

RADIAL ARTERY MAPPING US PROTOCOL

PURPOSE:

- To assess the suitability of the radial artery for use as a conduit for CABG and to assess the patency of the superficial palmar arch.

EQUIPMENT:

- High-frequency 8-15 MHz linear probe

PATIENT PREPARATION & ASSESSMENT:

- Introduce yourself to the patient.
- Verify patient identity via two patient identifiers (name and date of birth) per hospital policy.
- Explain the examination, its purpose and how long it will take.
- Answer any questions the patient may have regarding the examination.
- Obtain patient history including symptoms, signs, risk factors and other relevant history.

GENERAL GUIDELINES:

- Complete assessment of the radial artery includes evaluation of anatomic variants, vessel caliber and degree of vessel plaque and stenoses.
- The patency of the superficial palmar arch must also be assessed.
- Contraindications to use of the radial artery for CABG include non-compressible vessels, the presence of an AV fistula/graft, an incomplete palmar arch, ischemic digits and Raynaud's syndrome.
- Set spectral Doppler gains to allow a spectral window and optimized to reduce artifacts.
- Cursor sample size will be small and positioned parallel to the vessel wall and/or direction of blood flow.
- A spectral Doppler angle of 45-60 degrees or less will be used to measure velocities. Note exceptions to these angles on the technologist worksheet.
- Vessel diameter measurements are taken from outer edge to outer edge.
- Any deviations from the standard protocol and any limitations to the examination should be documented on the technologist worksheet for future reference and for repeatability in follow-up studies.
- Report preliminary critical findings to the referring clinician when appropriate (i.e. immediate medical attention may be warranted) and according to hospital policy.

DOCUMENTATION:

- Document a transverse image at the origin of the radial artery displaying the radial and ulnar arteries side by side. The radial artery origin is normally in the antecubital fossa but can occasionally arise more proximally in the upper arm.

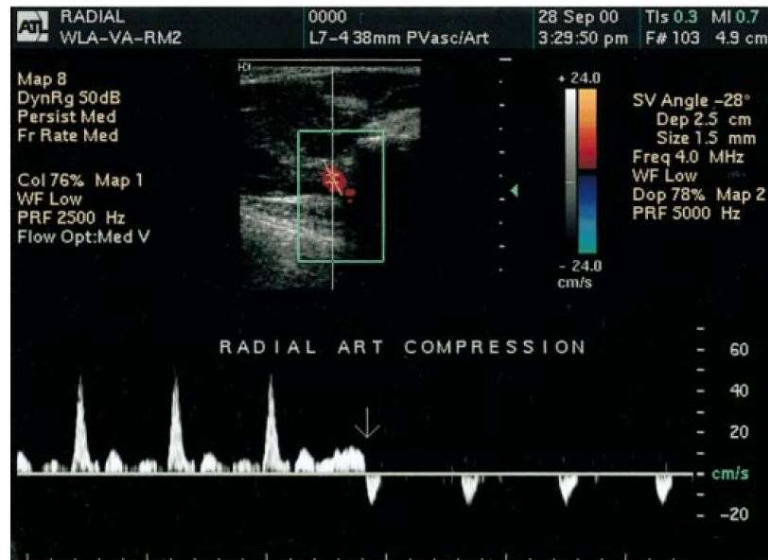
- Document transverse split-screen images without and with measurements AP diameter of the radial artery in the following segments:
 - Immediately distal to its origin
 - Proximal forearm
 - Mid forearm
 - Distal forearm
 - Wrist
- Document longitudinal color and spectral Doppler images with PSV measurements of the radial artery in the following segments:
 - Immediately distal to its origin
 - Proximal forearm
 - Mid forearm
 - Distal forearm
 - Wrist
- Assess the degree of atherosclerotic plaque burden along the length of the radial artery. Document any stenoses with longitudinal color and spectral Doppler images with PSV measurements just proximal to and within the stenoses.

Modified US Allen Test

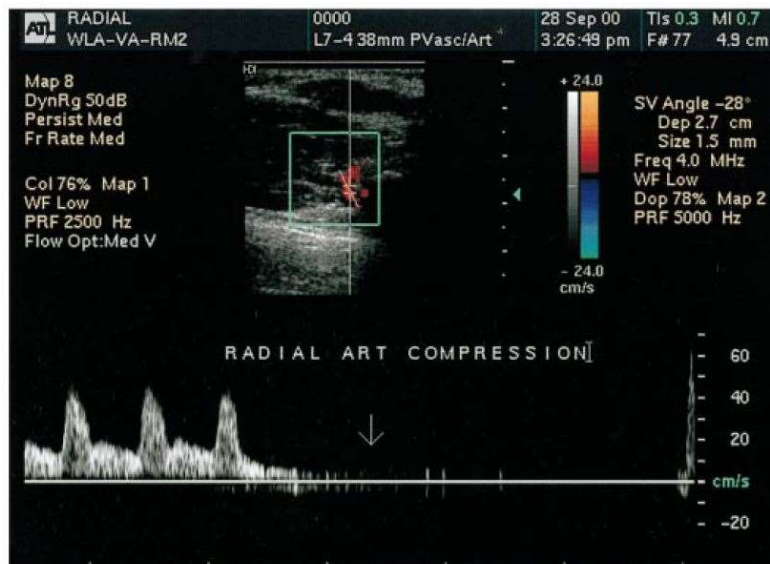
- Used to determine whether or not the superficial palmar arch is complete (patent connection between the radial and ulnar sides of the arch). A complete superficial palmar arch decreases the incidence of hand/finger ischemia if the radial artery is harvested. The superficial palmar arch is complete in approximately 66-94% of individuals.
- Document longitudinal spectral waveforms of the radial side of the arch by insonating in the skin crease at the base of the thumb without and with manual compression of the radial artery at the wrist.



- A complete arch is present when flow in the radial side of the arch reverses during occlusion of the radial artery at the wrist (as collateral flow is provided from the ulnar side of the arch).



- An incomplete arch is present when flow in the radial side of the arch stops during occlusion of the radial artery at the wrist (as no collateral flow is provided from the ulnar side of the arch).



REFERENCES:

- Radial Artery Assessment for Coronary Artery Bypass - https://higherlogicdownload.s3.amazonaws.com/SVUNET/c9a8d83b-2044-4a4e-b3ec-cd4b2f542939/UploadedImages/PPG_Docs/7__Radial_Artery_Assessment_for_Coronary_Artery_By_pass_Updated_2019_.pdf.

- Zimmerman, P., Chin, E. E., Laifer-Narin, S., Ragavendra, N., & Grant, E. G. (2001). Radial artery mapping for coronary artery bypass graft placement. *Radiology*, 220(2), 299–302. <https://doi.org/10.1148/radiology.220.2.r01au40299>.