

Vascular Ultrasound Protocol: Carotid Duplex

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Last Review Date: [Link to Last Review Date Table](#)

List of Required Images

Carotid Duplex: Bilateral

- **Transverse:** Bilateral images using dual screen with and w/o color Doppler
 - Common Carotid A. prox
 - CCA mid
 - CCA distal
 - CCA bulb
 - ECA/ICA bifurcation
 - ICA prox
 - ICA mid
 - ICA distal
- **Sagittal images with and without color Doppler**
 - Common Carotid A. prox
 - CCA mid
 - CCA distal
 - bulb
 - ECA/ICA Bifurcation
 - ECA prox
 - ICA prox
- **Sagittal with color Doppler**
 - Subclavian A.
 - ICA mid
 - ICA distal
 - Vertebral A.
- **Sagittal spectral Doppler images**
 - Subclavian A.
 - CCA prox
 - CCA mid
 - CCA distal
 - CCA bulb
 - ECA prox
 - ICA prox
 - ICA mid
 - ICA distal
 - Vertebral A.

For general pathology, use the [Pathology Protocol](#).

Additional Images for Anatomy and Vascular-Specific Pathology

- Abnormal findings generally require additional images to document the complete extent of the abnormalities.
 - Color and angle corrected spectral Doppler imaging may provide additional information, including improved visualization of hypoechoic plaque.
 - Obtain Trans and Sag images when there is moderate to severe plaque.
 - Areas of suspected stenosis or occlusion should include Doppler waveforms and velocity measurements prox, mid and distal to site of interrogation.
 - Evaluate stents with color and spectral Doppler proximal to, within, and distal to stent.

Guidelines for Carotid Duplex

- 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
Normal	<180 cm/s	< 40 cm/s	< 2.0	
<50% stenosis	180 cm/s	< 40 cm/s	< 2.0	intimal plaque < 50%
50-69% stenosis	180 - 230 cm/s	40 - 100 cm/s	>2 but <4	plaque estimate > 50%
70-95% stenosis	> 230 cm/s	> 100 cm/s	> 4	plaque estimate > 50%
Near occlusion	variable	Variable	Variable	visible plaque, flow identified
Occlusion	visible plaque, no detectable flow			

- Bilateral exam, unless contraindicated.
- Evaluate visible course of the following arteries: subclavian, common carotid, internal carotid, proximal external carotid, and vertebral.
- Use a 9 MHz linear transducer or Vascular transducer.
- Use an insonation angle of 60 degrees or less to measure velocities.
- Plaque should be assessed and documented as smooth, irregular, homogenous, or heterogeneous.

Common Indications for Carotid duplex

Evaluate the extracranial carotid and vertebral arterial system for atherosclerosis or stenosis • Carotid bruit • Trauma • Pulsatile mass • Endarterectomy • Stent evaluation • Stroke • TIA • Amaurosis fugax • Vertigo • Dizziness • Ataxia • Diplopia • Drop attacks • Visual disturbance • Paresthesia • Syncope • Headache • Confusion