

## Cognitive Function Should NOT be a Reason for Treating more ACS Patients with Procedures

**DEBATE**

A/Prof Anne L. Abbott  
Neurologist  
Neuroscience Department, Central Clinical School  
Monash University, Melbourne, Australia

[FACTCATS.org](http://FACTCATS.org)



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## Disclosures


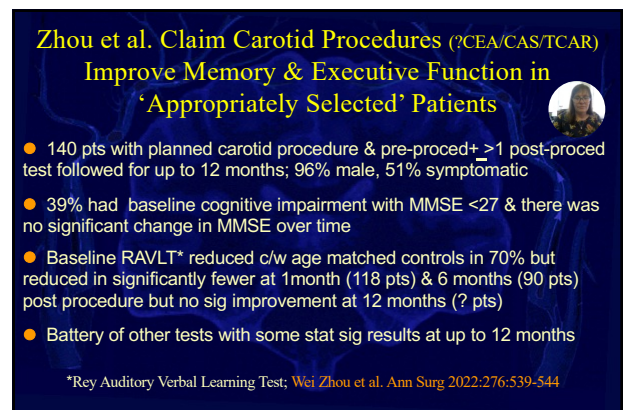
- I am a neurologist
- My academic work has been supported only by independent grants
- Founder of the Faculty Advocating Collaborative & Thoughtful Carotid Artery Treatments: [FACTCATS.org](http://FACTCATS.org)




## Zhou et al. Claim Carotid Procedures (?CEA/CAS/TCAR) Improve Memory & Executive Function in 'Appropriately Selected' Patients


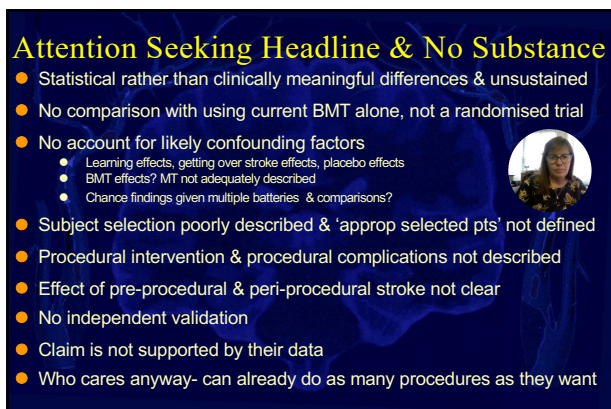
- 140 pts with planned carotid procedure & pre-proced+ >1 post-proced test followed for up to 12 months; 96% male, 51% symptomatic
- 39% had baseline cognitive impairment with MMSE <27 & there was no significant change in MMSE over time
- Baseline RAVLT\* reduced c/w age matched controls in 70% but reduced in significantly fewer at 1month (118 pts) & 6 months (90 pts) post procedure but no sig improvement at 12 months (? pts)
- Battery of other tests with some stat sig results at up to 12 months

\*Rey Auditory Verbal Learning Test; Wei Zhou et al. Ann Surg 2022;276:539-544

## Attention Seeking Headline & No Substance


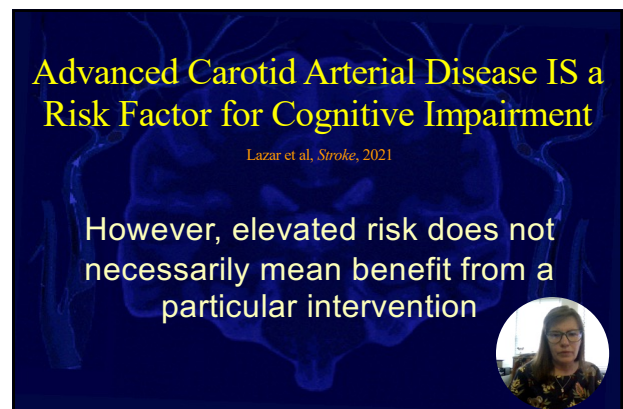
- Statistical rather than clinically meaningful differences & unsustainable
- No comparison with using current BMT alone, not a randomised trial
- No account for likely confounding factors
  - Learning effects, getting over stroke effects, placebo effects
  - BMT effects? MT not adequately described
  - Chance findings given multiple batteries & comparisons?
- Subject selection poorly described & 'approp selected pts' not defined
- Procedural intervention & procedural complications not described
- Effect of pre-procedural & peri-procedural stroke not clear
- No independent validation
- Claim is not supported by their data
- Who cares anyway- can already do as many procedures as they want

## Advanced Carotid Arterial Disease IS a Risk Factor for Cognitive Impairment

Lazar et al, Stroke, 2021

However, elevated risk does not necessarily mean benefit from a particular intervention

## Multiple Causes of Cognitive Impairment In People with Carotid Arterial Disease

- Vascular dementia (multiple vascular territories)
- Alzheimer's disease
- Other neurodegenerative / psychiatric conditions
- Medication / polypharmacy
- Biochemical / metabolic disturbances
- Possibly ipsilateral reduced cerebral perfusion
- Exact diagnosis in life is often difficult / impossible
- Often multiple causes in an individual



## Carotid Procedures Unlikely to Help

- Procedures focus on improved circulation via 1 artery & cannot address other factors which are much more likely to dominate in causing cognitive impairment
- Existing studies inconclusive - *small & different definitions*
- No clear evidence of net procedural benefit for cognition (so, *CREST-H*)



Zhou et al, *JVS*, 2012; Paraskevas et al, *Eur J Vasc Endovasc Surg*, 2014 & 2022

## Note on CREST - H

Carotid Revascularization & Medical Management for Asymptomatic Carotid Stenosis Trial - Hemodynamics

- **Aim:** To determine if cognitive impairment attributable to cerebral hemodynamic impairment in high-grade asymptomatic carotid stenosis is reversible using CEA or CAS.
- **Subjects:** 385 hemodynamically & cognitively impaired CREST-2 patients
- **Hemodynamic impairment** defined by an inter-hemispherical MRI perfusion "time to peak" (TTP) delay on the side of stenosis
- Cognitive batteries at baseline & 1 year
- **Hypothesis:** Those randomized to a procedure will have better cognitive outcomes than those in the medical-only treatment arm
- Estimated completion : July 2027
- **Currently:** No indication for a carotid artery procedure to preserve/improve cognition

<https://classic.clinicaltrials.gov/ct2/show/NCT03121209>

## Non-invasive Arterial Care Works! Healthy Lifestyles & Medication

- The only proven beneficial intervention for carotid arterial disease & should always be utilised
- An holistic intervention
- Demonstrated to reduce risk of all stroke & all stroke types
- Growing evidence for it reducing the risk of cognitive impairment / dementia independently of stroke
- Stroke & cognitive impairment/dementia share risk factors



Abbott, *Front Neurol*, 2022; Gardener et al, *Nat Rev Neurol*, 2015; Ding et al, *Lancet Neurol* 2020; Peloso et al, *Neurology*, 2020; McGrath et al, *Neurology*, 2022

## Conclusions

- Cognitive impairment with carotid disease is multifactorial.
- Carotid procedures unlikely prevent or reverse cognitive impairment (*given complex pathogenesis & procedural risk*).
- Non-invasive arterial care benefits & should always be used.
- **Current priority:** stroke & dementia risk stratification studies with current best practice non-invasive care alone.



## Please Help Our Ukrainian Vascular Surgeons



<https://esvs.org/> (search 'Ukraine')