

Guidance

Lower Limb Venous Incompetence Duplex Examination Guidance

1 Scope

Local

2 Purpose

To provide guidance on how to perform lower venous incompetence duplex examination scans using current evidence.

3 Definitions

CFV – Common femoral vein

CIV – Common iliac vein

CVS - Clinical Vascular Scientist

EIV – External iliac vein

IVC – Inferior vena cava

LSV – Long saphenous vein

NICE – National Institute for Health and Care Excellence

SFJ - Sapheno-femoral junction

SPJ – Sapheno-popliteal junction

SFV – Superficial femoral vein

SSV – Short saphenous vein

SVT - Society for Vascular Technology for Great Britain and Ireland

4 Introduction

The NICE guidance¹ recommends that a lower limb venous ultrasound scan should be used to determine the extent of reflux and to plan treatment in people with suspected primary or recurrent symptomatic varicose veins.

The primary objective of a lower limb venous incompetence scan is to assess the deep and superficial venous systems of the leg for evidence of thrombosis and reflux, and identify the source of reflux in superficial veins to aid treatment planning.

5 Undertaken by (staff groups)

A CVS who is accredited via the SVT or a trainee who has successfully passed the departmental competency assessment in performing and interpreting lower limb venous incompetence duplex examination scans.

6 Clinical equipment list

Duplex ultrasound scanner with both linear and curvilinear transducers. A low and high frequency probe should be available.

If the patient is unable to stand, a couch capable of tilting by at least 30 degrees should be used.

7 Limitations

- Obesity
- Open wounds
- Casts
- Dressings
- Limited mobility (e.g. unable to stand)
- Patient discomfort (e.g. painful calf which limits augmentation)

8 Chaperones

Chaperone posters are displayed in patient waiting areas advising patients that they may bring a friend or relative into the room with them or request a formal chaperone. All patients have the right to a chaperone if they request one.

As per trust and SVT chaperone guidance documents (see associated documents), it is mandatory to have a formal or informal chaperone present when scanning children under 18. It is mandatory to have a formal chaperone present for patients:

- with communications needs or learning difficulties
- who are intoxicated with drugs or alcohol
- who are unconscious
- where English is not their first language
- who are vulnerable for other reasons not stated.

9 Method

The examination usually consists of scanning the venous system from the CFV to the ankle, or may focus on a specific region as per request.

If flow in the CFV appears abnormal, or circumflex / pudendal veins appearing to be acting as collaterals then the iliac veins and inferior vena cava should be assessed to exclude obstruction.

In most cases the following veins should be evaluated:

- CFV
- SFV
- Popliteal vein
- SFJ
- LSV
- SPJ
- SSV
- Any incompetent tributaries
- Any relevant perforators

If indicated the scan should be extended to include:

- IVC
- CIV
- EIV

The following techniques should be adopted to assess the lower limb venous system using **B-mode, colour and spectral Doppler**:

- Use B-mode to assess compressibility and colour and spectral Doppler to assess phasicity in the CFV.
- Assess competence of the SFV and popliteal vein. Competence should be assessed using colour and spectral Doppler. The release of distal compression or a valsalva manoeuvre should result in cessation of flow as competent valves close. The spectral Doppler trace is used to estimate the degree of reflux. (See section 10).
- Assess the LSV for reflux at the level of the SFJ. Visible branches dividing from the SFJ should also be evaluated for reflux.
- Assess the LSV throughout for patency and competency. The source, location and extent of incompetent segments should be noted, alongside any associated tributaries and branches
- If there is reflux in the LSV or anterior thigh vein, determine whether the vein is straight and within the muscle fascia (suitable for radiofrequency ablation). If superficial to the fascia, assess where it is most superficial.
- Assess the SPJ for reflux if present. The presence and competency of Giacomini vein should also be assessed.
- Assess the length of the SSV for patency and competency. The source, location and extent of incompetent segments should be noted, alongside any associated tributaries and branches.

- Any perforators found to be incompetent should be reported, specifying the aspect of the limb on which they arise, together with the diameter.
- Any varicose veins not linked to the LSV or SSV should be examined to identify other sources of reflux.
- When marking the SPJ pre-operatively, a cross is placed over the junction with a line drawn indicating the path of the SSV to the point where it becomes superficial.

10 Interpretation

ASSESSMENT OF COMPETENCY	
REFLUX DURATION	INTERPRETATION
< 0.5 seconds	Within normal limits
0.5 – 1.0 second	Moderate Reflux
> 1 second	Significant reflux
> 2 seconds	Gross reflux

(Table based on reported criteria^{2,3,4}).

11 Images

As a minimum, the following images should be recorded:

- Spectral trace showing phasicity of the CFV waveform.
- Spectral trace showing SFV, popliteal vein, LSV and SSV competence.
- If the LSV is incompetent, a diameter measurement should be imaged in the thigh.
- Any incompetent perforators with diameter measurements.

Images are stored on a DVD or external hard drive, in a locked filing cabinet in a secure vascular studies unit scanning room.

12 Reporting

A report should be completed and signed on Epic within 24 hours. This will be sent to the referring source and a copy is saved in the imaging section of the patients chart. The report should include:

- The presence / absence of phasic flow in the CFV.
- Which veins have been assessed, the competency of the veins, and the presence / absence of thrombus.

- If the LSV is incompetent, report on whether it is suitable for radiofrequency ablation (straight, in the fascia, diameter measurement, depth if superficial).
- Any anatomical variations (e.g. absence of LSV due to previous surgery.)
- Any limitations (e.g. areas not visualised due to ulceration.)
- If disease is present, a diagram should be included.

Any urgent findings should be communicated to the requesting Doctor immediately.

13 Monitoring and Compliance

Key standards to be monitored:

- That CVS perform lower limb venous incompetence duplex scans in line with this guidance

This will be monitored and carried out by CVS by:

- Departmental audits
- Peer review
- Attending MDT meetings
- Attending vascular surgery audit meetings
- Patient satisfaction surveys

The lead CVS is responsible for overall compliance and follow up of any actions identified.

14 References

1. National Institute for Health and Care Excellence (NICE). 2013. *Varicose Veins in the Legs*, CG168. [online] NICE. Available at: <https://www.nice.org.uk/guidance/cg168/evidence/varicose-veins-in-the-legs-full-guideline-191485261>
2. Baliyan, V., Tajmir, S., Hedgire, S.S.L., Ganquli, S., Prabhakar, A.M. (2016) Lower extremity venous reflux. *Cardiovascular Diagnostic Therapy*. [e-journal] 6 (6) p.533-543. Available at: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5220199/>

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3. Coleridge-Smith, P., Labropoulos, N., Partsch, N., Myers, K., Nicolaides, A., Cavezzi, A. (2006). Duplex Ultrasound Investigation of the Veins in Chronic Venous Disease of the Lower Limbs—UIP Consensus Document. Part I. Basic Principles. *European Journal of Vascular and Endovascular Surgery* 31 (1) p.83-92 Available at: [https://www.ejves.com/article/S1078-5884\(05\)00540-X/fulltext#Definition of venous reflux](https://www.ejves.com/article/S1078-5884(05)00540-X/fulltext#Definition%20of%20venous%20reflux)
 4. Thrush, A. & Hartshorne, T. (2010) *Peripheral Vascular Ultrasound How, Why and When* (3rd Edition). London: Elsevier Churchill Livingstone.

15 Bibliography

Cole, S. E. A. (Ed.) (2001). *Vascular Laboratory Practice - Part IV Lower Limb Venous Assessment*. York: Institute of Physics and Engineering in Medicine.

Pellerito J.S. and Polak, J.F. (2012) *Introduction to Vascular Ultrasonography* (6th Edition). Philadelphia: Elsevier Saunders

Society for Vascular Technology, (2013) Professional Performance Guidelines: Lower Limb Venous Duplex Ultrasound Examination. Available at: www.svtgbi.org.uk .

16 Associated documents

Cambridge University Hospitals NHS Foundation Trust, 2016. *Chaperones: Requirement for use of chaperones*. [online] Cambridge University Hospitals NHS Foundation Trust. Available at: <http://merlin/Pages/Results.aspx?k=chaperone%20policy>

Professional Standards Committee, 2012. *SVT Chaperone Guidelines*. [online] Society for Vascular Technology of Great Britain and Ireland. Available at: <https://www.svtgbi.org.uk/professional-issues/>

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Department of Vascular Surgery

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