PRESERVATION OR RESTORATION OF COGNITIVE FUNCTION
The Next Frontier for Carotid Revascularization

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DISCLOSURES

- None

RATIONALE FOR CAROTID INVASIVE INTERVENTION

- 1. Prevention of death and disability from stroke
- 2. Largely overlooked is the possibility of preventing cognitive loss due to "silent" brain infarction or compromised cerebral blood flow.

Asymptomatic Carotid Disease and Cognitive Impairment: What Is the Evidence?

Hediyeh Baradaran[1], Amir Hossein Sarrami[1] and Ajay Gupta[2,3]*

- Cerebral hypoperfusion can lead to accelerated amyloid and tau deposition
- Flow limiting stenosis can lead to cerebral atrophy
- Plaque volume correlates with compromised cognition
- Vulnerable plaque are associated with increase in microemboliztion and compromise in cognition

Association between asymptomatic carotid stenosis and cognitive function: A systematic review-Cochrane analysis

- Based on available evidence, we suggest that "asymptomatic"
- CS is not entirely asymptomatic because it seems to be associated
- with cognitive dysfunction. If this association turns out to be causal,
- it would change the way clinicians define asymptomatic CS and it
- would argue for including cognitive function as an important outcome
- in cardiovascular clinical trials and as another factor to guide
- decision-making about treatments.

Baseline Cognitive Impairment in Patients With Asymptomatic Carotid Stenosis in the CREST-2 Trial

Measurement of baseline cognition in the first 1000 patients demonstrated impaired cognition when compared to population based cohort

MECHANISMS FOR COGNITIVE IMPAIRMENT

- 1. Chemical-amyloid and tau deposition, similar to that seen in Alzheimers
- 2. Silent brain infarction from emboli
- 3. Compromise in hemisphere perfusion

Can Cognitive impairment be prevented or reversed with revascularization ?

- **Asymptomatic carotid stenosis and cognitive improvement using transcervical stenting with protective flow reversal technique**
- G Ortega[1], B Alvarez[2], M Quintana[3], X Yugueros[2], J Alvarez-Sabin[3], M Matas[2]
- European J. Vasc Endovasc Surg 2014;47(6):585-92
- 25 PATIENTS UNDERWENT COGNITIVE TESTTING 1 MONTH PRIOR AND 6 MONTHS AFTER TCAR-ALL SHOWED SIGNIFICANT IMPROVEMENT

Effects of Carotid Endarterectomy on Cerebral Reperfusion and Cognitive Function in Patients with High Grade Carotid Stenosis: A Perfusion Weighted Magnetic Resonance Imaging Study

Q. Wang a,1, M. Zhou a,1, Y. Zhou a, J. Ji a, D. Raithel b, T. Qiao a,*

46 patients documented improved cognition following cerebral re-perfusion following CEA after sufficient recovery time

Carotid Intervention Improves Cognitive Function in Patients with Severe Atherosclerotic Carotid Disease

Wei Zhou, MD1, Bahaa Succar, MD1, Devin P. Murphy, MS2, Yazan Ashouri, MD1, Ying-Hui Chou, PhD3, Chiu-Hsieh Hsu, PhD4, Steven Rapcsak, MD3, Theodore Trouard, PhD2,5 Ann Surg. 2022 September 01; 276(3): 539–544

- Cognitive testing was performed in 170 consecutive patients with high grade carotid stenosis, pre-revascularization procedure and at 1, 6, and 12 months post procedure.
- Multi-modal cognitive testing demonstrated improved memory and executive function at all post-procedure time intervals

The Effects of Carotid Revascularization on 1-Year Cognitive Performance in Patients With Carotid Artery Stenosis-Ning, Y. et al . J. Endo Ther. 2024

- 89 patients undergoing CEA or CAS underwent pre-op and 3, 6, 9, and 12 month post testing using the Montreal Cognitive Assessment Instrument(MoCA).
- MoCA scores in domains of attention, language fluency, delayed recall, and cube copy all improved

CREST 2 AND CREST H

Included in their design is measurement of cognitive function and hemisphere perfusion on entry and exit

This will be the only randomized control study comparing revascularization with medical management alone regarding cognitive function

CREST 2 AND CREST H

- The CREST trials may or may not demonstrate benefit of CEA and CAS over intensive medical therapy(IMT) in stroke prevention in asymptomatic patients.
- What happens if CEA and/or CAS shows benefit over IMT in preservation of cognitive function ?

CONCLUSIONS

- Carotid stenosis, plaque volume, and microemboliztion are associated with compromised cognitive function
- Anecdotal reports suggest that revascularizton can reverse compromised cognition
- CREST 2 and CREST H design includes the effect of revascularization plus IMT vs. IMT alone on cognitive function and should provide a definitive answer