

Carotid Ultrasound Parameters



Diagnostic & Preventative Imaging Center

Degree of Stenosis (%)	Primary Parameters		Additional Parameters	
	ICA PSV (cm/sec)	Plaque Estimate (%)*	ICA/CCA PSV Ratio	ICA EDV (cm/sec)
Normal	<125	None	<2.0	<40
<50	<125	<50	<2.0	<40
50-69	125-230	≥50	2.0-4.0	40-100
≥70 but less than near occlusion	>230	≥50	>4.0	>100
Near occlusion	High, low or undetectable	Visible	Variable	Variable
Total occlusion	Undetectable	Visible, no detectable lumen	Not applicable	Not applicable

Internal Carotid Artery Stenosis

	Peak Systolic Velocity	End Diastolic Velocity	IC/CC PSV Ratio
0-29%	≤ 110 cm/sec		
30-49%	>110 cm/sec ≤ 130 cm/sec		
50-69%	>130 cm/sec ≤ 280 cm/sec	≤ 100 cm/sec	$> 3.2 \leq 4$
70-99%	> 280 cm/sec	> 100 cm/sec	> 4

External Carotid Stenosis

$\leq 50\%$	PSV ≤ 250 cm/sec
$> 50\%$	PSV > 250 cm/sec

Look at CCA waveform. The common carotid waveform proximal to a high-grade ICA stenosis or occlusion will have increased pulsatility and a high resistance pattern. ECA obstruction does not alter the CCA waveform.

A proximal CCA stenosis will show a decreased waveform amplitude with a low resistance waveform. Can see decreased amplitude with physiologic variations. Look for side to side asymmetry.

Renal Artery Duplex Exam

Direct Renal Artery Analysis

Renal Artery Stenosis Greater than 60%

1. Peak systolic velocity > 200 cm/sec.
2. PSV Renal Artery: PSV of the Aorta Ratio > 3.5
3. Look for discrepancy in renal size and post-stenotic dilation of the renal artery.

Indirect Waveform Analysis

Renal artery stenosis greater than 60%

1. Acceleration time > 0.70
 2. Acceleration index < 300 cm/sec²
- (Acceleration Index = $\Delta V / \Delta T$)