

LOWER EXTREMITY PERIPHERAL VENOUS SONOGRAM

Recommended Transducer(s)

GE 700: M121L Linear, LA39 Linear, 546 Linear

GE Logiq 9: M12 Linear, 7L Linear

Acuson: 15L8w Linear, 8L5 Linear

In very large patients, it may be necessary to use a lower frequency transducer (i.e. abdominal probe)

A complete examination consists of serial compression studies of the deep veins in the transverse plane using gray scale imaging with Doppler evaluation, as appropriate. The presence of blood-flow is interrogated with Doppler.

Position: Supine with the leg in external rotation. This positioned the entire femoral vein superficial to the femur, facilitating the compression of it. If the patient does not tolerate this position, compression of the mid and distal segments of the femoral vein should be directed laterally towards the femur. As an alternative, bi-manual compression can be performed.

Images:

Transverse: Gray scale: CFV w/o and with compression.
CSFJ w/o and with compression.
Proximal FV w/o and with compression.
Distal FV w/o and with compression.
Popliteal vein w/o and with compression.

Color Doppler Popliteal vein bifurcation.

Sagittal: CFV spectral Doppler with respiratory variation. If no respiratory variation is seen, compare with the other side.
Greater saphenous vein in color Doppler. Try to include at least 2 cm segment of the GSV. Use the direction of the GSV on the transverse image of the GSFJ as a guide to find the optimal scanning angle.
Profunda Vein in color Doppler
Popliteal Vein spectral wave form with ankle compression. If the augmentation response is limited / blunted, compare to other side.

Deep calf veins.

If requested, take the following images in the transverse plane:

Proximal posterior tibial and peroneal w/o and with compression

Mid posterior tibial and peroneal w/o and with compression.

Distal posterior tibial and peroneal w/o and with compression.

Images can be taken in gray scale if the veins are clearly seen (these are usually duplicated). Color Doppler images on the compression studies are often helpful to both the sonographer and radiologist.

Notes:

If the veins are poorly seen (i.e. in large patients), use color Doppler on the compression studies to identify and highlight the vessels. If veins are not compressible, the presence of flow on color Doppler is adequate to exclude an occlusive thrombus.

If a clot is detected on gray scale images or compression study, **no further compression or augmentation** maneuvers are to be done. Evaluate the clot with color Doppler to detect any flow around the thrombus or in it (i.e. recanalization). Complete the remainder of the study using color Doppler only.

If a vein is non-compressible but no clot is visible, evaluate the vein with color Doppler to detect a hypoechoic thrombus. Confirm the absence of flow with **spectral Doppler** (slow flow may not be detected on color Doppler).

Evaluate any areas of focal swelling-mass and focal tenderness-pain for non-vascular pathology (e.g. Baker's cyst, lymphadenopathy, hematoma, aneurysm, etc.).

If a segment of a vein is not visualized, take these additional views:

- Respiratory variation below the non-visualized segment.
- Augmentation across non-visualized segment: Get a spectral waveform above non-visualized segment while compressing the segment distal to it.

For evaluation of venous valve incompetence, do the study with a Valsava maneuver. For the evaluation of the deep veins, do the study at the CFV, proximal SFV, distal SFV and popliteal vein. For superficial vein reflux evaluation, do the study at the GSV near its femoral junction and the LSV near the popliteal junction.