TCD AND CAROTID INTERPRETATION

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DISCLOSURES

- Ex-Board Member, IAC-Vascular intersocietal vascular ultrasound laboratory accreditation commission

- Director, ASN Neurosonology examination 1998-2018

- President-Elect, ASN

IAC-VASCULAR "MUST'S" OF US REPORTS

- *Patient name, DOB, unique identifier*

- *Indication for test*

- *Referring MD name*

- *Date and place of service*

- *Specific test name and description of methods*

- *Summary of technical findings*

- *Interpretation*

- *Recommendations, if applicable*

Your Laboratory Logo
and contact information
HERE

www.iac.org/vascular

IAC-VASCULAR REQUIRED DX CRITERIA

- *normal extra- and intracranial findings*
- *carotid stenosis and plaque formation*
- *carotid occlusion and dissection*
- *vertebral artery stenosis or occlusion*
- *intracranial arterial stenosis*
- *arterial spasm*

- *hyperemia*
- *collateral flow patterns and flow directions*
- *cerebral embolization*
- *increased intracranial pressure*
- *cerebral circulatory arrest*
- *intracranial arterial occlusion*
- *subclavian steal syndrome*

ADDITIONAL RECOMMENDED CRITERIA

- *intracranial steal and reversed Robin Hood Syndrome*
- *grading right-to-left shunts*
- *arterial recanalization and re-occlusion*

NORMAL EXTRA AND INTRACRANIAL FINDINGS

- Absence of pathology on B-mode

- Undisturbed (laminar) antegrade flow

- Waveforms with expected resistance

- Symmetry between homologous segments
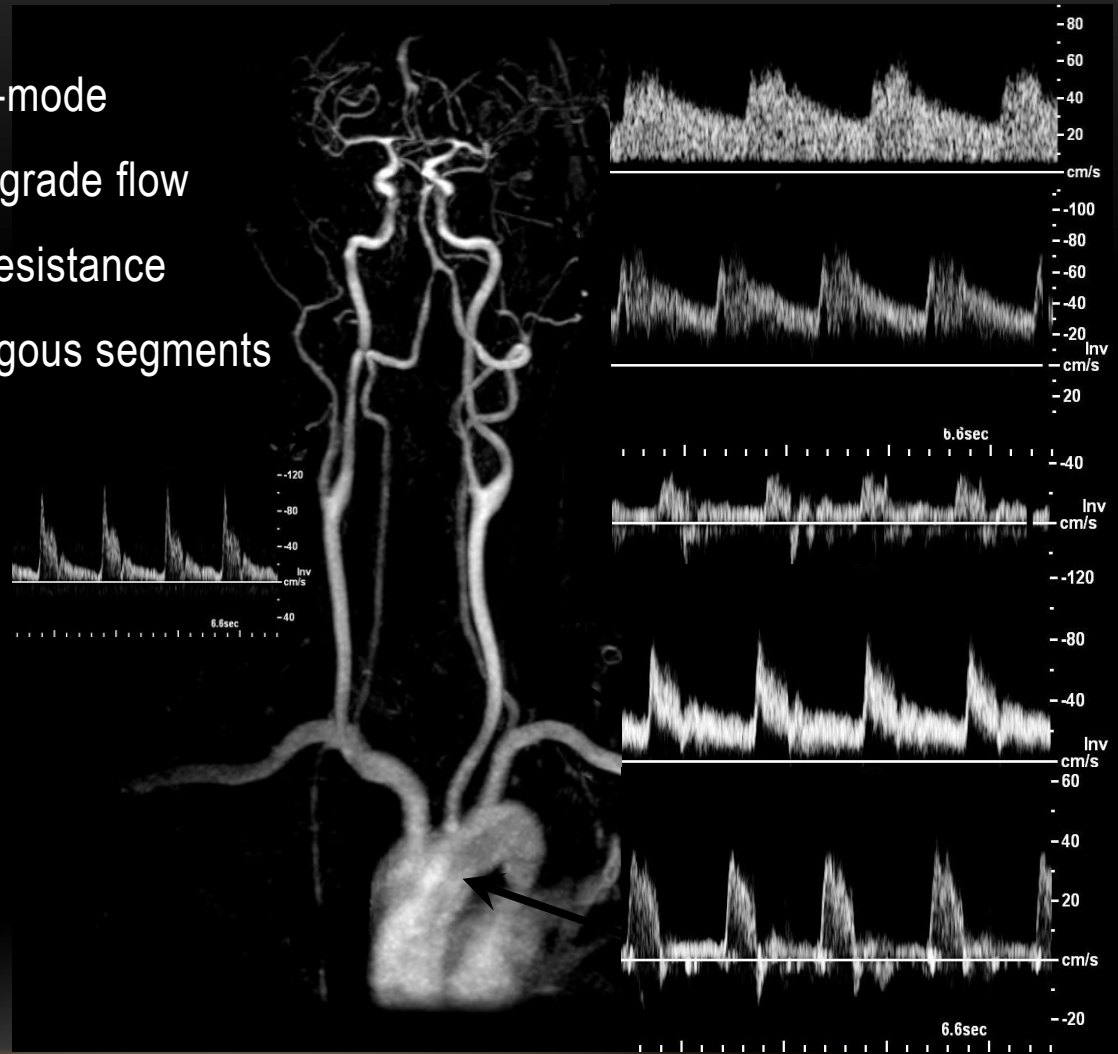
NORMAL INTRACRANIAL FINDINGS

- **Normal flow direction**

- **Velocity / pulsatility symmetry L:R difference < 30% for MCAs, << other vessels**

- **MFV < 100 cm/s (normal Hb and Ht)**

- **Velocity hierarchy**

  - **MCA$\geq$ACA$\geq$PCA$\geq$ICA$\geq$BA$\geq$VA**

- **PI 0.6 – 1.1 (normotensive)**

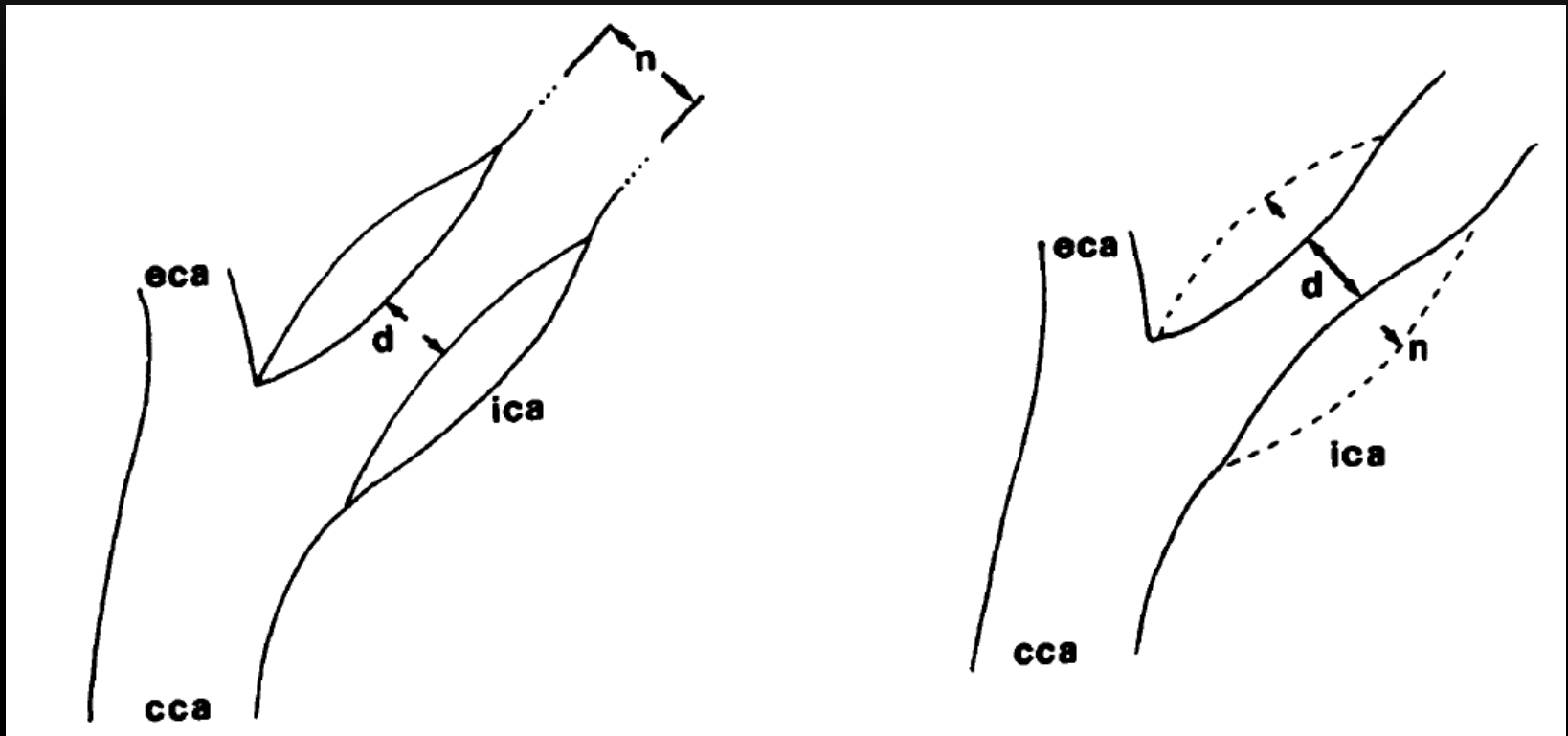- **PI can be $\geq$ 1.2 (OA or chronic HTN)**

THESE FINDINGS HELP RULE OUT
HEMODYNAMICALLY SIGNIFICANT
EXTRACRANIAL ICA STENOSIS OR
OCCLUSION
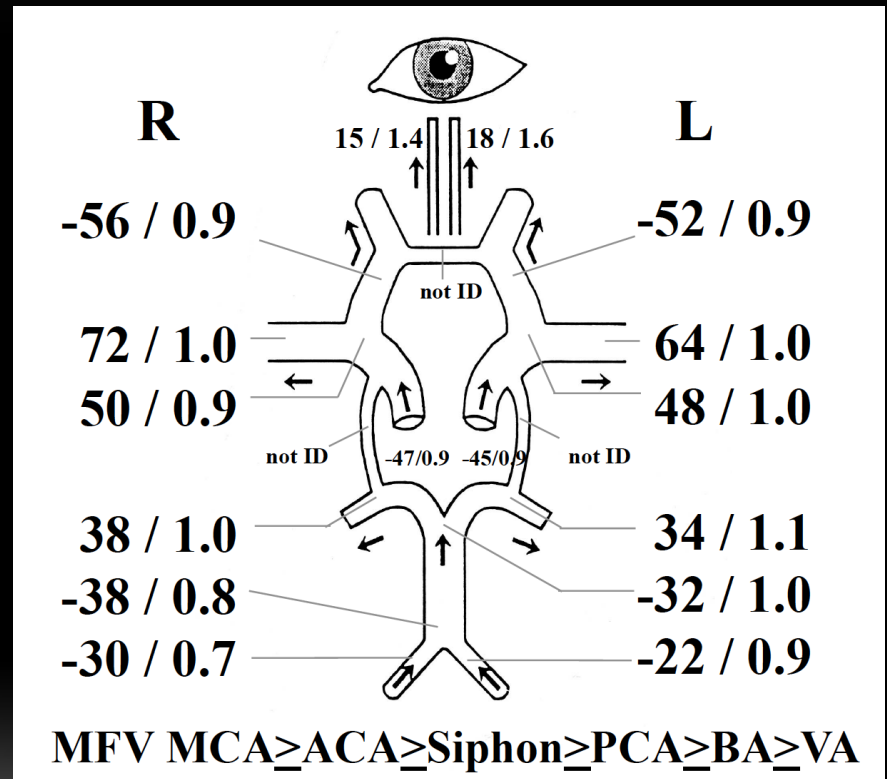
HOW TO REPORT CAROTID PLAQUE FINDINGS

- Presence

- Location

- Extent

- Surface

- $< 50\%$ or $\geq 50\%$ B-mode narrowing

- Distal end of the plaque

NASCET OR ECST MEASUREMENT?

Alexandrov AV et al. Stroke 1993;24:1291-1296.

NASCET METHOD

- Perform catheter angiography

- Select single projection that shows the tightest residual lumen

- Use jeweler's eye-piece

- Measure the narrowest diameter of the residual lumen (d)

- Measure normal vessel diameter (n) far distal to the stenosis in the segment with parallel walls beyond post-stenotic dilation

- Use the following formula to calculate percent stenosis:

$$Carotid\ stenosis\ (\%) = (1-d/n) \times 100$$

Source: Fox AJ

CAROTID STENOSIS: REFER TO "N" METHOD

- *Multidisciplinary Society of Radiologists in Ultrasound Criteria*

TABLE 3. Consensus Panel Grayscale and Doppler US Criteria for Diagnosis of ICA Stenosis

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

*Plaque estimae (diameter reduction) with grayscale and color Doppler US.

WHAT IS THE BEST DIAGNOSTIC US CRITERION?

LOCALLY VALIDATED