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| Clinical Protocol **venous Insufficiency DUPLEX** | |
| **SETTING** | Vascular Science Unit |
| **FOR STAFF** | Clinical Vascular Scientists |
| **PATIENTS** | Patients referred for a venous insufficiency duplex |
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**INTRODUCTION**

A venous insufficiency duplex is a B-mode, colour and spectral Doppler investigation of the deep and superficial veins of the lower limb. The aim is to assess for venous incompetence, locate incompetent perforators and assess suitability for different treatment options (eg foam sclerotherapy, endothermal ablation).

**This protocol should be read in combination with the Vascular Science generic protocol which covers preparation, patient communication, environment, equipment, workforce, health & safety, infection control and equality & diversity.**

**NICE GUIDELINES**

**NICE clinical knowledge summaries for varicose veins (February 2020) states [1]:**

* **Duplex ultrasound provides both anatomical and haemodynamic data on the functioning of the superficial and deep venous systems**
* People with varicose veins who are seen by a vascular service should be assessed with duplex ultrasound to confirm the diagnosis of varicose veins and the extent of truncal reflux, and to plan treatment for suspected primary or recurrent varicose veins

**REFERRAL PATHWAY**

Referrals can be made by vascular consultants and vascular nurse specialists. Referrals can be made from GPs or doctors within the trust following discussion with the vascular science team. Referrals are received through the ICE referral system and triaged by a clinical vascular scientist.

**CLINICAL INDICATION**

* Chronic leg swelling
* Leg pain or discomfort, particularly after prolonged standing
* Skin changes (hyperpigmentation and venous eczema)
* Venous ulceration
* Spontaneous bleeding from a varicose vein site
* Venous claudication
* Recurrent superficial thrombophlebitis
* Visible varicose veins
* Post venous intervention

**CONTRAINDICATIONS**

There no known major contraindications of a venous insufficiency duplex.

**LIMITATIONS**

* Obesity
* Severe oedema/swelling
* Dressings, open wounds, casts, frames
* Patient discomfort
* Limited patient mobility/compliance
* Patient unable to stand
* Examination performed with the patient in a chair
* Patients who are unable to cooperate due to reduced cognitive functions e.g. Alzheimer’s or dementia and through involuntary movements
* Examinations undertaken portably at the patient’s bedside maybe limited due to equipment and room dimension

**EQUPIMENT SPECIFICATION**

*For accessory equipment, maintenance, QA, calibration and ultrasound safety please refer to the generic vascular Science protocol.*

GE Logic 9 ultrasound machines are used for a venous insufficiency duplex. The 5-9MHz linear array and 6-15MHz matrix linear array transducers are routinely used. The curvilinear array transducer can be used when necessary (eg for swollen/larger limbs). The lower extremity venous (LEV) pre-set should be used as standard.

All equipment has regular safety checks and maintenance.

**PREPARATION**

*For test preparation applicable to all assessments please refer to the generic vascular Science protocol.*

**PATIENT COMMUNICATION**

*For patient arrival and waiting time and introduction, information and consent please refer to the generic vascular Science protocol.*

**Clinical history, presenting symptoms and risk factors**

The written referral for the investigation should contain a relevant clinical history. This should be confirmed and clarified with the patient prior to the starting the examination. A relevant venous insufficiency clinical history should be taken including:

* Presenting symptoms – character, onset, duration, severity and progression
* Previous history of deep vein thrombosis (DVT) or superficial thrombophlebitis
* History of lower leg ulceration
* History of or current intravenous drug use
* Previous varicose vein treatment

**STANDARD OPERATING PROCEDURE**

Please see the venous insufficiency duplex SOP

**VENOUS AUGMENTATION TECHNIQUE**

In general, a single vascular scientist can perform adequate venous augmentation with one hand by squeezing the calf or foot.

If adequate venous augmentation cannot be achieved by a single vascular scientist, a second vascular scientist or vascular science associate should assist in the scan by using both hands to perform a calf/foot squeeze to produce adequate venous augmentation. Common examples of when two persons are required are:

* Large circumference leg
* Firm/hard leg
* Ulceration/skin breaking
* Patient in an sub-optimal position (eg. due to limited mobility)

**REPORTING**

The venous insufficiency duplex is reported on CRIS and the vascular science database. The standardised CRIS report template and reporting phrases should be used where possible (see appendix 1 and 2). Additional comments can be added when necessary.

All reports should include:

* Type of scan ‘LOWER LIMB VENOUS DUPLEX (INCOMPETENCE)’
* Symptoms and relevant clinical history (as stated above)
* Clinical report – see below
* Name of Vascular Scientist performing scan
* VSU contact phone number

**Clinical report**

The following veins should be assessed:

* Common Femoral Vein
* Femoral Vein (thigh)
* Popliteal Vein
* Greater saphenous vein (including the sapheno femoral junction)
* Short saphenous vein (including the sapheno popliteal junction)
* Any other superficial veins (if present)

The report should comment on the following for each vein stated above:

* The presence/absence of phasic flow (in the common femoral vein CFV)
* The presence/absence of thrombus
* Competent/ incompetent (see criteria in table 1)
* ***If an incompetent vein:*** 
  + The length of reflux (see criteria in table 1)
  + The location and extent of the incompetent section
  + If the vein is straight/uniform or tortuous (superficial veins only)
  + The depth and diameter (superficial veins only)
  + Presence of any large incompetent perforators

**Table 1. Reporting criteria**

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| **Length of reflux** | **Interpretation and reporting phrase** |
| <0.5 seconds | Competent |
| 0.5-1 second | INCOMPETENT (mild reflux 0.5 – 1 seconds) |
| >1 seconds | INCOMPETENT (reflux of > XX seconds) |

* If a vein is not present, possibly due to previous vein stripping, this should be clearly noted in the report
* If an acute thrombus is seen then proceed to perform a full lower limb DVT scan – please refer to the lower limb DVT protocol and SOP
* Any significant/incidental findings should be documented, reported and acted upon appropriately
* Any poor views, limitations or low confidence findings should be clearly stated in the report

**Urgent findings**

If an incidental urgent finding is found the referring clinician should be contacted via email or phone call.

The most common incidental finding on a venous insufficiency scan is an acute DVT or superficial thrombophlebitis. The referring clinician should be contacted immediately to arrange onwards patient management.

**RELATED DOCUMENTS AND PAGES**

Venous insufficiency Operating procedure

Vascular Science generic protocol

Bristol, Bath and Weston Vascular Network Standard Operating Procedures for Clinical Vascular Scientists

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| **Table A** | |
| **REFERENCES** | NICE CKS: varicose veins. Last revised in February 2020 |
| **RELATED DOCUMENTS AND PAGES** | Venous insufficiency Operating procedure  Vascular Science generic protocol  Bristol, Bath and Weston Vascular Network Standard Operating Procedures for Clinical Vascular Scientists |
| **AUTHORISING BODY** | Vascular Science Unit |
| **SAFETY** | Please referrer to the VSU health and safety policy |
| **QUERIES AND CONTACT** | Vascular Science Unit  A225  Bristol Royal Infirmary  Upper Maudlin Street  Bristol, BS2 8HW  Tel: 0117 342 7530  Email: VSU@uhbw.nhs.uk or uhb-tr.vascular-science@nhs.net |

**Appendix 1 – Report Template**

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| Phrase: ULVIN  VSU VV normal | LOWER LIMB VENOUS DUPLEX (INCOMPETENCE)  SYMPTOMS:  RIGHT LEG DEEP VEINS:  The common femoral, femoral and popliteal veins were competent and compressible with phasic flow  RIGHT LEG SUPERFICIAL VEINS  The sapheno-femoral junction and greater saphenous vein were competent  The sapheno-popliteal junction and the short saphenous vein were competent  LEFT LEG DEEP VEINS  The common femoral, femoral and popliteal veins were competent and compressible with phasic flow  LEFT LEG SUPERFICIAL VEINS  The sapheno-femoral junction and greater saphenous vein were competent  The sapheno-popliteal junction and the short saphenous vein were competent  Scanned by:  NB: the adjective "distal" is used to indicate the part of the vein furthest from the heart, whereas "proximal" is nearest the heart  Any queries please contact Vascular Science on 0117 34 27530. |

**Appendix 2 - Report phrases**

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| Phrase: ULVIP  VSU VV phrases | The common femoral, femoral and popliteal veins were INCOMPETENT (reflux of XX) but compressible with phasic flow  The sapheno-femoral junction and greater saphenous vein (GSV) were INCOMPETENT (reflux of XX)  The GSV was predominately STRAIGHT AND UNIFORM throughout with a diameter and depth of:  Upper thigh: DDcm diameter DDcm depth (in fascia)  Mid thigh: DDcm diameter DDcm depth (in fascia)  Lower thigh: DDcm diameter DDcm depth (in fascia)  Upper calf: DDcm diameter DDcm depth (in fascia)  Mid calf: DDcm diameter DDcm depth (in fascia)  Lower calf: DDcm diameter DDcm depth (in fascia)  The sapheno-popliteal junction and the short saphenous vein (SSV) were INCOMPETENT (reflux of XX)  The SSV was predominately straight and uniform throughout with a diameter and depth of:  Upper calf: DDcm diameter DDcm depth (in fascia)  Mid calf: DDcm diameter DDcm depth (in fascia)  Lower calf: DDcm diameter DDcm depth (in fascia)  The sapheno-popliteal junction was not identified but the short saphenous vein was competent  The sapheno-popliteal junction was not identified but the short saphenous vein (SSV) was INCOMPETENT (reflux of XX)  The GSV was extremely TORTUOUS throughout with multiple branches and visible varicosities.  The SSV was extremely TORTUOUS throughout with multiple branches and visible varicosities.  No evidence of large incompetent perforators |