Early duplex surveillance following deep venous stenting for the treatment of post-thrombotic syndrome can predict patients at greatest risk for re-intervention

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Background

Endovascular treatment of post-thrombotic syndrome using nitinol venous stents is associated with symptomatic improvement, but ~40% require re-intervention. We examined whether ultrasound surveillance was sensitive for re-intervention, and whether it was possible to predict patients at greatest risk of re-intervention.

Methods

Stent patency was assessed between 2012-2017 using duplex ultrasonography 24hrs, 2wks, 6wks, 3mths, 6mths, 1yr and yearly post-intervention. Maximum in-stent stenosis was calculated, with re-interventions performed when stent diameter reduction was >50%. Patient demographics were collected to determine which factors were associated with re-intervention.

Results

Cumulative patency was 167/194 (86%). 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 surveillance in 70/79 (87%) cases, and this was driven by scan results rather than symptom change. At 6wks, maximum 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, maximum in-stent stenosis between 30-50% at 6wks was associated with a higher risk of re-intervention at 6mths (HR 29.90; p=0.002, 95% CI [3.519-253.989]).

Conclusions

Ultrasound surveillance should occur at frequent intervals up to 3wks post deep venous stenting. Surveillance at 6wks could be used to differentiate between patients that require further surveillance before 6mths. These may include patients with maximum in-stent stenosis between 30-50% at 6wks and patients with stents crossing the inguinal ligament.
Validation of the Global Anatomic Staging System (GLASS) using the BASIL-1 best endovascular therapy cohort

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Background: Global Anatomic Staging System (GLASS) is a new anatomical staging system proposed in the Global Vascular Guidelines (GVG) on Chronic Limb Threatening Ischaemia (CTLI) that aims to correlate the angiographic pattern of disease with immediate technical failure (ITF) and clinical outcomes following infra-inguinal endovascular revascularisation. We aimed to clarify the relationship between GLASS, ITF and clinical outcomes in the Bypass versus Angioplasty in Severe Ischaemia of the Leg (BASIL-1) trial.

Methods: We examined the relationship between ITF, amputation free survival (AFS), limb salvage (LS), and major adverse limb events (MALE) in 213 patients (43% diabetes) who underwent angioplasty (n = 159, femoro-popliteal [FP] only; n = 54, infra-popliteal [IP] ± FP) as their first revascularisation procedure in BASIL-1 and in whom baseline angiograms were available for GLASS staging.

Results: There were 43, 54, and 116 patients in GLASS stage I, II, and III respectively. GLASS stage and diabetes were predictors of ITF, which occurred in 22% of patients. In the FP only group, GLASS stage III was associated with significantly worse AFS (vs stage I, p=0.04), LS (vs stage II, p=0.03) and MALE (vs stage I, p=0.05). There was no relationship between these outcomes and GLASS in the IP ± FP group.

Conclusion: This is the first study to attempt to validate GLASS in a cohort of CTI patients undergoing infra-inguinal revascularisation and suggests GLASS may be a useful predictor of ITF and longer-term clinical outcomes so allowing better choice of initial revascularisation procedure and stratification of patients.
Use of AngioJet pharmacomechanical thrombectomy during the treatment of iliofemoral deep vein thrombosis, reduces overall dose and exposure to lytic therapy

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Background:
Use of catheter-directed thrombolysis (CDT) for the treatment of acute iliofemoral deep vein thrombosis, may reduce the incidence of post-thrombotic syndrome, but carries the risk of major haemorrhage. We aim to assess whether addition of pharmacomechanical AngioJet thrombectomy, can minimise exposure to potentially dangerous lytic agents, while maintaining a beneficial patient outcome.

Methods:
A retrospective analysis of all cases of acute ilio-femoral DVT presenting to a tertiary centre between 2011 and 2017. Outcome measures included lysis duration, dose of lytic therapy, complication rate, incidence of post-thrombotic syndrome, and venous patency.

Results:
81 patients were treated with CDT versus 70 with AngioJet thrombectomy. A decrease in lysis duration, (40hrs (95%CI:34-46) vs. 53hrs (95%CI:49-58) p=0.0001) and in lytic dose ((49mg (95%CI:42-55) vs. 57mg (95%CI:52-61) p=0.007)) were observed with use of AngioJet. Reduction was greatest for cases initially treated with Power Pulse™ AngioJet thrombectomy ((27hrs (95%CI:20-34) and 42 mg (95%CI:34-50)(n=24)). Incidence of haemoglobinuria was increased following AngioJet thrombectomy (18.6% v. 3.7%). One major bleed was observed following CDT. Villalta scores at 6mths and 1yr, were comparable (p=0.28). Primary-assisted and secondary patency was greater amongst patients initially treated with AngioJet versus CDT alone (n=64,p=0.029). Use of Power Pulse™ AngioJet thrombectomy did not confer an advantage when used following 48hrs of unsuccessful CDT (n=10, p=0.001).

Conclusion:
Early use of adjuvant AngioJet thrombectomy can reduce overall dose and exposure to lysis during treatment of iliofemoral DVT, without compromise to patient outcome.
Changes in microcirculation following percutaneous angioplasty in patients with diabetic foot ulcers

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Diabetic foot disease is a condition with increasing worldwide prevalence. Diabetes mellitus (DM) affects the regulation of vascular tone and response to trauma of the skin's microcirculation, increasing the risk of ulceration. How microcirculatory function changes following percutaneous angioplasty (PA) and during ulcer healing is poorly understood. This pilot study aims to examine this.

Patients with DM and active foot ulceration were recruited from diabetic foot clinics into one of two cohorts. Group One (G1) had significant peripheral arterial disease (PAD) requiring PA and group Two (G2) had no significant PAD. At recruitment and prior to the procedure, the patients' pedal microcirculation was examined using laser Doppler fluxmetry. The main parameter examined was time to maximum flux (TtM) following a three-minute occlusion of the affected limb. These measurements were repeated monthly until the ulcer healed.

Nine patients were recruited to G1 and fourteen to G2. Six patients had healed by the end of the study in both groups. In G1, there was a reduction in the TtM following PA. At last visit, on the study toe, TtM had significantly reduced from 210.5s (72.18-231) to 50.71s (27.38-105.18, p=0.046) in those who healed. In G2, on both the study toe and dorsum, there was an increase in TtM (study toe, 13.40s (6.33-73.85) to 64.43 (22.05-114.20), p=0.028).

PA appears to be related to significant improvement in microvascular reactivity. The increase in TtM in patients without PAD may be related to a reduction in inflammation following healing. A higher powered study is required.
The incidence of venous outflow obstruction as a complicating factor of Retroperitoneal Fibrosis

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Background:

Iliocaval compression in retroperitoneal fibrosis (RPF) can result in lower limb swelling, discomfort, skin changes or tissue loss. If there are significant symptoms then intervention is often indicated.

This study reports a tertiary centre’s experience of managing patients with iliocaval disease in RPF.

Methods:

A retrospective analysis of all patients presenting to a tertiary unit (from January 2013 to January 2018) with a diagnosis of RPF was performed from computerised records. Data was analysed for demographics, interventions, stent patency and procedural complications.

Results:

A total of 213 patients with RPF were identified of which 18/213 (8.4%) had iliocaval occlusion as a consequence. The median age of the 18 patients was 60 years (range 47-83 years) of which 11/18 (61%) were male.

Seven (39%) have undergone IVC reconstruction. A double barrel technique with Veniti Vici™ stents was used in 5/6 patients and Sinus XL™ was used if the stent extended into the supra-hepatic IVC in 2/6.

The occlusion was successfully crossed in 6/7 (86%). One year primary, primary-assisted and secondary patency are 67%, 100% and 100% with a median follow up of 15 months (range: 2 months to 27 months).

Significant symptomatic improvement was noted in all patients who underwent treatment with resolution of swelling in all and complete resolution of back pain in 2/7.

Conclusion:

IVC involvement is a rare but significant complication of RPF. IVC reconstruction is technically feasible and can lead to significant symptomatic improvement with acceptable patency in these patients.
Current methods for assessing peripheral arterial lesions do not predict functional and haemodynamic significance

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BACKGROUND

Peripheral arterial disease (PAD) is treated using visual estimation of lesion severity by CT angiography (CTA) and haemodynamic significance on duplex ultrasound (DU). In coronaries, Fractional Flow Reserve (FFR) assesses the functional severity of lesions to inform revascularisation. We related FFR to current standards for assessing peripheral arterial lesions.

METHODS

Patients with short distance claudication (IC) and critical limb ischaemia (CLI) underwent CTA and DU. Four blinded specialists determined likelihood of lesion significance on CTAs. During angioplasty/stenting, 0.014” dual-sensor guidewires (ComboWire XT®, Phillips-Volcano) were used to measure resting trans-stenotic pressure (Pd/Pa) and FFR by provoking hyperaemia with intra-arterial adenosine. Quantitative Vessel Analysis (Innova IGS, GE Healthcare) was used to analyse %diameter stenosis on intra-operative angiograms (IA DS%).

RESULTS

51 (iliac:22, femoral:29) stenoses in 41 patients with IC (n=30, 59%) and CLI (n=21, 41%) were evaluated. Specialists agreed on haemodynamic significance in only 47% of lesions, with large inter-observer variability (k=0.298 [95% CI, 0.11-0.48]; p<0.005). The median IA DS% was 61% (IQR 48-75%). Pre-treatment median Pd/Pa and FFR were 0.91 (IQR 0.78-0.97) and 0.70 (IQR 0.52-0.87), respectively. DU (R²=0.25; p<0.05) and IA DS% (R²=0.15; p<0.04) correlated poorly with FFR. Measuring FFR unmasked haemodynamic significance in 68% of lesions. The FFR improved significantly after angioplasty/stenting [0.91 (0.80-1.00), P<0.0001].

CONCLUSIONS

FFR may better indicate the functional significance of lower limb lesions than current tools. Clinical trials will determine whether FFR will become, as it has in the coronary circulation, the gold standard for making treatment decisions.