Peripheral Doppler:
Lower Extremity Venous

Indications

- Evaluation for venous thrombosis or obstruction in symptomatic or high-risk patients
  - Swelling of the leg or along a vein in the leg
  - Increased warmth in the leg in an area of swelling
  - Pain/tenderness in the leg or positive Homan's sign
  - Redness or discoloration of the skin of the affected leg
  - Palpable cord
  - Elevated D-dimer
  - Fever
  - History of PE
  - Recent surgery or trauma; immobilization
  - Pregnancy and hormones (OCP, HRT)
  - History of malignancy
  - Hereditary conditions
- Follow up evaluation for residual thrombosis prior to the end of anticoagulation therapy
- Assessment for dialysis access or venous access
- Assessment for venous insufficiency, reflux, or varicosities
- Venous mapping

Equipment

- Linear or curvilinear transducer
  - 5 MHz or higher

Patient Position

- Supine with slight head elevation
- External rotation of leg and slight flexion of the knee

Patient Prep

- None

Evaluation

Transverse With & Without Compression

- CFV (Common Femoral Vein) superior to GSV (Greater Saphenous Vein) thru Pop V (Popliteal Vein) Distal
  - Evaluate coaptation throughout length of vessels
  - Include GSV junction and proximal Profunda Vein
- PTV (Posterior Tibial Veins) & Peron V (Peroneal Veins) from ankle to knee
  - Evaluate coaptation of paired PTV and Peron veins

PW Doppler

- CFV superior to GSV thru Pop V
  - Evaluate each segment using PW Doppler
    - Place cursor in center of vessel
  - Document
    - Spontaneity
    - Phasicity
    - Augmentation (CFV Only)
- PTV (2) & Peron V (2)
  - Not necessary to do PW Doppler

Color Doppler

- CFV superior to GSV thru Pop V
  - Evaluate Color Doppler fill of vessel lumen
    - Angle color box with vessel
  - Evaluate any area of thrombus using simultaneous split screen w/ color and gray scale and/or Bflow
  - Decrease color scale and/or use Power Doppler for areas of potential occlusion
- PTV (2) & Peron V (2)
  - If clot or not well visualized
    - Evaluate Color Doppler fill of vessel lumen
      - Angle color box with vessel
      - Augment foot if necessary
    - Decrease color scale and/or use Power Doppler for areas of potential occlusion

Contralateral CFV (Unilateral request)

- PW Doppler

Peripheral Doppler:
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Images

Transverse Compression

- Cine clip
  - CFV (superior to GSV) thru Pop V
  - 1-3 clips as needed demonstrating compression
- Split screen with & without compression
  - PTV(2) and Peron V (2)

If unable to obtain cine clip due to body habitus, edema:

Split Screen with & without compression

- CFV superior to GSV
- CFV & GSV junction
- FV (Femoral Vein) Proximal
  - Profunda Vein Proximal
- FV Mid
- FV Distal
- Pop V
- PTV (2)

Longitudinal Color and Pulse Wave (PW) Doppler

- CFV superior to GSV
  - Augmentation, *if needed*
    - Must be done below Pop V
- GSV at junction
  - *Color only*
- FV Proximal
- Profunda Vein Proximal
  - *Color only*
- FV Mid
- FV Distal
- Pop V
- PTV (2)
  - *Color only if clot or non visible on compression*
- Peron V (2)
  - *Color only if clot or non visible on compression*

IF UNILATERAL STUDY ORDERED:

- **Contralateral CFV**
  - **Color & PW Doppler only (1 image)**
    - **Label side and "*Contralateral Comparison*"**
  - **Change to bilateral and perform complete study if DVT found**

Peripheral Doppler:
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Additional Information

- Positive DVT
  - Evaluate areas of suspected thrombus (non-compressing vein) using low flow Color Doppler, Power Doppler, and PW Doppler as indicated above
  - Thrombus
    - Acute: Hypoechoic appearance, dilated vessel, and spongy with compression
    - Chronic: Hyperechoic to isoechoic appearance, contracted vessel, and rigid with compression; may see collateralized flow
    - Non-occlusive: Partial compression and maintained Color and PW Doppler signal (normal or abnormal)
    - Occlusive: Non-compressible and absent Color and PW Doppler signal
  - Document location and extent of thrombus
    - May require imaging of iliac vein and IVC
  - Document thrombus in GSV and distance from CFV
  - Document lack of spontaneous flow or absent flow using Color and PW Doppler with augmentation
  - Interrogate any additional areas patient complains of pain

- PW Doppler
  - Spontaneity
    - Venous signal detected without augmentation
  - Phasicity
    - Signal variation with respiration (stops w/ inspiration and hold)
  - Augmentation
    - Velocity increase w/distal augmentation
  - Competency
    - Venous flow stops with Valsalva

References

- ACR-AIUM-SPR-SRU Practice Parameter for the Performance of Peripheral Venous Ultrasound Examination https://gravitas.acr.org/PPTS/GetDocumentView?docId=58+&releaseId=2
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