LOWER EXTREMITY PERIPHERAL VENOUS EVALUATION FOR
DEEP VENOUS THROMBOSIS

POLICY: Lower extremity venous ultrasound will be performed with an order from a physician or other qualified clinical practitioner. The examination will be supervised and interpreted by a radiologist or other licensed practitioner who is qualified by reason of training to understand the normal anatomy, pathophysiology of the venous system, and integration of ultrasound with other imaging techniques to optimize the probability of detecting disease.

PURPOSE: To assess the venous anatomy of the lower extremity for the detection of deep venous thrombosis (DVT).

INDICATIONS: Ultrasound of the lower extremity venous system is indicated for patients with signs, symptoms, and/or laboratory evidence of deep venous thrombosis. This examination is an appropriate study for patients with signs of possible venous obstruction or thrombus in symptomatic or high risk asymptomatic individuals, evaluation for deep-vein thrombosis (DVT) in patients with suspected pulmonary embolism, or follow up for patients with known venous thrombosis.

PATIENT PREPARATION: No prep needed.

PROCEDURE: The patient is placed in the supine position with the bed adjusted so the feet are lower than the head to cause venous pooling and easier visualization of lower extremity venous anatomy. The patients can be rolled to either side to better visualize the popliteal and calf veins.

Compression, using real-time imaging should be performed in the transverse plane along the entire length of the vessel under examination, with and without pressure applied to the skin in an effort to completely appose the venous walls. A non-compressible segment of vein should be documented with spectral or color Doppler and documented accordingly.

Bilateral exams are performed from the common femoral to popliteal vein only. If the patient is symptomatic in one or both calves, a more detailed examination of the area of concern is warranted in bilateral exams.

Patient presentation or clinical indication may require protocol adjustments such as a more detailed examination of the superficial venous system.
If a thrombosed GSV is encountered, then the length of the thrombus must be measured. The exact measurement is not necessary in lengthy clots (simply report that it is >5cm). The distance from the thrombus to the saphenofemoral junction should also be measured if it is in close proximity to the junction.

*Current anticoagulation guidelines recommend treatment of greater saphenous vein thrombus if it involves >5cm of length or extends within 3cm of the saphenofemoral junction.*

- American College of Chest Physicians (ACCP) guidelines regarding anticoagulation and management of various thrombotic disorders 2012
  - February 2012; 141(2_suppl) Antithrombotic Therapy and Prevention of Thrombosis, 9th ed: American College of Chest Physicians Evidence-Based Clinical Practice Guidelines

Each venous segment (e.g. CFV, proximal FV, mid FV, etc) should be imaged completely (compression, color and spectral Doppler) and recorded before storing images of the next segment. Images should be labeled RT or LT according to the limb examined and should be labeled as follows:

- Common femoral vein = CFV
- Saphenofemoral junction = SFJ
- Confluence of the femoral vein and deep femoral vein = FV/DFV CONFLUENCE
- Femoral vein = (formerly superficial femoral vein) FV PROX, FV MID, FV DIST
- Popliteal vein = POP
- Posterior tibial veins = PTV
- Peroneal veins = PERON

**Static color images:** Color (or power) Doppler images should be obtained in a plane parallel to the length of the vein being investigated. The pulse repetition frequency should be adjusted to identify slow flow along the vessel wall, while simultaneously minimizing color artifact in surrounding soft tissues. (9 images total)

- Common femoral vein (1 image)
- Sapheno-femoral junction to include the proximal great saphenous vein (1 image)
- Confluence of femoral vein and deep femoral vein (1 image)
- Femoral vein - proximal, middle and distal (3 images)
- Popliteal vein – proximal and distal (2 images)
- Posterior tibial veins (1 image)
- Peroneal veins (1 image)
**Compression cine sweeps:** Compression images should be obtained with the probe perpendicular to the vein axis. Walls of a normal vein should completely coapt. (7 cines total)

- Common femoral vein (1 cine)
- Femoral vein - proximal, middle and distal (3 cines)
- Popliteal vein (1 cine)
- Posterior tibial veins (1 cine)
- Peroneal veins (1 cine)

**Spectral Doppler waveforms:** Spectral wave forms should be obtained with the probe parallel to the vein axis with the patient in quiet respiration. The Doppler spectrum should occupy at least 50% of the image format and the pulse repetition frequency optimized so that the venous waveform occupies at least 50% of the velocity scale. The spectrum sweep should be adjusted to display at least one complete respiratory cycle. (5 waveforms total)

- Common femoral vein (1 waveform)
- Femoral vein - proximal and distal (2 waveforms)
- Popliteal vein (1 waveform)
- **Contralateral** common femoral vein (1 waveform)
  - demonstrate phasicity; if continuous flow is found, investigate for proximal thrombus in the iliac vein and/or IVC