

	US Peripheral Venous		
	Reviewed:	Date: 4/11/2024	
	Revised:	Date: 4/11/2024	

PURPOSE

Practice parameter for the performance of diagnostic ultrasound of the peripheral venous system including upper and lower extremities.

SUPPORTIVE DATA

- Obtain a written, verbal, or electronic order from provider
- Verify that written orders are scanned into Epic
- Previous relevant imaging procedures

INDICATIONS

Indication for a peripheral venous system ultrasound examination include but are not limited to:

- Evaluation for suspected deep venous thrombosis (DVT) or venous obstruction
- Serial evaluation for DVT in some high-risk individuals, whose initial exam is negative for DVT
- Evaluation of patients with ilio caval thrombus or occlusion, or asymmetric iliofemoral Doppler waveforms
- To help determine the source of a known pulmonary embolism
- Follow up of patients with known venous thrombosis on therapy who undergo a clinical change and where a change in thrombus burden will alter treatment
- Assessment of venous insufficiency, reflux, and varicosities
- Postprocedural assessment of venous ablation or other interventions

CONTRAINDICATIONS

- There are no absolute contraindications but there may be physical limitations that prevent a complete duplex examination. These include open wounds, recent surgeries, scar tissue, calcification, severe edema, contractures or other causes of mobility.

EQUIPMENT LIST

- Real-time ultrasound scanner with transducer of appropriate frequency
- Gel
- Towels
- Patient gown (if applicable)

SAFETY

- Universal precautions for bodily fluids should be observed as per hospital protocol.
- All ultrasound carts are annually checked and are up to date with all state and manufacturer guidelines.
- Exams will be prioritized according to ordering status (STAT, ASAP or Routine)

PATIENT PREPARATION

- None

PROCEDURE

1. Check provider's orders for reason for exam and any comments.
2. Review report of patient's most recent ultrasound, relevant imaging or relevant labs if applicable.
3. Start exam in Epic
4. Verify patient by 2 patient identifiers (name, DOB, wristband).
5. Process should be explained to patient.
6. Have patient change into gown if appropriate
7. Perform imaging procedure
8. End exam in Epic

IMAGING PROCEDURE

Lower Extremity Venous to rule out DVT

A normal lower extremity venous protocol to rule out DVT will aim to include the following views:

Dual Image:

1. Trans CFV with & w/o compression
2. Trans SFV Prox with & w/o compression
3. Trans SFV Mid with & w/o compression
4. Trans SFV Distal with & w/o compression
5. Trans POP V. with & w/o compression
6. Check calf veins

Post tibialis w + w/o compression

Peroneals w + w/o compression

Augmentation:

1. Sag SFV Mid

Once DVT located check thrombosed vein with color instead of compression in order to avoid causing PE.

If DVT located in CFV check Iliac veins and IVC to determine proximal extent of DVT.

Include information on presence of thrombosis in the greater saphenous vein, size, and proximity to the greater saphenous/femoral junction (so measure and comment on how far it is from the SFJ). This will affect decision to treat or not to treat with anticoagulant therapy.

If patient presents with focal redness and/or pain, check for focal thrombophlebitis in that area in addition to above exam.

Upper Extremity Venous to rule out DVT

A normal upper extremity venous protocol to rule out DVT will aim to include the following views:

1. IJV Color Flow or with and w/o compression
2. Supraclavicular SUBC V. Color Doppler
3. Infraclavicular SUBC V. Color Doppler
4. Infraclavicular SUBC V. spectral PW Doppler to check for phasicity
5. Axillary V. spectral PW Doppler to check for phasicity
6. Brachial V. Prox with and w/o compression
7. Brachial V. Mid with and w/o compression
8. Brachial V. Dist with and w/o compression
9. Basilic V. Prox with and w/o compression
10. Basilic V. Mid with and w/o compression
11. Basilic V. Dist with and w/o compression
12. Cephalic V. Prox with and w/o compression
13. Cephalic V. Mid with and w/o compression
14. Cephalic V. Dist with and w/o compression

Lower Extremity Venous Reflux Protocol

A normal lower extremity venous reflux protocol will aim to include the following protocol:

1. Stand patient up and visually exam legs. Identify the problem: varicose veins, area of pain, wound, or skin changes.
2. Put patient in steep reverse Trendelenberg position and annotate this on image. If you change patient to sitting or standing position note this on image.
3. Compress deep veins to R/O DVT. Image one augment to prove DVT exam was done.
4. Check near source of superficial problem for deep venous reflux. i.e. If varicose veins at distal thigh check distal SFV. Evaluation of all sections (i.e. CFV, SFV, POP) is not necessary. Document 1 image of deep vein competence. Positive for reflux if >1 second reverse flow with spectral Doppler.
5. Document small saphenous vein (SSV) competence at small saphenous popliteal junction (SPJ). Positive for reflux if >0.5 second reverse flow with spectral Doppler. Only need to check rest of SSV for reflux if related to a problem varicose vein/wound.

6. Quickly scan posterior calf to note any obvious problem varicose veins or perforators (>3mm) that are contributing to reflux. Do not dwell on perforators on initial insufficiency exam, these will be re-examined on subsequent exam if more treatment is necessary.
7. Note if Thigh Extension vein (TE) and/or Giacomini vein are present and check at mid thigh for reflux. Note if reflux is coming down from GSV to SSV or from SSV to GSV. (TE vein =cranial extension of the SSV that terminates in a perforating vein(s) but not in GSV. Giacomini vein cranial extension of SSV that communicates with the GSV via the posterior thigh circumflex vein.)
8. Image SFJ with Epigastric vein and check competence with valsalva.
9. If patient has anterior lateral or posterior medial accessory GSVs assess competence. If accessory GSV is incompetent then measure the diameter and the straight length. Segment must be 10 cm or greater for RFA treatment due to length of heating element.
10. Check GSV competence throughout thigh with proximal compression and/or distal augmentation (Valsalva maneuver not recommended). Positive for reflux if >0.5 second reverse flow with spectral Doppler. Measure and document reflux duration, if present.

IF GSV IS INCOMPETENT:

1. Document incompetence with 1 image. No need to assess for competence distally.
2. Measure representative GSV diameter (inner to inner) in proximal, mid, distal thigh and proximal calf. Also measure any focal bulges.
3. Note any large branches or varicose veins (same size as GSV) or other issues that might cause a problem for the RFA catheter.
4. Quickly scan down leg to note any obvious problem perforators (>3 mm). Don't dwell on perforators. If GSV is incompetent it will be treated with RFA first, if RFA treatment is not sufficient another venous exam will be performed to assess treating perforators or other veins.

IF GSV COMPETENT:

1. Document competence with 1 image.
2. If accessory GSV is also competent continue to look for a cause of patient's symptoms. i.e. If a large varicose vein is the problem look for a contributing perforator. Or if a wound is the problem look for perforator or varicose vein deep to wound.

FOLLOW UP VENOUS INSUFFICIENCY EXAM:

1. These exams will be tailored to the patient's continued symptoms post RFA or stripping.
2. A problem perforator will be distal to the disease and show reflux and be > 3 mm. A reentry perforator may be >3mm but will not have reflux and therefore is not the problem. Perforators are positive for reflux if flow reverses for >.35 sec by spectral Doppler or bi-directional colorflow is noted.
3. If a perforator is the source of the problem, measure coordinates so the perforator can be easily located for mapping. For anterior or posterior

4. calf perforators a measurement is taken from anterior surface of tibia to the perforator at the level of the deep fascia and a second measurement is taken from planter surface of the heel to the perforator. For thigh perforator measure from up from knee crease and back from anterior surface of femur.

DOCUMENTATION

1. Written, verbal, or electronic order from provider
2. The worksheet and images need to be scanned into PACS under appropriate exam and put online.
3. Ultrasound images should be labeled with anatomy imaged and orientation (SAG or TRANS)
4. All images are submitted with above documentation for dictation and stored in PACS
5. For all STAT, ER and Urgent Care ultrasound exams, call radiologist for preliminary report to give to ordering provider
6. If it is between 2200 - 0700, submit exam along with proper documentation to teleradiology

REFERENCE

- Approved by Pharmacy and Therapeutics Board on 08/14/2020
- Approved by Medical Executive Team on 09/11/2020
- Approved by Medical Director, Dr. Muneer Desai, on 08/20/2020
- Approved by Radiology Protocol Committee on 3/9/2020
- [ACR Practice Parameters Resolution 29 \(2019\)](#)

References

Reference Type	Title	Notes
Documents referenced by this document		
Referenced Documents	ACR Practice Parameters Resolution 29 (2019)	