

DOPPLER CRITERIA FOR VARYING DEGREES OF STENOSIS

DIAMETER STENOSIS	PEAK SYSTOLIC VELOCITY {cm/sec}	PEAK DIASTOLIC VELOCITY {cm/sec}	SYSTOLIC VELOCITY RATIO {VICA/VCCA}	DIASTOLIC VELOCITY RATIO {VICA/VCCA}	SPECTRAL BROADENING {cm/sec}
1%-39% {Mild}	<110	<40	<1.8	<2.6	<40
40%-59% {Moderate}	<130	<40	<1.8	<2.6	<40
60%-79% {Severe}	>130	>40	>1.8	>2.6	>40
80%-99% {Critical}	>250	>100	>3.7	>5.5	>80
100% {Occlusion}	N/A	N/A	N/A	N/A	N/A

DOPPLER CRITERIA FOR CAROTID ARTERY DISEASE

Diameter Stenosis	Peak Systolic Velocity, IC	Systolic Velocity Ratio IC/CC	End Diastolic Velocity	Diastolic Velocity Ratio IC/CC	Turbulence
1. <50%	<150	<2	<50	<2.4	0
2. >50%	>150	>2	>50	>2.4	+
3. >70%	>225	>3	>75	>4	++
4. Occlusion	0	0	0	0	0

1. "Diagnostic Criteria for Carotid Duplex Sonography."
American Journal of Roentgenology 151:1045-1049. 1988.

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Table 3
Gray-Scale and Doppler US Criteria for Diagnosis of ICA Stenosis

Degree of Stenosis (%) [†]	Primary Parameters		Additional Parameters*	
	ICA PSV (cm/sec)	Plaque Estimate (%) [‡]	ICA PSV/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	>230	≥50	>4.0	>100
99 (near occlusion)	High, low, or undetectable	Visible	Variable	Variable
100 (total occlusion)	Undetectable	Visible, no detectable lumen

Source.—Reference 31.

*May be useful in cases of discrepant results in primary parameters due to technical or clinical factors.

[†]Based on angiographic criteria for measuring diameter stenosis in the NASCET.

[‡]As determined with US.

[§]CCA = common carotid artery.

[¶]EDV = end diastolic velocity.

Table 4
US, CT Angiography, and MR Angiography versus DSA in the Detection of 70%-99% Stenosis of the ICA

Modality	Sensitivity (%)	Specificity (%)
US	86 (84, 89)*	87 (84, 90)*
CT angiography	85 (79, 89) [†]	93 (89, 96) [†]
MR angiography	95 (92, 97)*	90 (86, 93)*

Note.—Numbers in parentheses indicate 95% confidence interval.

*Data from reference 35.

[†]Data from reference 36.

mally invasive modalities are now starting to replace DSA. Currently, stent placement is emerging as a treatment for ICA stenosis, and some suggest that it may be as effective as surgery (37). Thus, DSA will remain as a diagnostic tool during endovascular therapy for ICA stenosis.

Renal Arteries

Because significant renal artery stenosis causing renovascular hypertension is potentially curable with vascular intervention (38-40), quantifica-

Table 5
Duplex US Criteria for Diagnosis of Renal Artery Stenosis

Diameter Stenosis (%)	Main Renal Artery PSV (cm/sec)	Ratio of Renal Artery PSV to Aortic PSV
<60	<180	<3.5
≥60*	≥180	≥3.5
100 (total occlusion)

*Only one of the two criteria listed needs to be met for diagnosis.

tion of the degree of stenosis is essential for patient treatment.

Because it is difficult to visualize the entire main renal artery at US due to its deeper location, flow velocity measurements made with Doppler analysis are used for grading renal artery stenosis (Fig 15, Table 5) (40,41). The reported sensitivities and specificities of Doppler US for detecting significant renal artery stenosis compared with