Protocols for the evaluation of lower extremity venous reflux: supine, sitting, or standing?

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PURPOSE
Duplex imaging of the lower extremity veins is performed to assess the deep and superficial venous system for the presence of deep or superficial venous incompetence and to document the location and severity of disease. The study includes evaluation of the great saphenous vein (GSV) and small saphenous vein (SSV).

INDICATIONS
A. Chronic leg pain
B. Chronic leg swelling
C. Varicose veins
D. Leg discoloration
E. Ulceration of the lower extremities
F. History of deep vein thrombosis
G. History of superficial venous thrombosis
H. Recurrent varicose veins post surgical procedure
Venous Incompetence: Documentation

Grayscale Images:

Compression images (Supine): Common femoral vein at the SFJ, profunda-proximal, mid femoral vein, popliteal vein, GSV, SSV

Measurements: (Standing)

Great saphenous vein: SFJ, proximal thigh, mid thigh, distal thigh, proximal calf, mid calf
Small saphenous vein: Junction or proximal calf, mid calf.

*Indicate if the GSV or SSV leaves the facial plane, is discontinuous, or has chronic or acute SVT
*Indicate if the SSV does not communicate with the popliteal vein.

Doppler Spectral Analysis

With augmentation and/or Valsalva maneuvers:

Deep veins: Common femoral vein, profunda-proximal, femoral-mid, popliteal vein

Great saphenous vein: Junction, proximal thigh, mid thigh, distal thigh, proximal calf, mid calf

Small saphenous vein: Junction or proximal calf and mid calf

*Duration of reflux is measured on screen using electronic calipers.
Process continued

- Look for branches and perforators (standing)
  - Determine size
  - Origin of branches
  - Communicator veins for perforators
  - Doppler spectral analysis for reflux (don’t forget to measure reflux time)

Process *(Method to our Madness)*

- Evaluate for acute deep or superficial vein thrombosis
  - Grayscale compression
  - Patient position should be supine
- Measure veins
  - Standing for maximum diameter (if patient is unable to stand sitting position)
- Evaluate for incompetence (deep and superficial)
  - Standing
  - Sitting ONLY if patient is unable to stand
- Reverse Trendelenburg at least 15-20 degrees (if other options were attempted)
- Obtain Doppler spectral analysis for reflux (Reflex time needs to be measured)
Interpretation criteria for DVT/SVT

Using Valsalva maneuvers and augmentation distal to the area you are interrogating:

- Less than 1 second of reflux is negative for valvular incompetence
- More than 1 second of reflux is positive for valvular incompetence

*This is our criteria. There are other cut points.
Why Supine, Sitting, or Standing?

Why supine for compression imaging?
- Hydrostatic pressure makes it ergonomically challenging for the sonographer
- Could be false positive for DVT or SVT
- Uncomfortable for the patient

Why should you stand a patient for measurements and reflux testing?
- Veins distend with hydrostatic pressure and your measurements will be most accurate
- Patients often complain that symptoms occur when standing
- Hydrostatic pressure will aid you in testing the vein valve

Why should you sit the patient?
- Used as an alternative dependent position
- When the patient physically can’t stand
- If you tried standing the patient and patient unable to comply

So why are we not standing the patient?
- Ergonomics tops the list
- Physically challenging and some what embarrassing position for the sonographer
- Simply can’t reach the ultrasound system and perform the study
- The patient gets tired
- Valsalva maneuvers can cause patients to get light-headed or nauseated

References


