

## Vascular – Carotid Duplex Ultrasound

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### INDICATIONS:

To evaluate the extracranial carotid and vertebral arterial system for atherosclerosis or Stenosis.

The indications for peripheral venous ultrasound examinations include, but are not limited to:

Carotid bruit, Trauma, pulsatile mass, atherosclerosis, stenosis, enterectomy, stent evaluation, stroke, TIA, amaurosis fugax, vertigo, dizziness, ataxia, diplopia, drop attacks, visual disturbance, paresthesia, syncope, headache, confusion

### Required Images:

A complete examination is always bilateral, unless contraindicated, and includes evaluation of the entire course of the accessible portions of the following arteries: subclavian, common carotid, internal carotid, proximal external carotid, and vertebral.

### **Carotid Duplex Evaluation**

#### **A. Technique:**

Supine position with head tilted away from side of interest. Use a 9 MHz linear transducer. Optimize equipment gain and display settings while imaging vessels with respect to depth, dynamic range, and focal zones. Use proper color scale for color flow images to demonstrate areas of high flow and color aliasing. Set spectral Doppler gains to allow a spectral window and optimize to reduce artifact. Use an angle of 60 degrees or less to measure velocities. Doppler angle should always be parallel to the vessel wall. Plaque should be assessed and characterized as smooth, irregular, homogenous, or heterogeneous.

#### **B. Required Images and documentation bilaterally:**

Gray scale images transverse and longitudinal

- a. CCA: Proximal, mid, and distal
- b. CCA: Bulb
- c. ECA/ICA Bifurcation

One Stand Alone color image and One Separate Spectral doppler image along the long axis of the vessel

- a. Subclavian A.
- b. CCA: Proximal, mid, and distal
- c. CCA: Bulb
- d. Bifurcation color doppler
- e. ECA: Proximal
- f. ICA: Proximal, mid, and distal
- g. Vertebral A.
- Abnormal findings generally require additional images to document the complete extent of the abnormalities.
  - a. Color and angle corrected spectral Doppler imaging may provide additional information including improved visualization of hypoechoic plaque
  - b. Images of moderate to severe plaque should be included
  - c. Areas of suspected stenosis or occlusion should include doppler waveforms and velocity measurements prox, mid and distal to site of interrogation.
  - d. Evaluation of stents, should include doppler interrogation prox, mid, and distal stent
  - e. For ICA/CCA peak systolic ratio, use the highest ICA PSV and the Distal CCA velocity.

Carotid stenosis grading (to match NASCET criteria) is performed using PSV and PSV ratios as described in IAC vascular communication, updated recommendations for Carotid Stenosis Interpretation Criteria - October 2021 modifying 2014 SRU Consensus.				
ICA STENOSIS	ICA PSV CM/SEC	ICA EDV CM/SEC	PSV ratio ICA/CCA	Plaque
<b>Normal</b>	<180 cm/s	< 40 cm/s	< 2.0	
<b>&lt;50% stenosis</b>	180 cm/s	< 40 cm/	< 2.0	intimal plaque < 50%
<b>50-69% stenosis</b>	180 - 230 cm/s	40 - 100 cm/s	>2 but <4	plaque estimate > 50%

<b>70-95% stenosis</b>	> 230 cm/s	> 100 cm/s	> 4	plaque estimate > 50%
<b>Near occlusion</b>	variable	Variable	Variable	visible plaque, flow identified w/in lumen
<b>Occlusion</b>	visible plaque, no detectable flow			