NEW RISK STRATIFICATION SYSTEM FOR HIGH GRADE ASYMPTOMATIC CAROTID STENOSIS

Fedor Lurie, MD, PhD

How to identify which patients with asymptomatic carotid stenosis could benefit from endarterectomy or stenting

1. Microemboli detection on transcranial Doppler (TCD)
2. Plaque echolucency on Duplex ultrasound
3. Progression of the severity of stenosis
4. Silent embolic infarcts on brain CT or MRI
5. Reduced cerebrovascular reserve (CVR)
6. Size of juxta luminal hypoechoic area
7. Identification of intraplaque hemorrhage using MRI
8. Carotid ulceration

In conclusion, there is a relatively limited evidence base to guide the choice of optimal antiplatelet therapy in patients with carotid stenosis.

the available data allow clinicians to inform patients of the risk of recurrent events on specific antiplatelet treatment regimens used in randomized trials

However, this is largely based on the coronary disease literature

Stenosis length = 5 mm
MPV = 625 cm/s
Transit time = 80 μs
Platelet activation time > 1s
Platelet activation can not occur in this stenotic region!
High shear rate thrombosis

Platelet binding to collagen

B. Savage. Blood 1999;94:2704-15
T. Calero. JTVB 2012;12:1466-76

- Adhesion to vWF via GPIb
- Does not require platelet activation
- Binding time < 10 μs
- Binding is reversible
- Platelet aggregates may embolize

At high shear rates Integrillin is effective even in subtherapeutic doses
ASA is ineffective

Near-wall shear rate

$32Q/\pi D^3 = \frac{8V}{D}$

Q: Volumetric Flow, D: Vessel Diameter


>70% ICA stenosis

PSV = 298 cm/s
WSR = 5,960 s⁻¹

PSV = 407 cm/s
WSR = 8,560 s⁻¹

Asymptomatic unilateral ICA stenosis > 70%
(PSV>230 cm/s, EDV >100 cm/s)
n=308

Single center case-controlled 1 year study

Asymptomatic unilateral ICA stenosis > 70%
(PSV>230 cm/s, EDV >100 cm/s)
n=308

Controls: asymptomatic
n=209

Patients with NWSR ≥ 8,000 s⁻¹ Were 12 times more likely to have an ischemic event
(OR = 12.2, 95% CI 6.12 - 24.09)

Prospectively collected 6 months data

ICAS
< 70% ≥ 70%
NWSR (s⁻¹) < 8,000 ≥ 8,000
n 12 8 21
Ipsilateral Microemboli > 2/hour % (n) 8 (1) 0 (0) 14 (3)

Asymptomatic ICA Stenosis

1 year

< 70%

≥ 70%

NWSR < 8,000

NWSR ≥ 8,000*

>2 microemboli/hour**

DUS

BMT

TCD

Intervention

** Ray A, Maron MB. October 2009;61(1):7

Jobst Vascular Institute

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