

C-TRACT: Venous Compression Sonogram Requirements Unscheduled Exam

Introduction:

Unscheduled exam; assess for changes from baseline exam. Compression sonogram required for patient presenting with new symptoms.

Only a lower extremity and ilio caval sonogram are required for unscheduled studies.

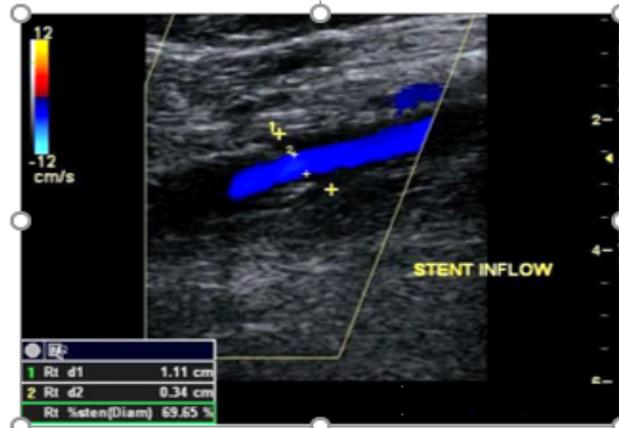
Study Limb Venous Compression Sonogram: Goals for Unscheduled Exams

- Scan from the ilio caval confluence to the popliteal tibial vein confluence.
- Evaluate for patency and changes from pre-procedure exam.
- Document image and waveform from the contralateral common femoral vein.
- Use the same protocol as the 6-month sonogram; assess for patency of the iliac veins, diameter measurements when necessary and document patency of the lower extremity veins with compression every 1-2cm in a transverse view.
- If the vein is not fully compressible (common femoral vein, femoral vein and or popliteal vein) measure the anterior to posterior residual diameter during compression.
- Obtain and document image and waveform from the contralateral common femoral vein (CFV).
- Complete the unscheduled exam submission form and submit de-identified images and worksheet to VasCore promptly.

Iliac Veins – Gray Scale and Color Doppler:

If scheduling allows scan the patient after an 8 hour fast. Place the patient supine with head slightly elevated to minimize muscular rigidity. Select transducer frequency based upon the depth of the vessel. Place the transducer at the level of the umbilicus to identify the ilio caval confluence in a transverse view. Document images and spectral Doppler waveforms from the proximal, mid, distal common iliac vein (CIV) and external iliac vein (EIV). Examine the CIV and EIV for vessel wall motion, compressibility when possible, (some segments of EIV) and respiratory variation. Images must clearly document the absence or presence of any venous disease. If stent present document stent patency and apposition to vein. If the stent is not widely patent obtain diameter measurement comparing the diameter of the stent to the residual diameter (fig. 1). After completing gray scale evaluation of the iliac veins, the spectral Doppler and color Doppler evaluation should commence, from a longitudinal view. The Doppler evaluation of the iliac veins is critical to determine patency since compressibility is limited. Document spectral waveforms from the CIV and EIV. Assess waveforms for spontaneity and respiratory phasicity. Use breath holding techniques to enhance the respiratory variation. Optimize color Doppler to visualize flow patterns and respiratory variation within the iliac veins. If possible, document with cine loop clip. Optimize color Doppler to display vein lumen, avoid color over-write outside vein walls and or the any intraluminal echoes. Document abnormal findings from two views; longitudinal and transverse.

Fig. 1: How to measure residual lumen of stent



Lower Extremity Veins - Compression:

Examine from the saphenofemoral junction to the confluence of the popliteal tibial veins. Document the absence of presence of venous disease at all levels. Veins must fully compress in the transverse view. Use cineloop clips to document compression and release/opening of compressed vein or side by side split screen pre and post compression. This confirms the sonographer did not roll off the vein during the compression maneuver. Continue compressions moving inferiorly at 1-2 cm from the saphenofemoral junction to femoral vein and into the popliteal vein. The entire course of each segment should be compressed. If probe pressure does not completely collapse the vein, increased pressure should be used – if the accompanying artery begins to deform then adequate pressure is confirmed. Any area that does not compress must be evaluated from both sagittal and transverse views to determine the reason for lack of compression. If a vein segment does not compress, the gray scale image should be enhanced to identify the absence or presence of low level echoes. If echoes are present where the vein is not compressible, the location and extent of the thrombus, the vessel size, and the absence or presence of flow should be documented (fig.1).

Perform residual diameter measurements, in a transverse view (fig. 2). Document non-compressible segment with and without color Doppler from both longitudinal and transverse view. Optimize settings to detect any low-level echoes (fig. 2). Document spectral Doppler waveforms from all segments. Document respiratory variation at all levels (fig.3). The transducer frequency should be selected based upon the depth of the vessel. Attention should be paid to ensuring patient comfort to minimize muscular rigidity during external compression with the probe. Compare CFV waveforms; assess for symmetry. Document one image and waveform from the contralateral CFV. Document images and waveform from the contralateral CFV. Assess for patency and symmetry of waveforms.

Fig. 2: Non-compressible segment; how to measure the diameter and set gain level to display intraluminal echoes

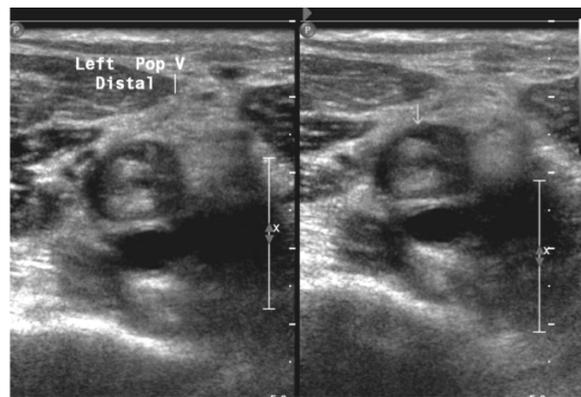
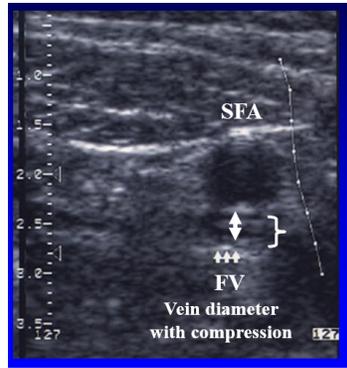
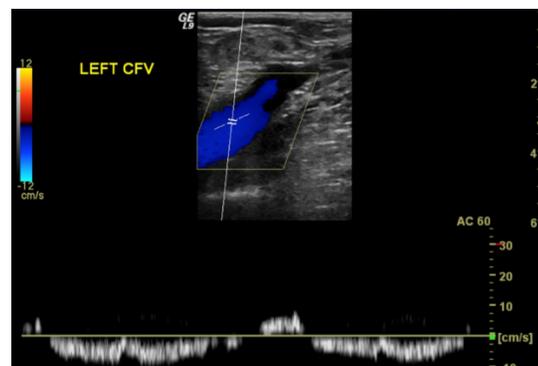


Fig. 3: Phasicity documented with spectral Doppler



From a longitudinal view, place the Doppler sample within the lumen of the vein. Not necessary to measure the Doppler angle however angles over 60 degrees are not acceptable. Assess venous flow for spontaneity, respiratory phasicity and if necessary use augmentation to document variation.

Characteristics of a normal venous Doppler signal are:

- 1) Spontaneous: Blood flow present without augmentation maneuvers
- 2) Respiratory phasicity: Blood flow velocity changes with respiration or valsava
- 3) Augmentation: Blood flow velocity increase with distal limb compression or with release of proximal limb compression.

Interpretation of Ultrasound Exams:

Exam interpretation will be based on the following criteria: 1) compression unequivocally excludes the presence of thrombus; 2) when compression is limited, such as in the iliac veins, the diagnosis is weighted more heavily on the Doppler waveform findings, symmetry of both common femoral vein waveforms, and the presence of color flow (the absence of color flow by itself does not necessarily indicate DVT or vein occlusion) and comparison between baseline and 6-month sonogram. A test is negative when the vein compresses (the vein walls coapt) when extrinsic pressure is applied; the lumen of the vein is echo-free; and the venous spectral Doppler waveforms and color Doppler document normal flow patterns and normal color filling.