



VIII° **C**orso Nazionale **C**ongiunto
ULTRASONOLOGIA VASCOLARE
DIAGNOSI E TERAPIA

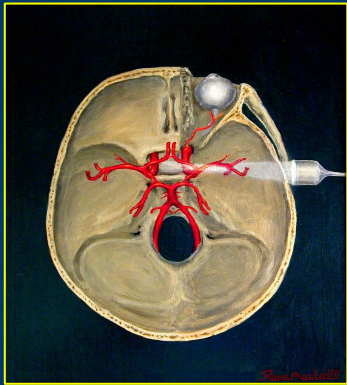


Centro Residenziale Universitario
Bertinoro (FC)
14-17 Aprile 2010

Doppler transcranico e test funzionali
Reattività cerebrovascolare:
Implicazioni terapeutiche e prognostiche

M. Silvestrini
Dipartimento di Neuroscienze
Università Politecnica delle marche





Neurons



Artery

Arterioles

Venules



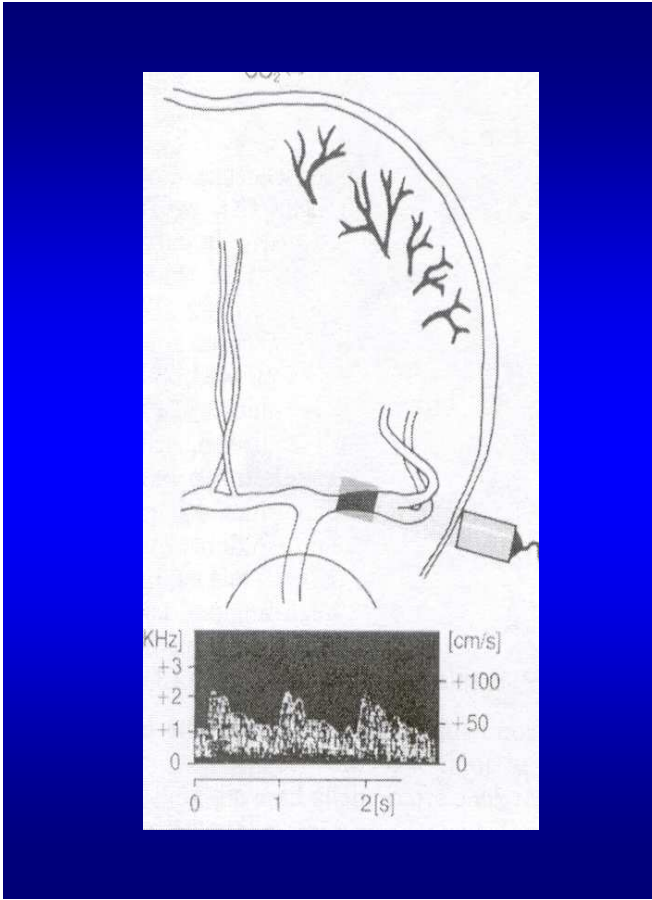
Vein

Capillary bed

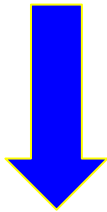


1 – 3 cm

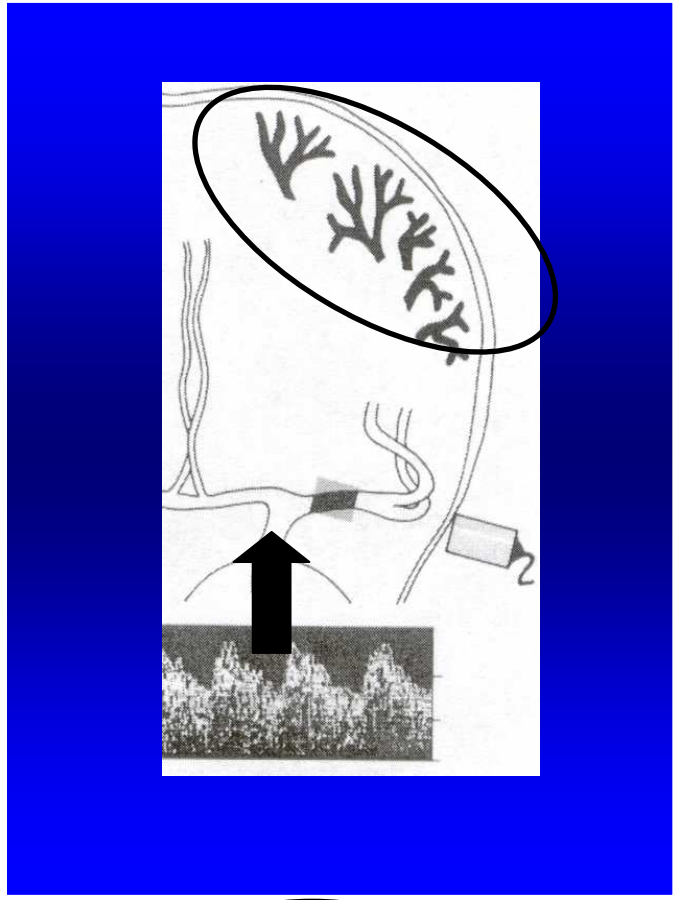
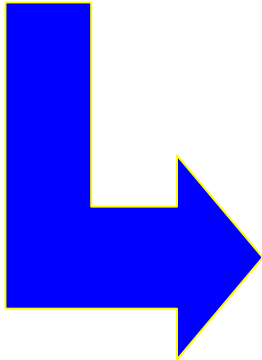
VASOMOTOR REACTIVITY



normoCO₂

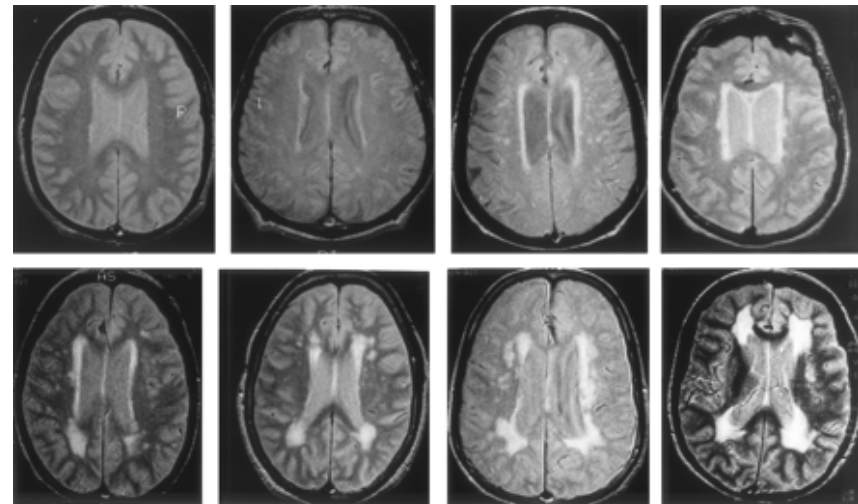
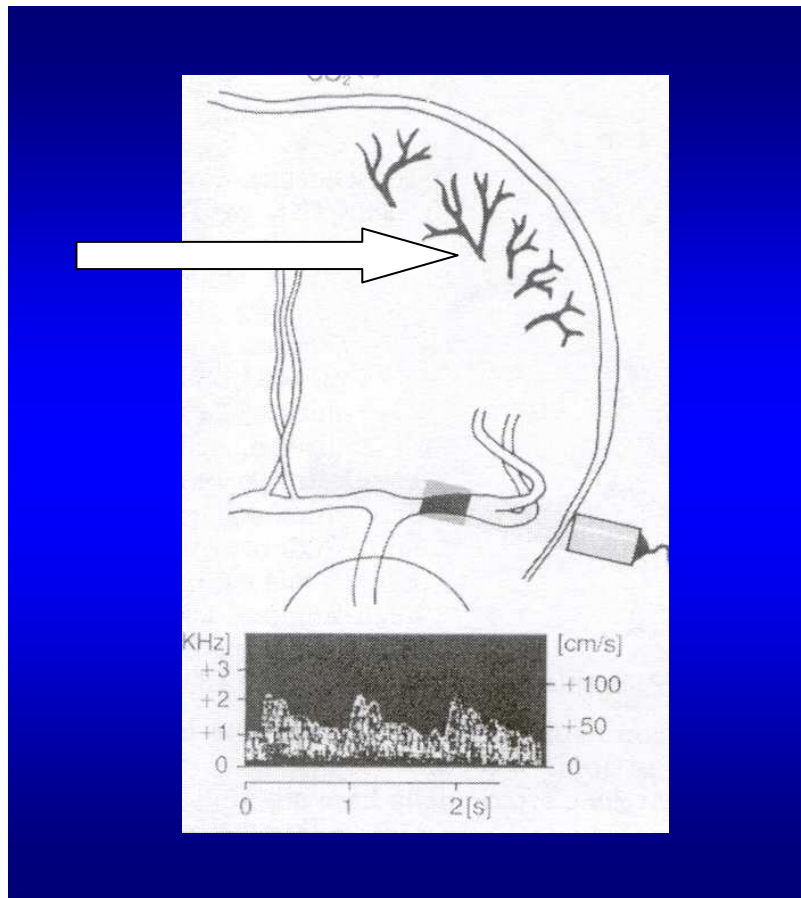


Apnea
Acetazolamide
Adenosin
CO₂



↑↑CO₂

ALTERATION IN VMR AND STROKE



**Impaired Cerebrovascular
Reactivity as a Risk Marker for
First-Ever Lacunar Infarction. A
Case-Control Study.**

C Molina et al. Stroke 1999

Statins and cerebral vasomotor reactivity: implications for a new therapy?

Carod-Artal FJ

Stroke 2006; 37: 2446-2448 EDITORIAL

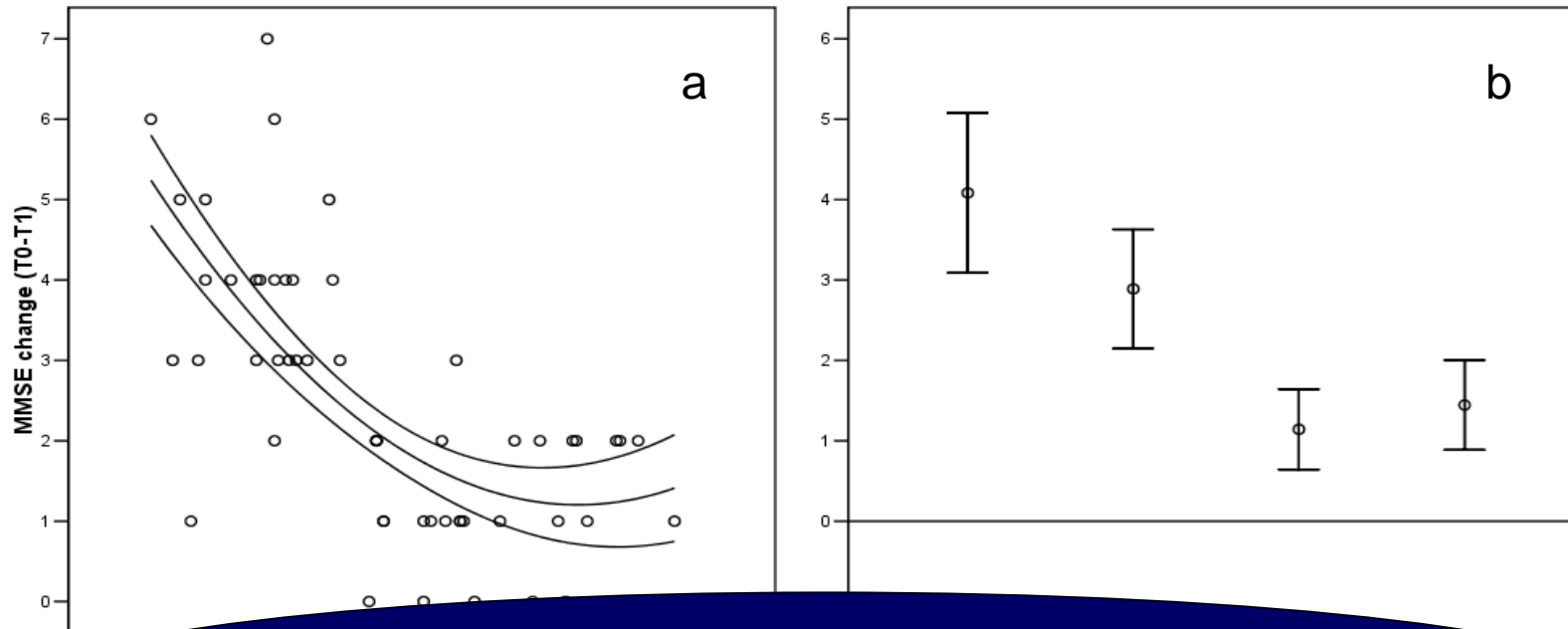
***Effect of perindopril on cerebral vasomotor
reactivity in patients with lacunar infarction***

M Walters et al.

Stroke 2004

CEREBROVASCULAR REACTIVITY AND THE EVOLUTION OF COGNITIVE IMPAIRMENT IN PATIENTS WITH ALZHEIMER DISEASE

Fifty-three patients with AD (NINCDS-ADRDA criteria)
mild to moderate cognitive impairment: score ≤ 2 (Clinical Dementia Rating)
BASAL MMSE: 17.5 ± 1.9 ; 1-YEAR MMSE: 15.0 ± 3.0



Selection of patients for aggressive treatment?

The EC/IC Bypass Study Group

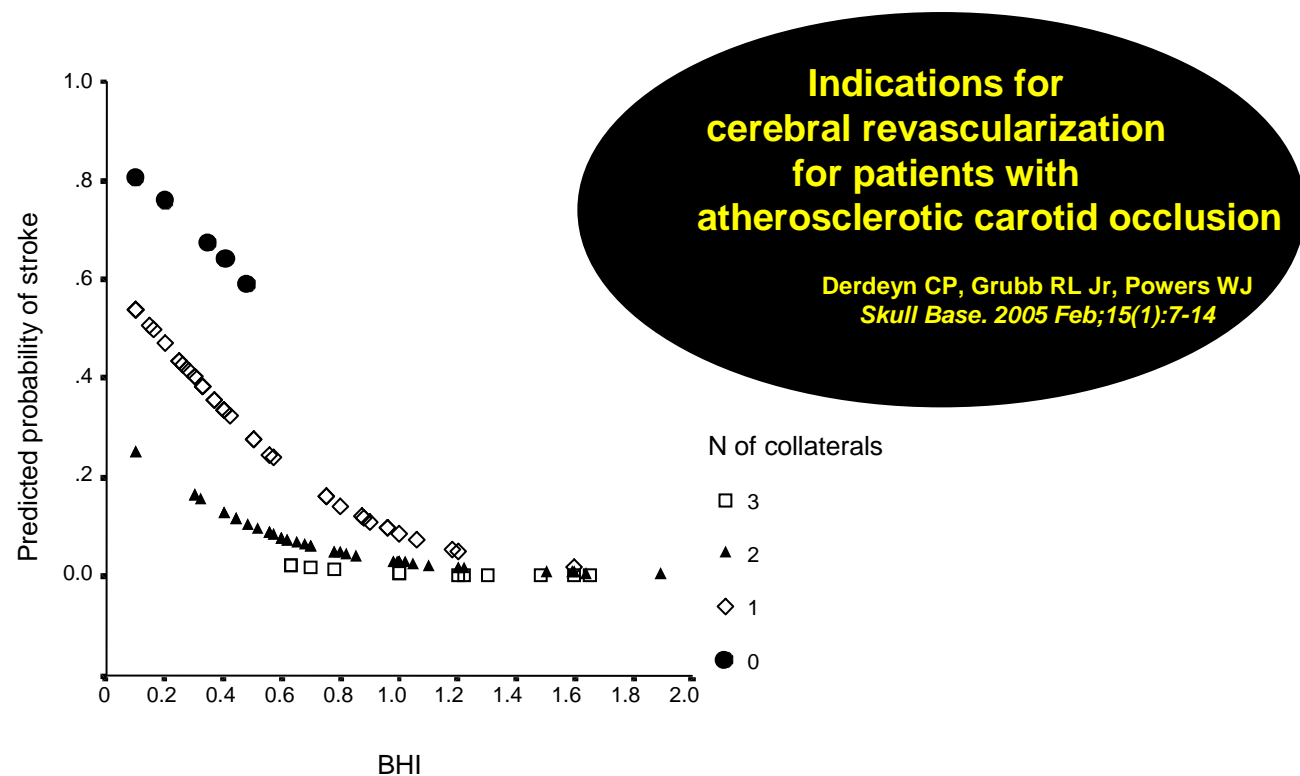
Results of an international randomized trial

N. Engl J. Med. 1985; 313:1191-1200.



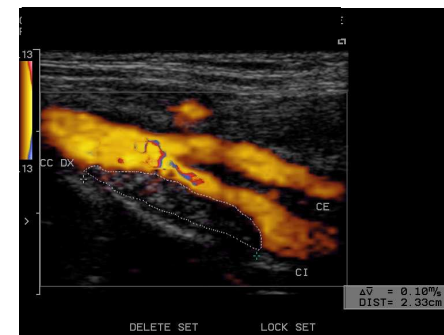
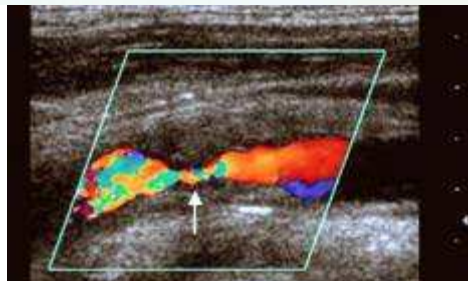
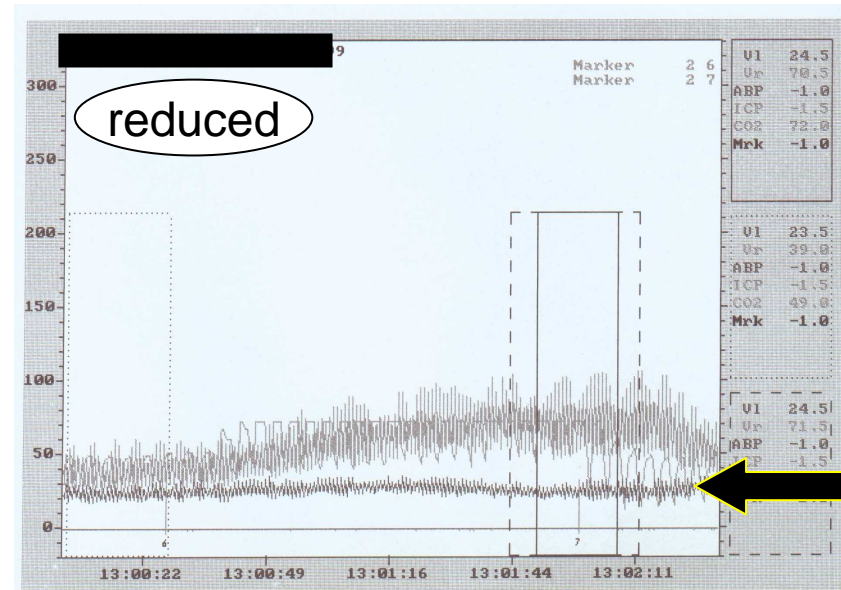
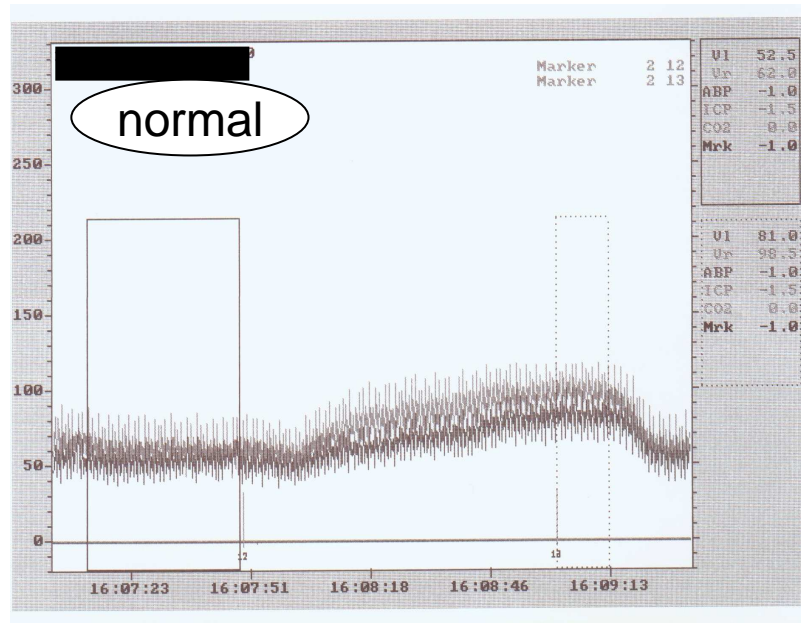
***Failure of
extracranial-intracranial
arterial bypass
to reduce the risk
of ischemic stroke***

Effect of collaterals and cerebral VMR on the outcome of carotid artery occlusion



Vernieri F, Pasqualetti P, Matteis M, Passarelli F, Troisi E, Rossini PM, Caltagirone C and Silvestrini M
Stroke 2001

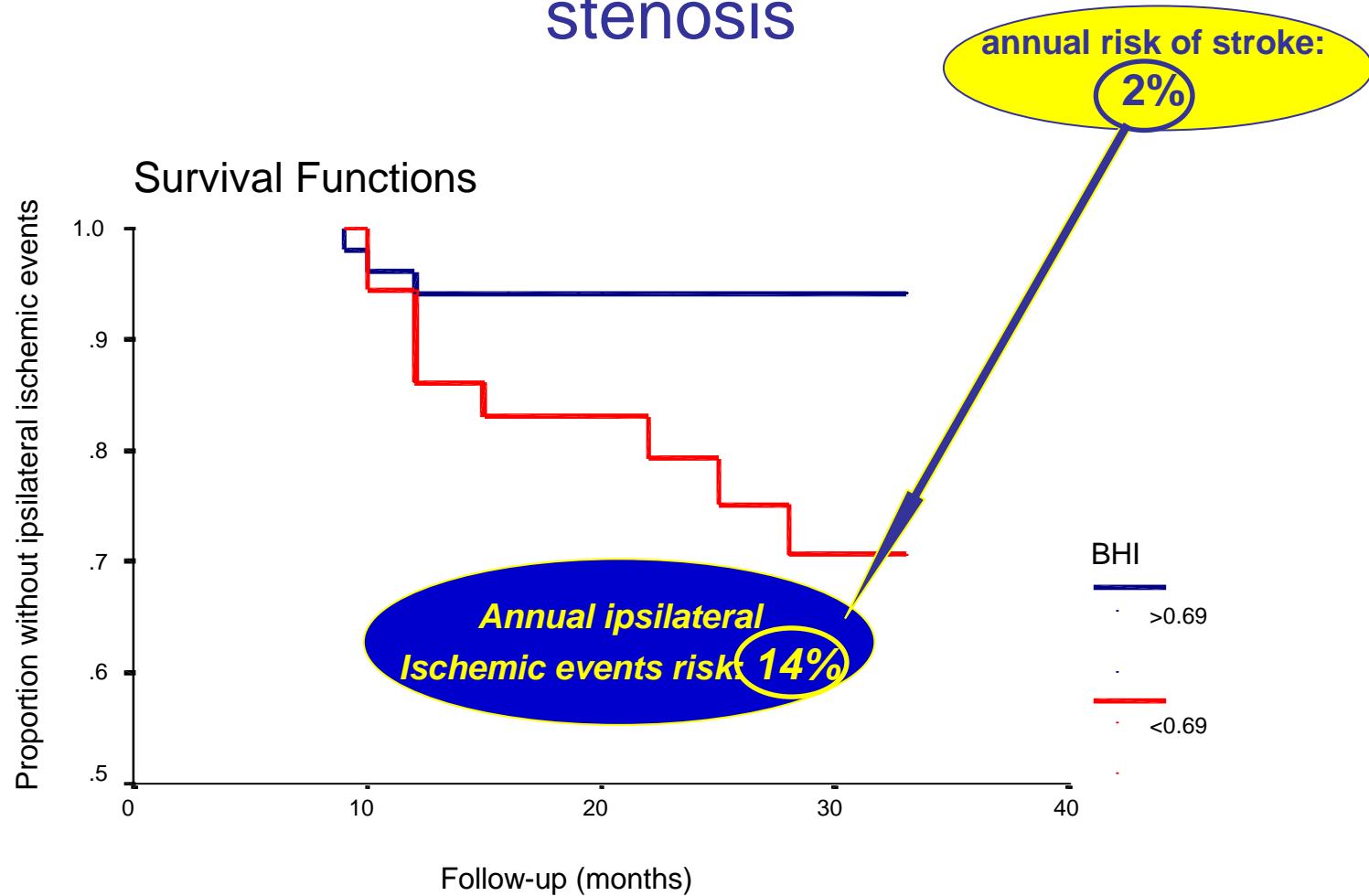
VMR in patients with carotid stenocclusive disease



...the degree of carotid stenosis correlates poorly with the hemodynamic status of the cerebral circulation...

W Powers, 1991

Impaired cerebral VMR in asymptomatic carotid stenosis



M. Silvestrini et al, JAMA 2000

CEREBRAL HEMODYNAMICS AND COGNITIVE PERFORMANCE IN PATIENTS WITH ASYMPTOMATIC CAROTID STENOSIS

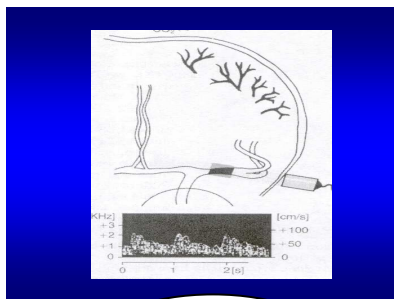
Objective:

to investigate whether the presence of severe internal carotid artery stenosis may be associated with different cognitive performance in relation to the side of the stenosis and its hemodynamic consequences.

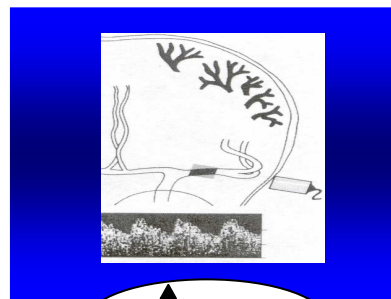
Eighty-three patients with asymptomatic severe unilateral internal carotid stenosis

NEUROPSYCHOLOGICAL ASSESSMENT:

Verbal Fluency using phonemic and category access, Coloured Progressive Matrices and Complex Figure Test Copy



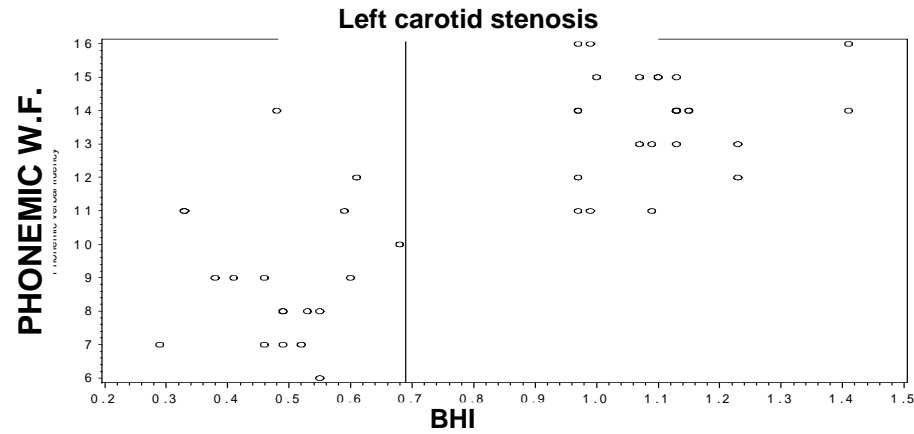
normoCO₂



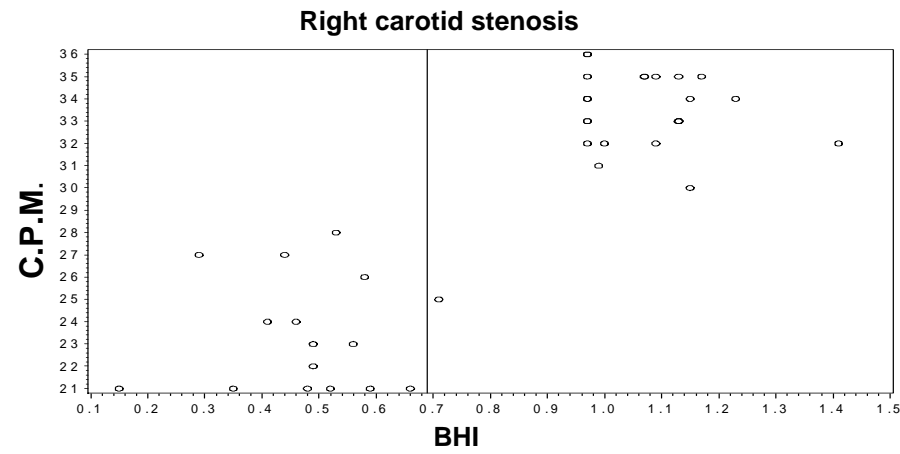
↑↑CO₂

• PRESERVED CVR $b_{hi} \geq 0.69$

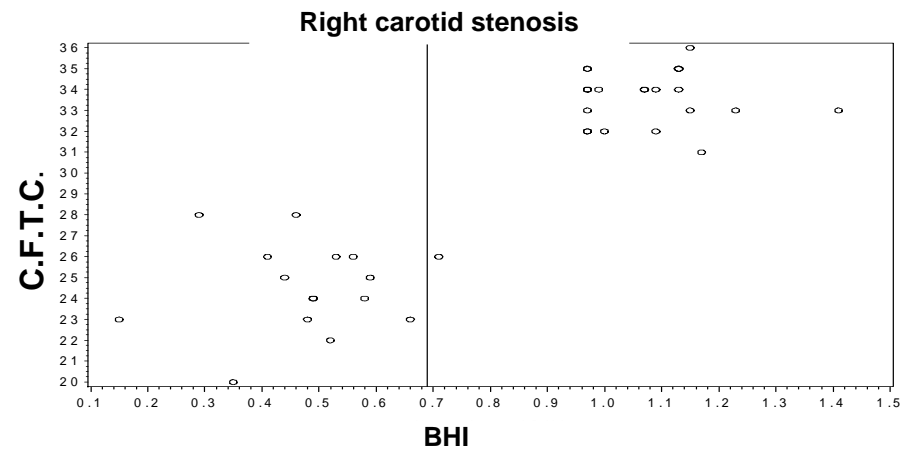
• IMPAIRED CVR $b_{hi} < 0.69$



Phonemic fluency



Coloured Progressive Matrices



Complex Figure Test Copy

**ASSESSMENT: TRANSCRANIAL
DOPPLER ULTRASONOGRAPHY**
Report of the Therapeutics and Technology
Assessment of the American Academy of Neurology
Neurology 2004: Special Article

PROMISING INDICATIONS

Vasomotor Reactivity ASSESSMENT

- Trombolysis Monitoring
 - Microembolic Signals Detection
- Monitoring During Carotid Endarterectomy
 - Monitoring During Coronary By-Pass
- Monitoring of vasospasm (post traumatic SE)