

Current best treatment for strokes apparent during or right after CEA, CAS,TCAR: Best diagnostic modalities and treatments; skills needed ?

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No Disclosures

Long-term outcomes of stenting and endarterectomy for symptomatic carotid stenosis: a preplanned pooled analysis of individual patient data.

Result: 1027 patients (511 CAS, 516 CEA). Primary outcome: Major stroke (IC, IJ) All stroke. The risk of events estimates are provided for all outcomes, including both preprocedural and postprocedural events on the left of the figure (A, C, E, G) and for postprocedural events only (ie, <24 days, B, D, F, H) on the right of the figure. p values are for treatment differences using the log-rank test. CAS=carotid artery stenting; CEA=carotid endarterectomy.

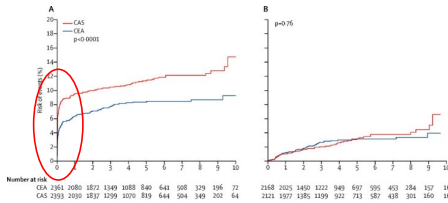


Figure 2. Kaplan-Meier estimates of risk of events for the primary outcome, postprocedural ipsilateral stroke, and the secondary outcomes of major stroke, minor stroke, and all stroke. (A) Primary outcome. (B) Postprocedural ipsilateral stroke. (C) Major stroke. (D) Minor stroke. (E) All stroke. The risk of events estimates are provided for all outcomes, including both preprocedural and postprocedural events on the left of the figure (A, C, E, G) and for postprocedural events only (ie, <24 days, B, D, F, H) on the right of the figure. p values are for treatment differences using the log-rank test. CAS=carotid artery stenting; CEA=carotid endarterectomy.

In the end.....it is all about the beginning !



Periprocedural events dominate the long term clinical benefit of carotid stenting and endarterectomy

Procedural strokes (ICSS & ACST1)

	Symptomatic patients		Asymptomatic patients
	CEA (n=27)	CAS (n=58)	CEA (n=53)
Stroke type			
- Ischaemic	21 (78)	56 (97)	43 (81)
- haemorrhagic	5 (19)	2 (3)	4 (8)
- unknown	1 (4)		6 (11)
Arterial Territory			
- ipsilateral	25 (93)	52 (90)	42 (79)
- contralateral / verteobasilar	2 (7)	4 (7)	9 (17)
- unknown		2 (3)	2 (4)
- Thrombo-embolism	12(45)	38 (62)	28 (56)

Huibers A et al. EIVES 2016

Timing of procedural stroke

Procedure performed under *general anaesthesia* (symptom free interval)



Procedure performed under *local anaesthesia*



Etiology of *intra*-procedural stroke

- **Emboli**
 - unstable carotid plaque
 - manipulation (stent, dissection, shunt insertion)
 - cardiac emboli
 - Air embolisation (shunt dysfunction)
- **Hypoperfusion**
 - clamping, difficulty placing shunt, balloon dilation
 - hypotension (baroreceptor)
- **Thrombus**
 - shunt / artery thrombosis
 - secondary to hypotension

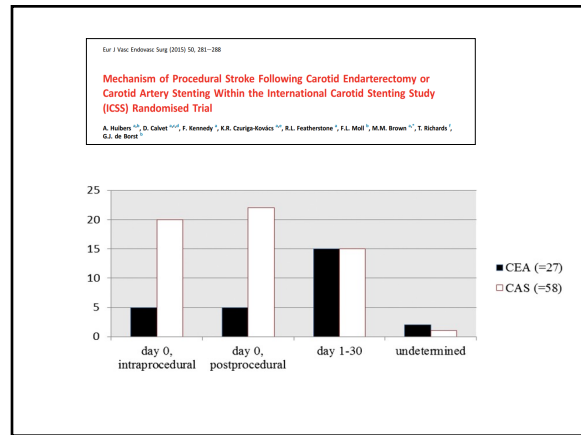
Etiology post-procedural stroke

- **Emboli**
 - endarterectomized surface, intimal flap
 - external carotid artery
 - cardiac emboli
- **Hypoperfusion**
- **Hyperperfusion**
- **Thrombus**
 - surface thrombosis
 - disturbed haemostasis
 - technical errors

Primary mechanism of stroke reduction in transcarotid artery revascularization is dynamic flow reversal

Isaac N. Naazie, MD, MPH^{1,2}; Gregory A. Magee, MD, MSc³; Asma Mathlouthi, MD⁴; Nadin Elsayed, MD⁵; Hanaa Dakour-Arindi, MD⁶; and Mahmoud B. Malas, MD, MHS⁷; La Jolla and Los Angeles, Calif

Conclusions: Compared with TCAS-DEP, TCAR was associated with a lower risk of perioperative stroke or death and stroke. This finding implies that dynamic flow reversal might provide better neuroprotection than does a distal embolic filter in reducing the perioperative risk of stroke. Avoiding the aortic arch did not confer any reduction in the stroke rate. The present findings serve to separate the clinical benefit of dynamic flow reversal from that of avoiding the aortic arch during TCAR. *D Vasc Surg* 2021;74:187-94.



Carotid and supra-aortic arteries Eur J Vasc Endovasc Surg (2021) 62, 350–357

Clinical Response to Procedural Stroke Following Carotid Endarterectomy: A Delphi Consensus Study

Annelle J.A. Meervoort¹, Dierre D. de Waard², Jaap Trappenburg³, Clark J. Zeebregts⁴, Richard Bulbulia⁵, Jaap L.J. Kappelle⁶, Ger J. de Bont⁷, on behalf of the Delphi consensus experts panel⁸

WHAT THIS PAPER ADDS
This study provides valuable insight into expert opinion regarding the optimal clinical management of a patient who experiences an in-hospital stroke during or following CEA. Quick diagnostics should be performed initially in most phases, but re-exploration of the index carotid artery should be performed in patients who experience an ipsilateral intra-operative stroke during restoration of blood flow until the end of the CEA procedure. If diagnostics should be performed, an expedited CT brain combined with a CTA or duplex ultrasound of the carotid arteries is recommended.

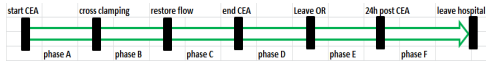
Aim: to develop a treatment algorithm if an in-hospital stroke occurred during or after CEA

Methods

- Delphi consensus study
- Multinational panel
- N=31
- Vascular surgeon or neurologist
- Expertise on stroke care
- 4 rounds

M Björck	J Bismuth
S Debus	JM Antti
H. Eckstein	L Bonati
P. Glowacki	T Brodt
A Halliday	D Calvet
S Kakkos	S Engelter
I Koncar	D McCabe
A Naylor	P Nederkoorn
D Rastak	P Ringieb
M Schermerhorn	M Paciaroni
H Sillescu	C Weimar
V Röwa	J Pettersson
M Vega de Ceniga	D Leys
F Vermissen	E Leira
C Zeebregts	M Uytendboogaard
F Bestos Goncalves	

Methods



- a) Perform diagnostics
- b) Re-open the carotid
- c) Wait and see

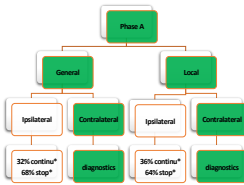
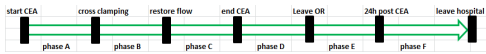
Results

Response rate

Round 1:	100%
Round 2:	90%
Round 3:	87%
Round 4:	77%

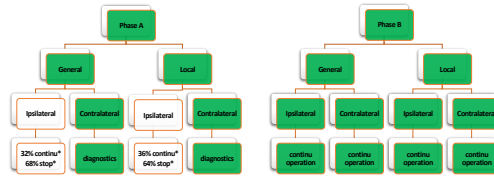
Consensus rate = 80%

Results



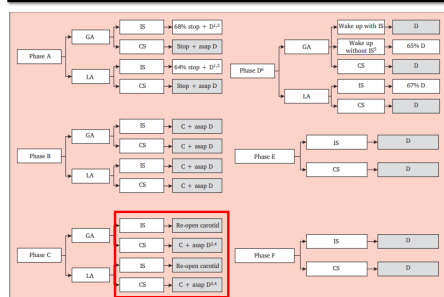
*Severe stroke: stop; mild stroke: continu

Results



*Severe stroke: stop; mild stroke: continu

Treatment decision tree



GA= general anesthesia; LA= local anesthesia; IS= ipsilat stroke; CS=contralat stroke;
C = continue operation / D = diagnostics

Conclusions

In CEA patients with stroke expedited diagnostics should be performed initially in most phases.

In patients who experience an ipsilateral intra-operative stroke following clamp release, immediate re-exploration of the index artery is recommended.

