

Symptomatic near total occlusion. Urgent repair or leave it alone?

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The known unknowns of near total occlusion of the internal carotid artery

- The natural history of near total occlusion is unknown as there are no prospective observational studies
- The influence of variables that can affect the natural history, such as carotid plaque morphology and the status of the collateral circulation is not known.
- The effect of near total occlusion on cognitive function is not known

- Reduction of flow across a near total occlusion, may decrease the shear stress on the plaque and the risk of embolization.
- TCD has shown a significant reduction of microemboli from ICA stenosis >90%

Molloy and Markus, Stroke 1999

Hypothesis:

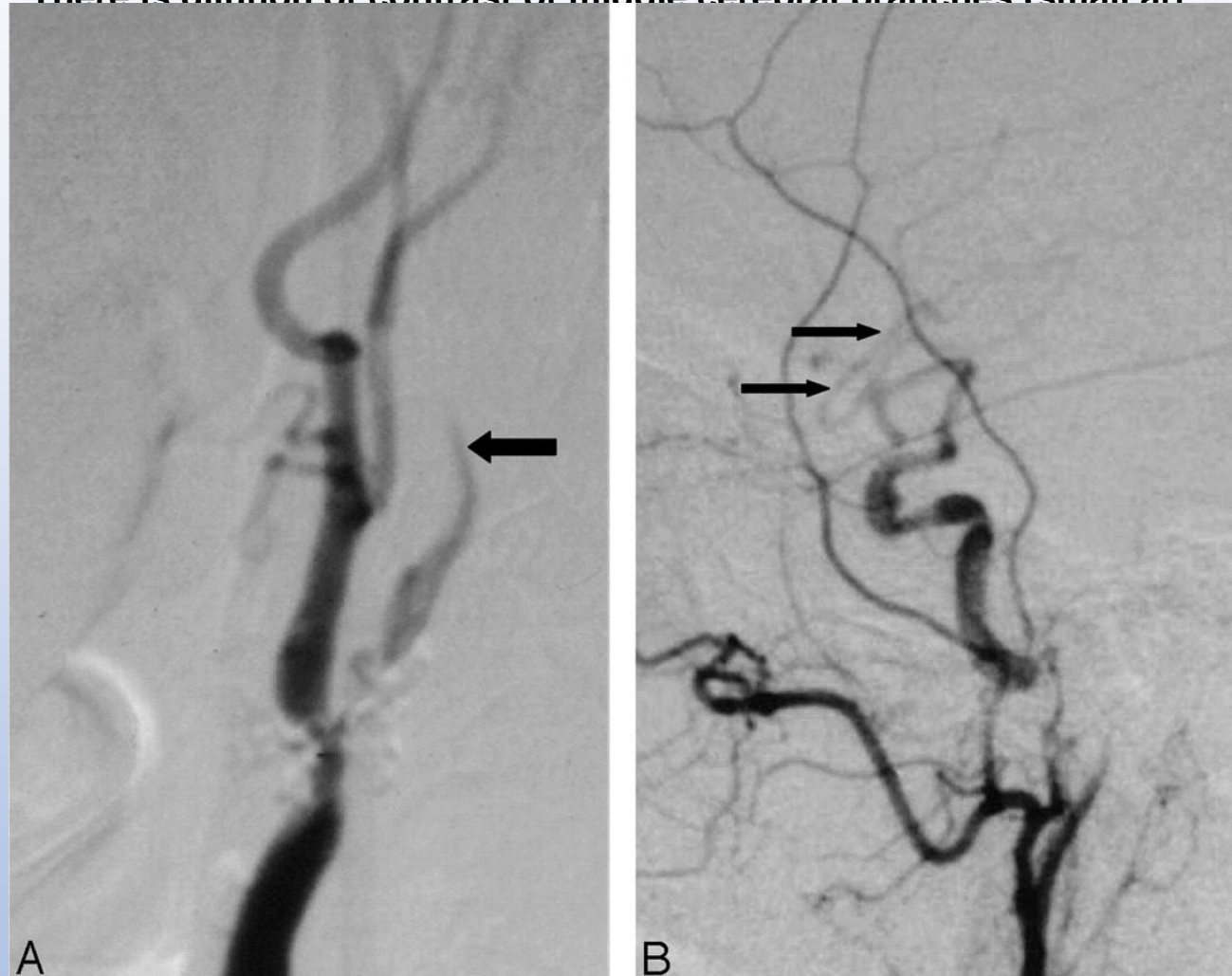
- The clinical behavior of near total occlusion may be significantly different from lesser degrees of severe carotid artery stenosis, hence there is a need for closer scrutiny of this group of patients.

Angiographic criteria that define near total occlusion

- Reduction of the ICA diameter compared to the ipsilateral ECA
- Reduced diameter of the ICA compared with the opposite ICA
- Intracranial collaterals seen as crossfilling contralateral vessels or ipsilateral contrast dilution
- Delayed cranial arrival of ICA contrast compared to the ECA

Fox et al , Am J Neuroradiol 2005

Delayed ICA filling and intracranial dilation from collaterals.A, Lateral carotid angiogram (neck view) shows delayed ICA filling (larger arrow) beyond the nearly occluded bulb stenosis.B, There is dilation of contrast of middle cerebral branches (small arr



Allan J. Fox et al. AJNR Am J Neuroradiol 2005;26:2086-2094



Analysis of pooled data from randomized controlled trials of CEA for symptomatic carotid stenosis

- Pooled data from ECST, NASCET and VA trial 309 were analysed.
- Pre-randomization of carotid angiograms from ECST were re-measured by methods used by the other 2 trials.
- Data from 6092 patients with 35000 patient years of follow up were pooled

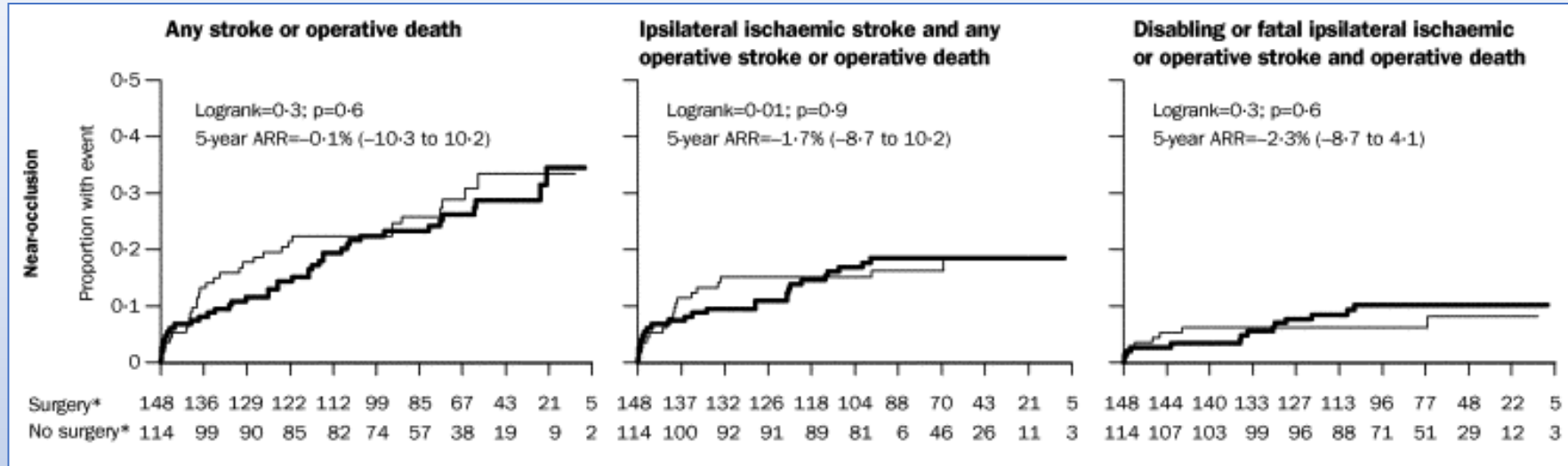
Rothwell et al; Lancet 2003

Analysis of pooled data from randomized controlled trials of CEA for symptomatic carotid stenosis

- There was a non significant trend towards benefit from surgery in patients with near occlusion at 2 years follow up (n=262, absolute risk reduction 5%, p=0.19) but no benefit at 5 years (absolute risk reduction -1.7%, p=0.9)

Rothewell et al; Lancet 2003

Effects of surgery on main study outcomes by degree of symptomatic carotid stenosis in analysis of pooled data from ECST, NASCET, and VA.



Thick line is surgical treatment; thin line is medical treatment.

PM Rothwell, et al. Analysis of pooled data from the randomised controlled trials of endarterectomy for symptomatic carotid stenosis. Lancet 2003

- The lower risk for cerebrovascular events in patients with near total occlusion, is probably related to the presence of a good collateral circulation.

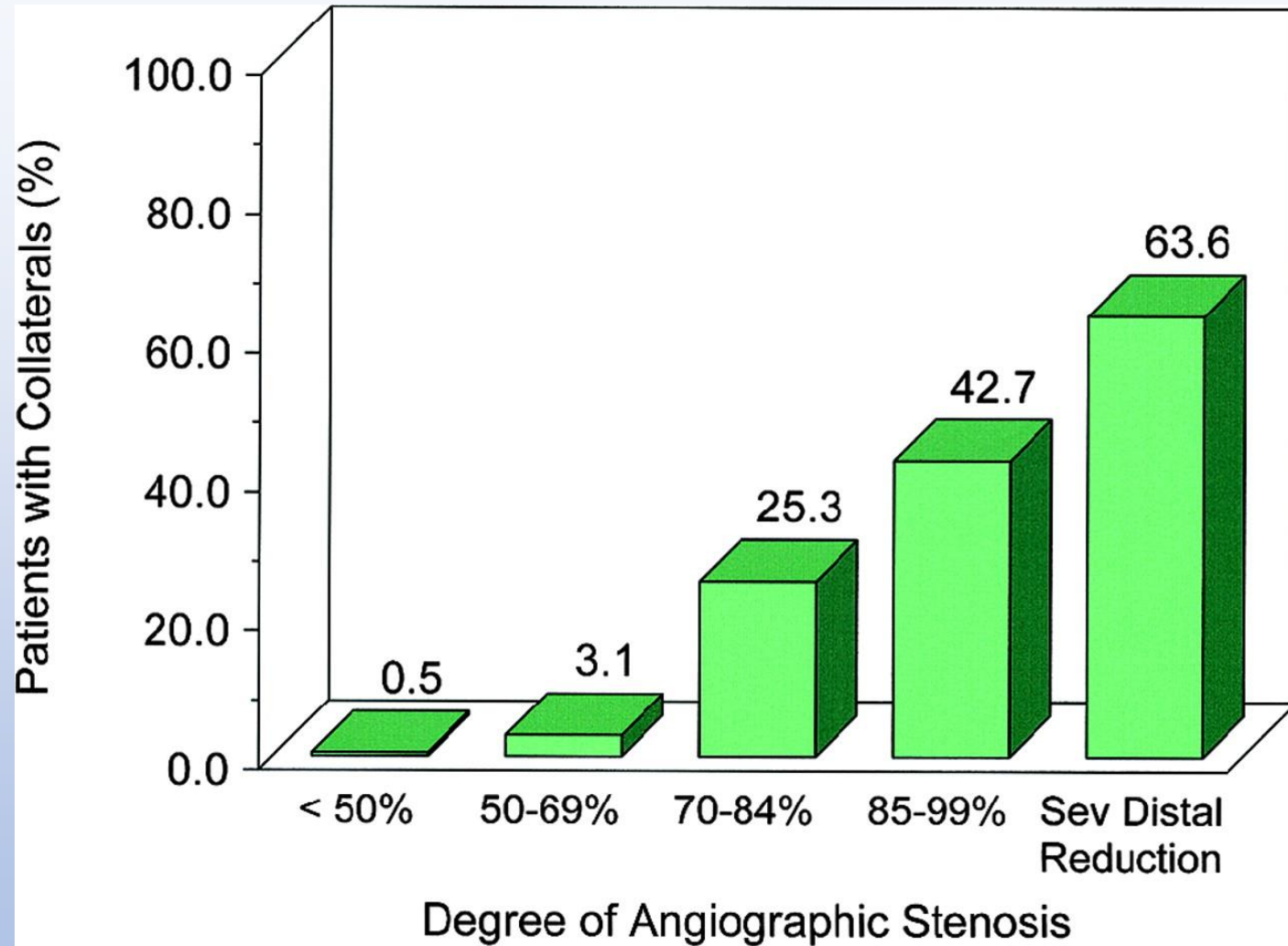
Angiographically Defined Collateral Circulation and Risk of Stroke in Patients With Severe Carotid Artery Stenosis

by Robert D. Henderson, Michael Eliasziw, Allan J. Fox, Peter M. Rothwell, and Henry J. M. Barnett

Stroke
Volume 31(1):128-132
January 1, 2000

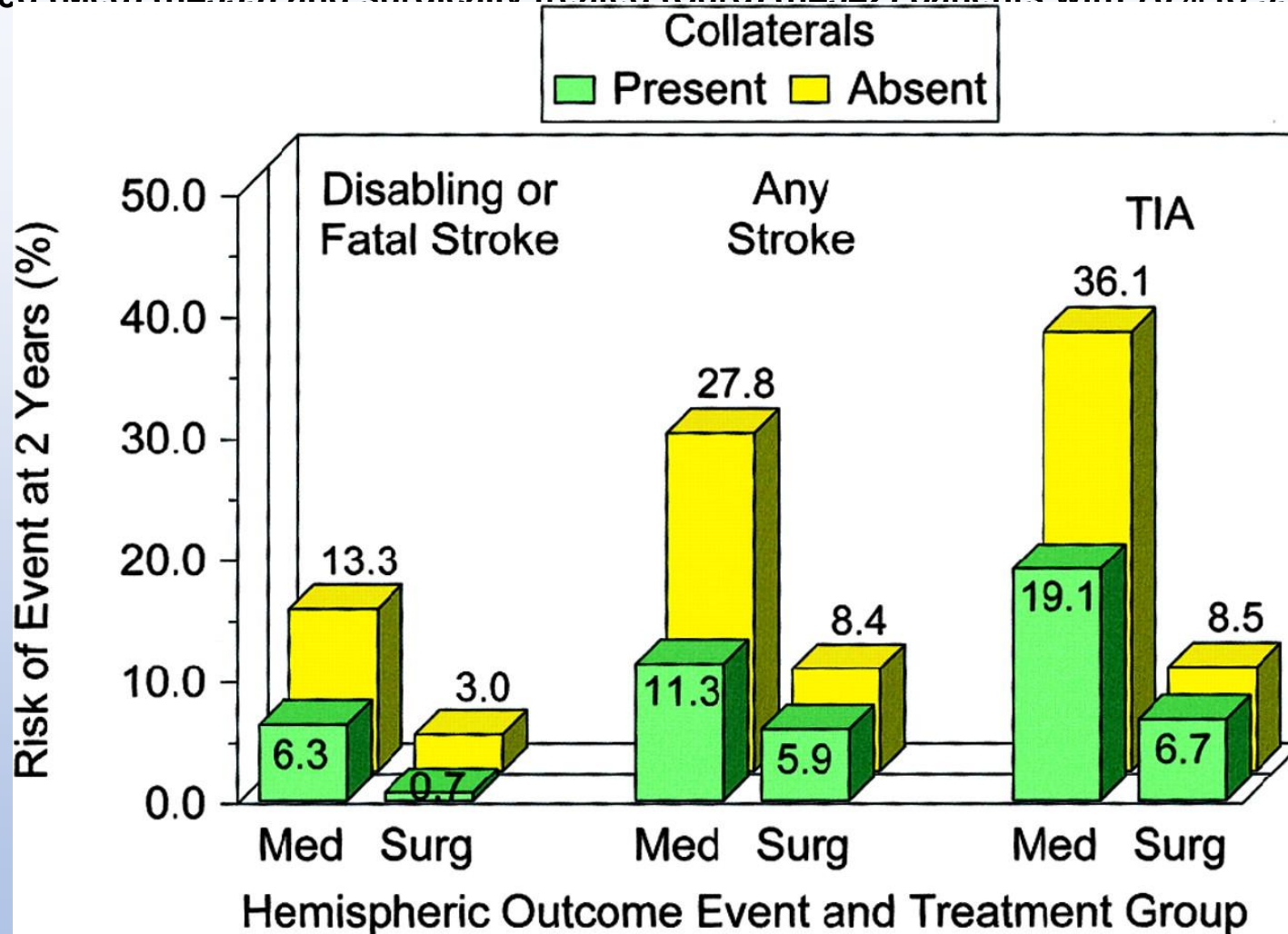


Percentage of patients with collaterals visualized on angiography by degree category of ICA stenosis.



Robert D. Henderson et al. Stroke. 2000;31:128-132

Effect of collaterals on risk at 2 years of ipsilateral hemispheric disabling or fatal stroke (left), any ipsilateral hemispheric stroke (middle), and ipsilateral hemispheric TIA (right) for medically treated (Med) (n=339) and surgically treated (Surg) (n=342) patients with 70% to 99% ICA



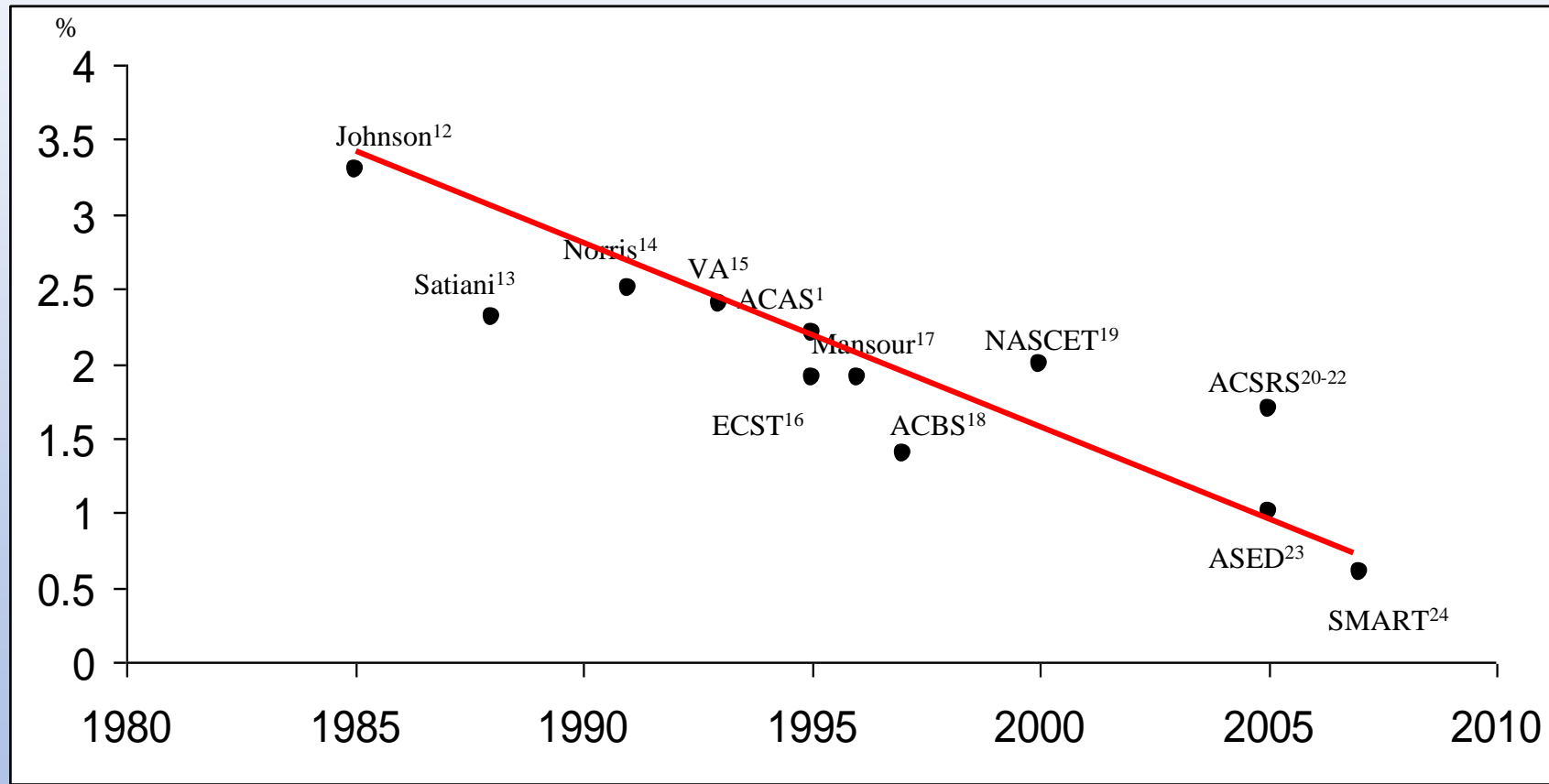
Robert D. Henderson et al. Stroke. 2000;31:128-132



- Patients with near total occlusion and poor collaterals that supply the hemisphere distal to the stenosis, may have a high risk of stroke and TIA. These patients could benefit from a carotid intervention, but this needs to be tested in future carotid trials.

- Best medical treatment has vastly improved over the last 20 years and the risk of stroke and death has declined. It remains to be seen whether these improvements may favor best medical treatment should future carotid trials include patients with near carotid occlusion.

Annual risk of ipsilateral stroke in asymptomatic patients with stenosis >50%



Carotid endarterectomy or carotid stenting are not recommended in symptomatic patients with a chronic internal carotid near-occlusion, unless associated with recurrent ipsilateral symptoms (despite optimal medical therapy) and following multidisciplinary team review.

Carotid guidelines, Recommendation 39, ESVS 2017

Conclusions

- Patients with near total internal carotid artery occlusion are distinct from patients with 70-99% stenosis and have a lower risk of stroke on medical treatment. There is no level one evidence to support that a carotid endarterectomy is beneficial for this group of patients.
- Till future carotid trials clarify best management, the treatment for the majority of these patients should be with best medical treatment.

