WHAT IS THE SIGNIFICANCE OF SUBCLINICAL DWMRI BRAIN LESIONS AFTER CAS AND CEA: DO THEY IMPAIR BRAIN FUNCTION

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WHAT

The purpose of this systematic review of the literature on the previous studies on subclinical DWMRI brain lesions in patients undergoing carotid artery surgery was to examine the literature on the relationship between carotid artery surgery and subclinical DWMRI brain lesions.

Methods

Studies were selected for inclusion if they met the following criteria: publications on non-invasive studies on subclinical DWMRI brain lesions in patients undergoing carotid artery surgery, studies with patients undergoing carotid artery surgery as the primary intervention, and studies with a follow-up period of at least 6 months.

Results

Studies included in the review were as follows:

- Bakker et al. J Neurol 2000; 247:669-676
- Capoccia et al. JVS 2010

Discussion

The literature review showed that there is a paucity of studies on the relationship between carotid artery surgery and subclinical DWMRI brain lesions. However, the available studies suggest that carotid artery surgery may be associated with subclinical DWMRI brain lesions, although the clinical significance of these lesions is unclear.

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Volume of subclinical embolic infarct correlates to long-term cognitive changes after carotid revascularization

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Infarct volume correlates negatively with cognitive decline

Zhou et al. JVS 2016

Comparison of domain-specific cognitive function after carotid endarterectomy and stenting

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Background Observational data suggests carotid artery stenting (CAS) is associated with higher incidence of subclinical embolic microinfarcts than carotid endarterectomy (CEA). No studies have examined the relationship between domain-specific cognitive changes and CAR. Methods Patients with MRA identified CCA or CAS with CCA with signs of massive reduced area stenosis. A history of treat or used to assess the cognitive domains of attention, memory, visual-spatial skills, executive functioning, and visuomotor processing (P < 0.05) were administered in 10 different subgroups. Differences were assessed using ANCOVA and regression analysis. Results Higher cognitive performance was noted between CCA and CAS in all years (P < 0.05). Accuracy in baseline, verbal and visual memory and attention function was substantially impaired in the CAS and CEA groups at 6 months (sufficient cognition test achieved statistical significance). Compared with CAS, cognitive processing speed, executive function, and visuomotor processing were significantly worse in the CEA group at 6 months (P < 0.05). Conclusions The lower cognitive performance seen in the CAS group at 6 months (sufficient cognition test achieved statistical significance). Compared with CAS, cognitive processing speed, executive function, and visuomotor processing were significantly worse in the CEA group at 6 months (P < 0.05). Kąkol et al. JVS 2018

Atherosclerotic carotid stenosis and cognitive function

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CEA vs CAS

Wang et al. Chin Neurology and Neurosurg 2016

COGNITIVE TESTS

To test different functions and areas

They are affected by
- Practice

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15 symptomatic CEA pts and 13 matched controls

Time-0, 24h in pts, time-0, 48h, 96h in controls

progressive improvements in learning and memory, working memory, and
attention and information

CEA was associated with a deterioration rather than an improvement in learning
and memory as originally observed (P < 0.05).

“Those findings highlight the potential for the clinical misinterpretation of POCF
unless practice effects are taken into account”

Marley et al. Physiological Rep 2017

Brain Structural Connectivity Distinguishes Patients at Risk for Cognitive Decline After Carotid Interventions

Hypothesis: a distributed function such as memory is more resilient in patients
with brains demonstrating higher degrees of modularity

They analyzed preoperative structural connectivity graphs (using T1 and DWI MRI) for 34
patients that underwent carotid intervention, and evaluated differences in graph metrics
using the Brain Connectivity Toolbox.

Brain modularity
study can help
identifying pts at
risk of developing
cognitive
impairment

Soman et al. Hum Brain Mapp 2016

Carotid revascularization and medical management for asymptomatic carotid stenosis – Hemodynamics (CREST-H):
Study design and rationale

A definitive answer?


COGNITIVE TESTS

To test different functions and areas
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• Practice
• Brain Connectivity

CONCLUSIONS

Effects of carotid revascularization on cognitive function
have not been clearly established

Cerebral plasticity can account for different effects of
carotid revascularization on cognitive performance

Perhaps metabolic imaging and SPECT can help
understand relationship between perfusion and cortical
function in different brain areas
Neurocognitive decline can deeply affect QoL of our patients

Thanks for your attention