4% respectively). Breast cancer was over-represented whilst colorectal cancer under-represented in the DVT cohort compared to the non-DVT cohort (Table1). A higher proportion of patients with DVTs received FEC-T chemotherapy compared to patients without DVTs (44% vs 16.6%).

Conclusion
In our study, breast cancer and FEC-T chemotherapy appeared to be over-represented in the DVT cohort.

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Preoperative heart rate variability predicts pain during local anaesthetic varicose vein surgery: Pilot study

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Abstract

Objective
Local anaesthetics endovenous procedures were shown to reduce recovery time, decrease postoperative pain and quicker return to baseline activities. However, substantial group of patients experience pain during these procedures. The autonomic nervous system modulates pain perception and its influence on stress response can be non-invasively quantified using heart rate variability (HRV) indices. The aim of our study is to evaluate whether preoperative baseline of HRV can predict intraoperative pain during local anaesthetic varicose vein surgery.

Methods
Patients scheduled for radiofrequency ablation were included into the study. They had their ECG recorded from a single channel of a custom-made amplifier. Each patient preoperatively filled in forms Y1 and Y2 of Spielberger's state and trait anxiety inventory (STAI), Aberdeen Varicose Vein Questionnaire (AVVQ) and rated their anxiety level on numeric scale. Postoperatively, they filled the pain they felt during the procedure on the numeric pain intensity scale. MATLAB software was used to extract R-waves and generate HRV signals and a mathematical model was created to predict pain score for each of patient.

Results
Out of multiple variables multivariate analysis found association only between reported and predicted patients pain scores. Predicted patients pain score (pPPS) was significantly correlated with reported pain score (rPPS) ($R=0.807$, $p< 0.001$) with accuracy of prediction of 65.2%.

Conclusions
This preliminary study shows that preoperative heart rate variability can accurately predict patients pain allowing patients with higher predicted score to have the procedure under general anaesthesia.

Variability in VTE assessment tools

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Abstract

Aim
To assess the concordance between different VTE risk assessment tools in stratifying inpatients at high risk of developing VTE who may require thromboprophylaxis.

Methods
This is a single centre, retrospective cohort study of 100 patients admitted to St Mary's Hospital between 27/03/2018 to 17/05/2018. A random number generator was used to select a sample of patients from each ward; the sample size from each ward was relative to the ward size. 39 surgical patients were retrospectively risk assessed using the Department of Health (DoH) and the Modified Caprini VTE risk assessment tools. 61 medical patients were risk assessed using the DoH, Modified Caprini, Padua and Improve VTE risk assessment tools. For each tool, the risk of VTE was graded as either low, moderate or high in each patient.

Results
All 39 surgical patients were at high risk of VTE according to DoH risk assessment tool (score >1). According to the Caprini VTE risk assessment tool, 2 patients were at low risk (score 0-2), 3 patients were at moderate risk (score 3-4) and 34 patients were at high risk (score >4). Moderate agreement between the two tests is demonstrated through measurement of an intraclass correlation coefficient (Cronbach's alpha) (0.618, $p<0.002$).

Of the 61 medical patients, 60 were considered high risk of VTE according to the DoH risk assessment tool. Using the Caprini VTE risk assessment tool, 4 patients were at low risk, 12 patients were at moderate risk and 45 patients were at high risk. According to the Improve VTE risk assessment tool, 39 patients were at low risk (probability of symptomatic VTE 0.2-0.6%), 12 patients were at moderate risk (0.6-1.5%) and 10 patients were at high risk (>1.5%). According to the Modified PADUA VTE risk assessment tool,

Nitinol venous stent outcomes in peripartum women following treatment for acute ilio-femoral deep vein thrombosis

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Abstract

Introduction
Deep vein thrombosis (DVT) is the leading cause of morbidity and mortality within pregnant and post-partum women. Contemporary management of acute ilio-femoral DVT includes catheter-directed thrombolysis and stenting of an obstructive lesion. This study examines venous stent related outcomes of peripartum women (pregnant or within 6wks post-partum) with acute ilio-femoral DVT.

Methods
Peripartum women (2012-2017) treated for acute ilio-femoral DVT were included for analysis. Primary patency was defined as a patent stent with <50% diameter reduction; primary-assisted patency included those requiring re-intervention to maintain patency, and; secondary patency defined as stents that were blocked and successfully re-opened.

Results
Of 190 patients treated for acute ilio-femoral DVT, 81 (43%) were women. Cumulative patency was 88% (median follow-up 2.3yrs; range 30-328wks). From this group, 9 women were peripartum (11%). Onset of DVT was post-partum for all (mean 4wks after birth; range 3-6wks). Two women were treated with catheter-directed thrombolysis alone, and 7 women were also stented. Median age at the time of stent placement was 29yrs (range 22-41yrs). Primary, primary-assisted, and secondary patency rates were 14%, 43%, and 43%, respectively. Re-intervention was required in 6/7 (86%) peripartum women, with mean time to re-intervention of 9wks (range 1-33wks). Venous stenting in peripartum women was associated with a higher risk of re-intervention (HR 6.58; p=0.0001, 95% CI [2.46, 17.60]), and was a strong predictor of cumulative patency loss (HR 10.71; p=0.002, 95% CI [2.37, 48.51]).

Conclusions
Peripartum women are significantly more likely to require re-intervention and experience patency loss compared with their non-peripartum counterpart. Thresholds for intervention may need to be higher and periprocedural anticoagulation strategies require more investigation if treatment is to be offered in the peripartum period.

## Prediction of venous ulcer healing: Insights from metabonomics

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Abstract

Chronic Venous Ulceration (CVU) affects 1% of the population but represents a 1% expenditure of the annual NHS budget(Beebe-Dimmer,2005). In those over 65 years of age, the prevalence increases to up to 4%; age and obesity are both risk factors for CVU, making its prevalence likely to increase in the future. Up to 50% of community nursing time is spent caring for patients with leg ulceration; of these, 75% will be venous in origin. The standard treatment for CVU is compression bandaging; this is cumbersome, can be painful for patients and, even when ulcers heal, up to 30% recur within a year(Gohel,2005). As such, there is urgent need to identify improved ways of diagnosing, prognosticating and treating patients with this condition.

Metabonomics describes the study of the end products of metabolism, providing more detailed information than what is achievable via genomics, proteomics and transcriptomics(Nicholson,2012). Biofluid assay via nuclear magnetic resonance (NMR) spectroscopy and mass spectrometry (MS) can provide important insight in the mechanistic processes invovled in disease biology.

We performed a pilot study on 28 patients, collecting serum, urine and ulcer fluid via standard operating procedures developed in the department. Untargeted NMR and MS assays were performed and multivariate statistical techniques applied to the spectral data. Results showed that the metabolic phenotype at week 0 was predictive of ulcer healing at 20 weeks. Changes

were present in serum, urine and ulcer fluid. Metabolites of interest included members of the sphingolipid and phospholipid metabolism and members of inflammatory pathways.
This study reveals that the metabolic phenotype of venous ulceration at baseline can be predictive of ulcer healing, with tremendous translational implications. Further validation via larger targeted studies is required.

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## Mechanochemical ablation for the treatment of superficial venous incompetence: A cohort study of a single centre's early experience


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Abstract

Background
Mechanochemical ablation (MOCA) is an innovative non-thermal method of treating symptomatic axial superficial venous incompetence (Elias and Raines, 2012; National Institute for Health and Care Excellence, 2016). This is a single centre cohort study aiming to investigate the anatomical occlusion rate of the technique as well as other clinical and technical outcomes at one year.

Methods
Primary unilateral symptomatic patients were offered treatment with MOCA using ClariVein® with 1.5% Sodium Tetradecyl Sulphate. Assessments including clinical examination, duplex ultrasound and patient reported Health Related Quality of Life (HRQoL) were performed at baseline and weeks 1, 6, 26 and 52.

Results
32 patients were recruited and 28 (87.5%) completed 1 year follow up. Complete target vein occlusion at 1 year was found in 21 patients (75%) and 6 (21.4 %) required secondary procedures, which were axial endovenous thermal ablation in 3 (10.7%) patients and ambulatory phlebectomy with perforator ligation in another 3 patients. There was a significant improvement in the Venous Clinical Severity Score from median (IQR) 6(5-8) to 1(0-2) ($p<0.001$) at 1 year and this was associated with significant improvement in HRQoL, both generic ($p=0.001$) and disease specific ($p<0.001$). 1 patient (3.1 %) had a non-fatal pulmonary embolus.

Conclusion
MOCA is a feasible and effective treatment for superficial venous incompetence. When using consensus definitions for anatomical closure, results for MOCA may be less favourable than endothermal techniques. Further studies are required to evaluate the impact of reduced

efficacy upon effectiveness, comparative technical results, safety and cost effectiveness.

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## Characterisation of endothelin-1 responses in rat ureter microvascular pericytes


Miss Shannon Gunawardana



Abstract

Understanding the physiological processes underpinning function of specific subclasses of pericytes remains elusive. This is in part due to the relative inaccessibility and fragility of the microvasculature, on which they exist. The aim of the present study is to investigate the role of endothelin-1 (ET-1) on subclasses of pericytes, defined as those surrounding arteriolar, capillary and venular regions of the microcirculation. Rat ureters were dissected and using confocal microscopy, simultaneous changes in intracellular calcium (Ca2+) and changes in diameter could be obtained. Addition of ET-1 (0.1-10nM) evoked concentration dependent increases in pericyte [Ca2+]i with similar amplitude along the vascular tree. Ca2+ signalling responses to ET-1 addition were accompanied by pericyte contraction which reduced arteriolar and venular diameter by 22±3% and 15±1%, respectively (n=6), but capillary diameter did not change despite increases in Ca2+ (n=5). By measuring pericyte Ca2+ responses at multiple sites along a vessel, it was evident that Ca2+ events occurred out of sequence, which is not consistent with intercellular electrically-derived Ca2+ signalling. Studies using inhibitors of endothelin-A (BQ123) and endothelin-B (BQ788) receptors, (ETAR and ETBR respectively), showed the pericyte response to 10nM ET-1 was due to ETARs. Immunohistochemistry confirmed the presence of ETARs on all subclasses of pericyte. Thus, ET-1 induced Ca2+ signalling in pericytes of the rat ureter microvasculature is mediated by ETARs. This study supports a contractile role for arteriolar and venular, but not capillary pericytes.


## Audit on the peripheral arterial disease referrals from primary care


Wajiha Zahra
Co-authors: Alexander Richard



Abstract

Peripheral Arterial Disease (PAD) is the narrowing or occlusion of the peripheral arteries, affecting the blood supply to the lower limbs, leading to intermittent claudication, typically caused by atherosclerosis.

Risk Factors - Smoking, Diabetes, Obesity and High Blood Pressure

Aims
To audit referrals to the Vascular team in Hull Royal Infirmary from primary care

Compliance of the referrals to NICE guidelines

To identify areas of improvement

STANDARD NICE AUDIT TOOL:
1.1 Information requirements
1.2 Secondary prevention of CV disease
1.3 Diagnosis
1.4 Management (NICE Guidelines- 2018)

Method

- 3 months of data collection (Oct'17- Jan'17)
- Standard - NICE audit tool for primary care
- Used GP referral letters and patient interviews

Inclusion criteria:

- First Clinic referral
- Must have attended clinic appointment
- Symptoms of intermittent claudication

Results

- BASICS
- Demographics-30 patients in total (17 male and 13 female)
- Average age 68 (min 28 and max 94)
- Diagnosis - History of intermittent cluadication-100%

Signs and symptoms of claudication- 97%

ABPI done prior to clinic- 30%

SECONDARY CARE PREVENTION

| | ANTI-PLATELETS | STATINS | ANTI-HYPERTENSIVES | DIABETES |
|---|---|---|---|---|
| STARTED | 53% | 47% | 57% | 17% |
| PRE-GP | 10% | 7% | 7% | 20% |
| NOT-APPLICABLE | - | 4%* | 7% | 60% |

*Intolerant

Smoking cessation advice: 86% of those who smoke were given advice (43% of the total)

Information requirements:
Oral information given 27%
Written information given 7%

Conclusion

- GP groups follow most of the NICE guidance
- Positive outcomes
- Recognising the signs, symptoms and need for referral to secondary care or specialist services
- Diabetes and hypertension medication

- Giving smoking sensation advice
- Opportunities for improvement
- Use of ABPI
- Prescription of Antiplatelets and statins
- Providing Information to patients
- LIMITATIONS:
- Sample size
- Resources to complete the study
- Detail within GP letters
- Reliability of patient memory
- Recommendations
- Exploring the feasibility of open access to ABPI in the community.
- Re-audit in future

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## The use of Entresto in heart failure


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Co-authors: Peter Carey


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Abstract

Introduction and aims
Entresto is a combination of sacubitril and valsartan. It is indicated for the treatment of symptomatic chronic heart failure with reduced ejection fraction. The NICE guidelines recommend the use of entresto, in patients with chronic heart failure. The PARADIGM-HF trial supported the replacement of ACE inhibitors or ARBs with entresto in the management of these patients.

General Practitioners (GPs) in Burton-on-Trent have shown to be reluctant in prescribing entresto due to it being a newer drug and its potential side effects. The aim of the Quality Improvement Project (QIP) was to provide evidence to GPs to support the use of entresto.

Method
A retrospective study was carried out on 43 patients at Queen Hospital Burton. These patients are currently or were on entresto.

Results
From the 43 patients, 36 tolerated entresto. 8 patients discontinued the use of entresto due to the following reasons: 1 patients' GP was unable to prescribe the medication; 3 experienced dizziness; 1 complained of headaches; 1 had altered renal function and 2 patients generally felt worse.

Out of the 43 patients, 38 had 0 hospital admissions since starting entresto, 4 patients had 1 hospital admission and 1 patient had 3 hospital admissions. 2 of the patients died post use of entresto, both suffering from severe heart failure and other co-morbidities.

Conclusion
Most patients, 84% tolerated entresto well. Up until now, 88% of patients on entresto have had no hospital admissions since. From the data collected, it is evident that entresto is decreasing both hospital admissions and mortality.

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## Outcomes in a diabetic foot clinic following incorporation of vascular surgery

Mr Rajab Khan


Abstract

Introduction
The multi-disciplinary high risk foot clinic in Salford Royal Infirmary is recognised by NICE as an example of excellence in practice. The new addition of vascular surgery and acceptance of STAMP guidelines has led to a move towards more urgent assessment and treatment of patients presenting with critical limb ischaemia.

Methods
241 patients seen by the vascular surgeon in the high risk foot clinic were assessed. Further subgroups were formed and analysed. 133 patients who underwent imaging and of those the 29 requiring further imaging. The final subgroup was individuals who underwent an intervention. The chameleon system, ICE and vascular laboratory were meticulously scrutinised to recover demographic and consultation outcomes for the aforementioned groups.

Results
The average age of patients seen in the clinic was 69.5 years with 48.2% having diabetes mellitus and 69.3% were male. Duplux was the most common imaging modality accounting for 69%. Of the patients imaged, 20% (n=15) were imaged within 7 days and 37% (n=28) had a wait time in excess of 28 days. Only 2 of 12 patients, who underwent an ultradistal bypass, were successfully enrolled in graft surveillance.

Conclusions
A duplux scan of every patient's bypass should be undertaken in accordance with local protocol. If this is not available then the patient's bypass should be surveyed at 1 month, 3 months, 6 months and 12 months. Efforts are to be made to ensure that patients treated at individual trusts, in the Greater Manchester area, are enrolled in a wider uniform database. Finally, non-diabetic patients should continue to be seen in the high risk foot clinic.

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## Effectiveness of a training programme to teach point-of-care vascular ultrasound for the detection of peripheral arterial disease in diabetes

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Abstract

Background
Peripheral arterial disease (PAD) is a major independent risk factor for adverse outcomes in diabetic foot disease. However, there is an unmet need for an accurate bedside screening test for PAD detection in diabetes. The 'podiatry ankle duplex scan' (PAD-scan) is a focused duplex ultrasound (US) scan of the anterior and posterior tibial arteries that can be performed by frontline healthcare workers to screen for PAD.

We aim to evaluate the effectiveness of a structured 8-week training programme to teach the PAD-scan to healthcare professionals at the frontline of diabetic foot care. We hypothesise that this programme will instil competency in performing the PAD-scan.

Methods
Five podiatrists and one diabetologist with no previous practical US experience underwent an intensive one-day course, followed by supervised and then independent in clinic patient scanning. Supervised scans were timed, assessed for agreement and evaluated for technical performance. At the end of the programme, theoretical knowledge and practical performance of the PAD-scan were again assessed.

Results
Significant improvements were observed for time ($p<0.05$) and technical performance ($p<0.05$) during supervised scanning. Perfect agreement ($k=1$) for waveform interpretation was achieved by supervised scan number 11. At the end of the programme, all participants demonstrated adequate knowledge and performed the PAD-scan competently on a patient.

Conclusion
The PAD-scan is readily learned and can be performed competently, quickly and accurately at the bedside after a structured 8-week training programme in a cohort of novice healthcare professionals.