

UT Southwestern Department of Radiology

Ultrasound – Upper Extremity Arterial Evaluation: Wrist Brachial Index

PURPOSE:

To determine the presence, severity, and general location of peripheral arterial occlusive disease in the upper extremities.

SCOPE:

Applies to all ultrasound upper extremity arterial evaluations with pressures performed in Imaging Services / Radiology

INDICATIONS:

- Arterial insufficiency
- Thoracic Outlet Syndrome
- Raynaud's Disease
- Ischemic ulcer
- Limb ischemia/Digital ischemia
- Follow-up patients with known PAD

CONTRAINDICATIONS:

- Dialysis graft/fistula
- Patients with known acute DVT
- Bandages
- Patients with stents and/or arterial bypass grafts
- Incompressible vessels
- IV/PICC line

EQUIPMENT:

- Parks Flo-lab
- VascuLab
- 5-8 MHz probe
- Cuffs ranging in sizes 2.5-12cm

PATIENT PREPARATION:

- The patient should rest for at least 15 minutes prior to examination
- The patient should lay supine with the heart at approximately the same level as the extremities

EXAMINATION:

GENERAL GUIDELINES:

- The examination must be bilateral unless otherwise contraindicated
- A complete examination includes evaluation of the entire course of the accessible portions of each vessel
- Variations in technique must be documented (i.e., stents)
- Note any prior studies, clinical indications, and relevant history

EXAM INITIATION:

- Introduce yourself to the patient
- Verify patient identity using patient name and DOB
- Explain test
- Obtain patient history including symptoms. Enter and store data page

TECHNICAL CONSIDERATIONS:

- Place 12 cm cuff at the upper arm, 10cm cuff at the wrist, and 2.5 cm cuff on the digits
- Do not perform brachial pressures over Peripheral IV's/PICC lines, grafts, or stents
- Do not perform brachial pressures on the ipsilateral side if the patient has undergone a mastectomy or lymph node dissection
- The cuff should be inflated 30mmHg beyond the last audible Doppler signal
- Gain and image size setting must remain the same throughout the entire exam
- Doppler waveforms must maintain an angle of 45-60 degrees between the skin and the transducer
- Document waveforms as triphasic, biphasic, monophonic, or absent
- If the brachial waveforms are abnormal, evaluate the axillary and subclavian arteries
- The highest wrist pressure is used to obtain WBI by dividing the wrist pressure by the brachial pressure

DOCUMENTATION:

- **Doppler Waveforms:**
 - Radial artery
 - Ulnar artery
 - Brachial artery
- **Segmental Pressures:**
 - Radial artery
 - Ulnar artery
 - Brachial artery
- **Finger Pressures and PPG Waveforms:**
 - Obtain from the 2nd and 4th digits

PROCESSING:

- Review examination data
- Export all images to PACS
- In the event of a significant finding, i.e. acute arterial occlusion, WBI of 0.34 or lower, acute graft occlusion, presence of pseudo aneurysm or A-V fistula, or progression of disease post intervention, the technologist will page the on call IR physician.
- Note any study limitations

REFERENCES:

- Manual of Vascular Diseases. Sanjay Rajagopalan, Debrata Mukherjee, Emile Mohler. Lippincott Williams and Wilkins

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APPENDIX:

A normal WBI is 0.8-1.3

A WBI < 0.7 is indicative of arterial occlusive disease

An absolute finger pressure of < 70 mm Hg is abnormal

CHANGE HISTORY:

STATUS	NAME & TITLE	DATE	BRIEF SUMMARY
Submission	Mark Reddick, MD	6/9/2016	Submitted
Approval	David Fetzer, MD, Director	6/20/2016	Approved
Review			Reviewed
Revisions	Kim Pong, RDMS, RVT	8/16/18	Equipment Add