

**ISNVD**  
International Society for  
Neurovascular Disease



# Timing And Results Of CEA In Acute Setting

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**Editor's Choice — Management of Atherosclerotic Carotid and Vertebral Artery Disease: 2017 Clinical Practice Guidelines of the European Society for Vascular Surgery (ESVS)**

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 ESVS Guidelines Committee<sup>b</sup>, P. Kolh, N. Chakfe, R.J. Hinchliffe, I. Koncar, J.S. Lindholt, M. Vega de Ceniga, F. Verzini,  
 ESVS Guideline Reviewers<sup>c</sup>, J. Archie, S. Bellmunt, A. Chaudhuri, M. Koelemay, A.-K. Lindahl, F. Padberg, M. Venermo

30-day death/stroke rate:

- 2.4% CEA was performed <48 hours of symptom onset.
- 1.8% when CEA was performed between 3 e 7 days.
- 0.8% where CEA was performed between 8 and 14 days.

Sharpe R, Sayers RD, London NJ, Bown MJ, McCarthy MJ, Nasim A, et al. Procedural risk following carotid endarterectomy in the hyperacute period after onset of symptoms. Eur J Vasc Endovasc Surg 2013;46:519e24.



Recommendation 40	Class	Level
When revascularisation is considered appropriate in symptomatic patients with 50–99% stenoses, it is recommended that this be performed as soon as possible, preferably within 14 days of symptom onset	I	A
Recommendation 41		
Patients who are to undergo revascularisation within the first 14 days after onset of symptoms should undergo carotid endarterectomy, rather than carotid stenting	I	A

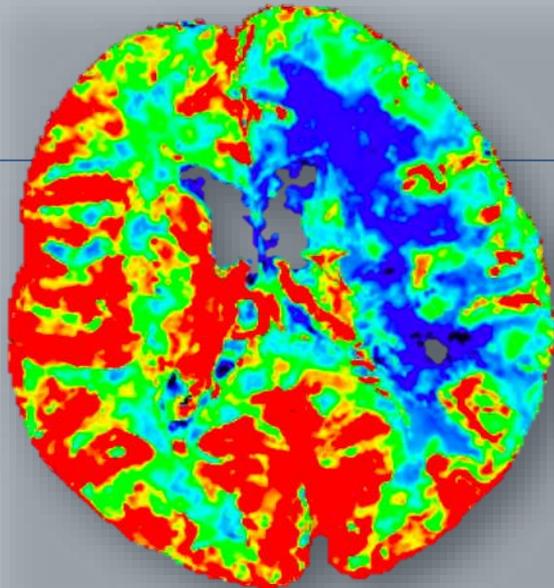


# Why very early CEA?

## Preventive CEA:

Prevents an early ICA occlusion and new emboli. Stenoses > 50-99% the early stroke risk is:

- 5-8 % at 48 h
- 17% at 72 h
- 8-22% at 7 days
- 11-25% at 14 days



## Time is brain:

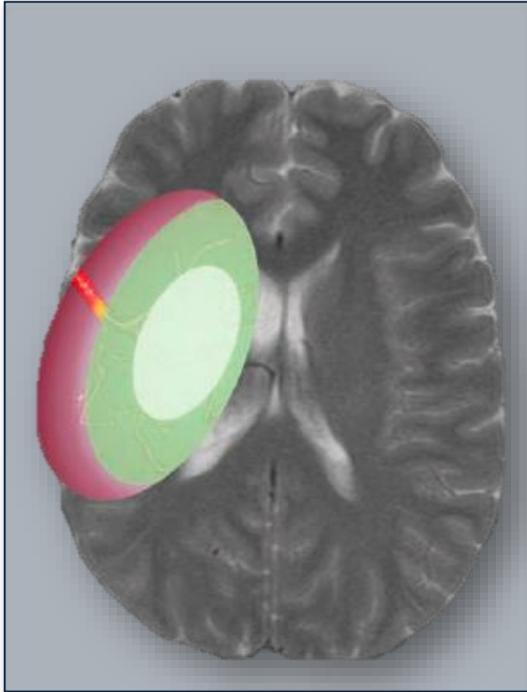
Allows immediate improvement of cerebral blood flow and revascularisation of the ischaemic penumbra.



# TIME IS BRAIN

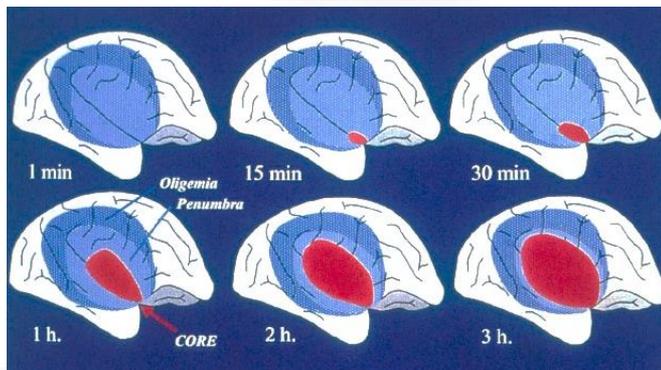
carotid intervention could be “curative” surgery

## What Is Dead May Never Die



The ischaemic penumbra is an area of cerebral tissue localised in the periferic ischemic core which appears

- Severly low perfused
- Reversebly damaged due to function imparment, but structurally intact related to vasodilatation produced by collateral circles.
- still vital and potentially recoverable in case of consequently reperfusion
- risk of infarct within 8-10 hours if not reperused



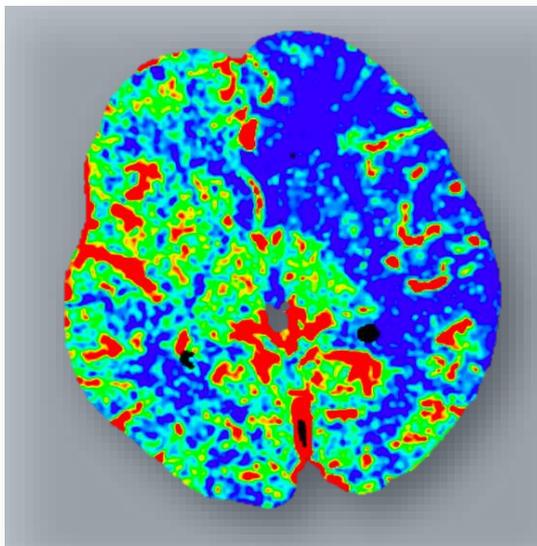
	Neurons Lost	Synapses Lost
Per Stroke	1.2 billion	8.3 trillion
Per Hour	120 million	830 billion
Per Minute	1.9 million	14 billion
Per Second	32 000	230 million



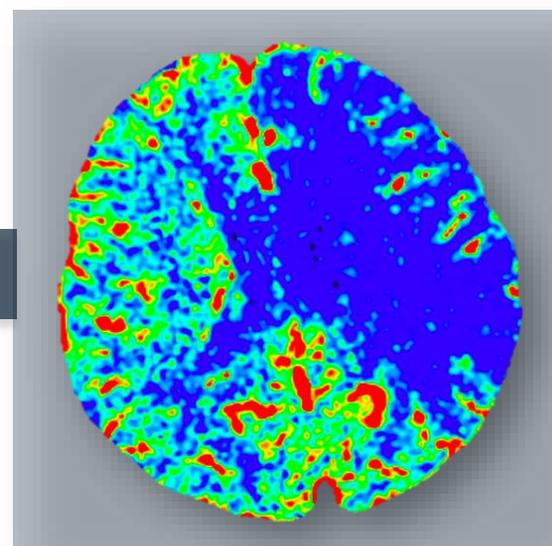
# CEA as soon as possible

- Full recanalisation of middle cerebral arteries
- Absence of any haemorrhagic transformation
- An ischaemic infarct inferior to one-third of the middle cerebral artery (MCA) territory

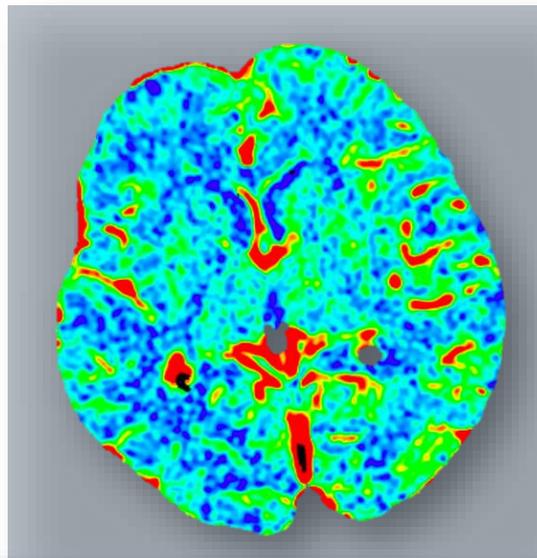




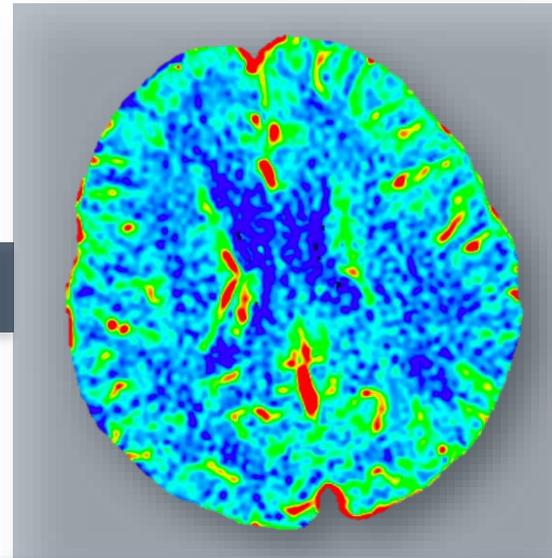
CBF



- Significant ischaemic penumbra on perfusion CT scan
- High grade symptomatic carotid stenosis (>70%) or acute extracranial carotid occlusion.



CBV



# Extracranial Carotid occlusion

	<b>Carotid Occlusion</b>
n.	15 M/6F
Age (y)	68±12
Onset to CEA time (min)	451±262

All patients had stroke in evolution

ASPECTS score was 10 in ten patients, 9 in four, and 8 in four, 7 in three



NIHSS at onset

11.0±7.5

NIHSS at 24 h

9.0±9.6

Clinical improvement in 16 patients at 24 hours

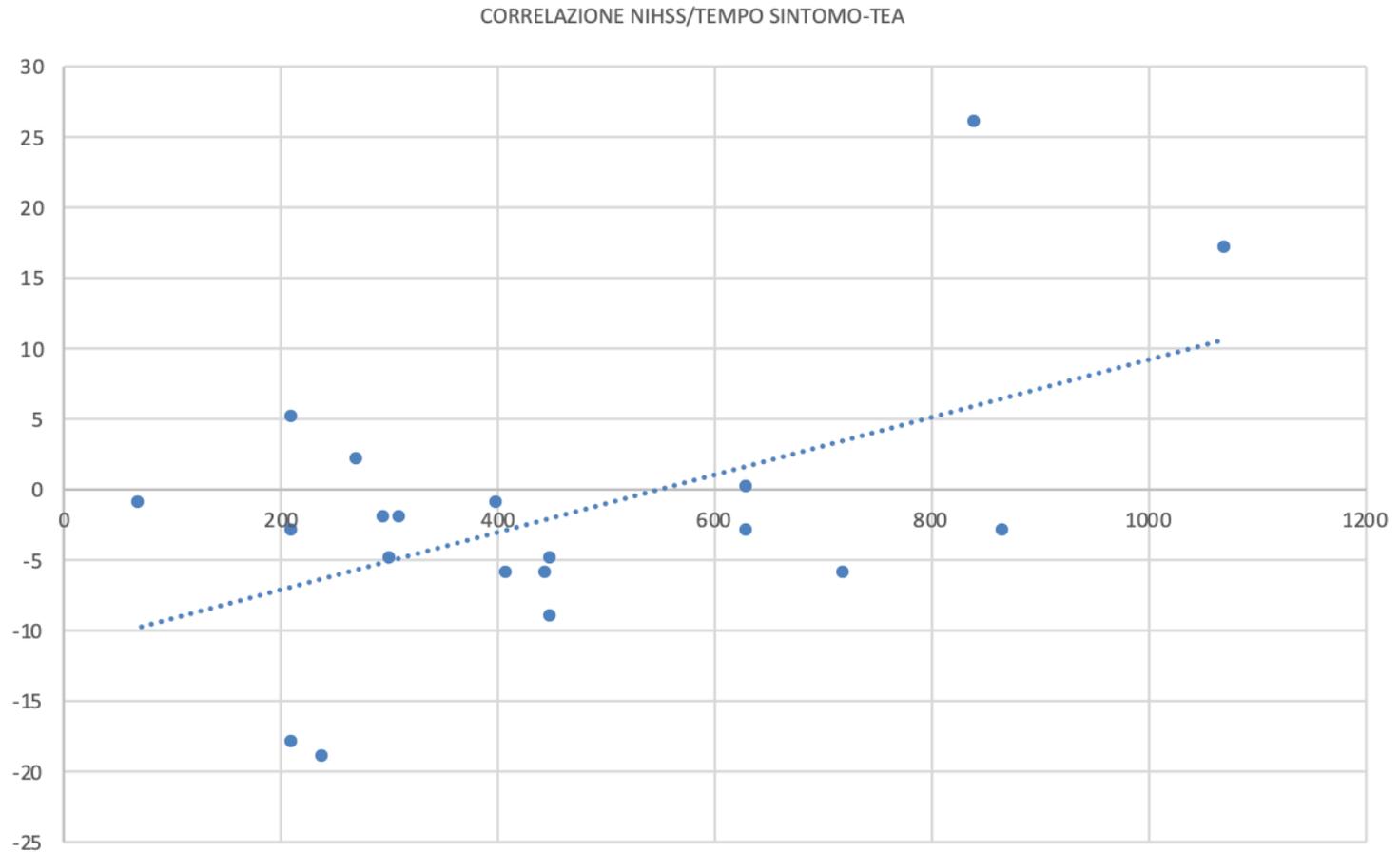
Post-operative CT scans were negative for haemorrhagic transformation

1 patients had acute myocardial infarction 3 days after CEA.

NO stroke within 3 months of CEA



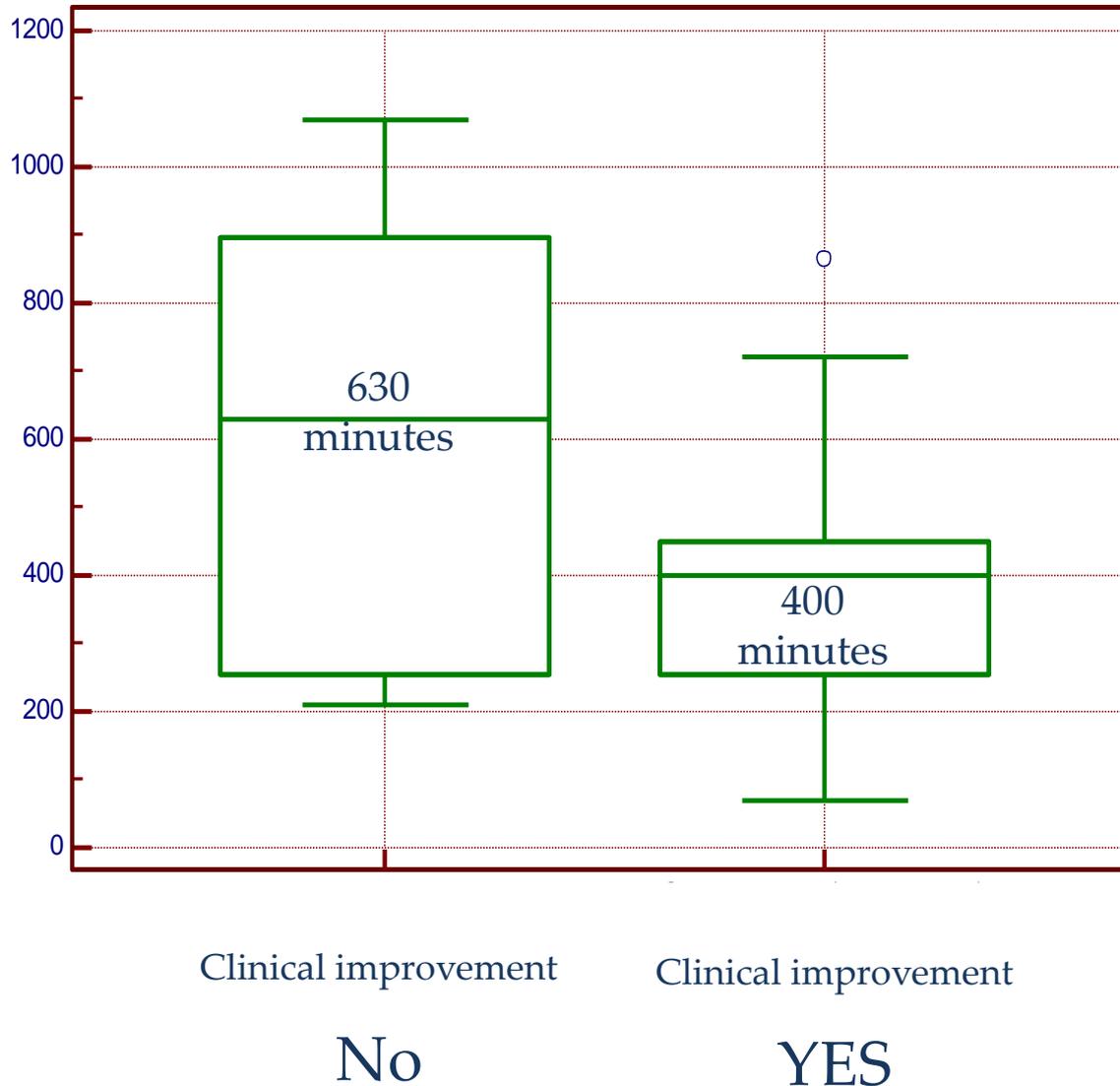
# Early CEA in carotid occlusion



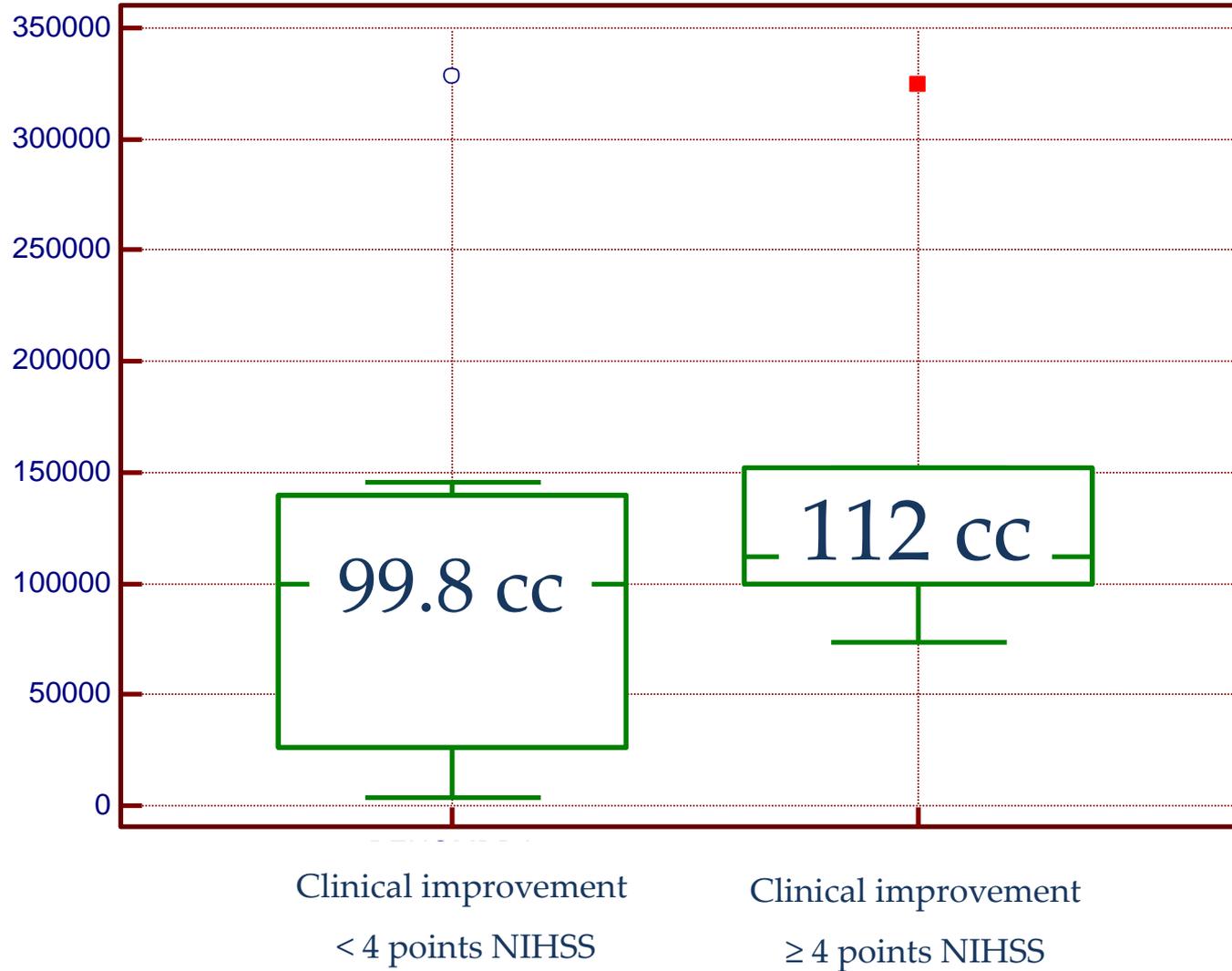
Onset to CEA time (min) and clinical variation



## Onset to CEA time (min) and clinical improvement



# Ischaemic penumbra volume



	Anno	n. Pz	Mediana IVT-TEA	Rischio stroke/morte a 30 giorni	Emorragia intracranica
Mc Pherson	2001	5	48 h	0/5 (0%)	0/5 (0%)
Bartoli	2009	12	8 d	1/12 (8.3%)	1/12 (8.3%)
Crozier	2010	10	8d	0/10 (0%)	0/10 (0%)
Leseche	2012	7	6d	0/7 (0%)	0/7(0%)
Rathenborg	2013	22	11d	0/22 (0%)	0/22 (0%)
Yong	2013	7	7 d	1/7 (14%)	1/7 (14%)
Koraen Smith	2014	71	10 d	2/71 (2.8%)	0/71 (0%)
Rathenborg	2014	202	12 d	7/202 (3.5%)	
Benes	2014	5	12 h	0/5 (0%)	0/5 (0%)

How long after thrombolysis should I delay CEA to minimise the perioperative risk whilst also minimizing the risks of further embolization and stroke?



# Results

## Very Early Carotid Endarterectomy After Intravenous Thrombolysis

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	<b>IVT-CEA within 12 h (n=11)</b>
n. Sex	11 M
Age (y)	67.9±10.7
Onset to needle time (min)	167±50
Thrombolysis to CEA time (min)	253±108
Onset to CEA time (min)	455±162

Nine had stenosis >90% and a stroke in evolution  
Two had an unstable carotid plaque

ASPECTS score was 10 in eight patients, 9 in two, and 8 in one

NIHSS at onset	10.0±6.3
NIHSS after thrombolysis	7.5±1.9
NIHSS at 24 h	5.0±3.8

Post-operative CT scans were negative for haemorrhagic transformation

One patient died from acute myocardial infarction 3 days after CEA.  
This patient's post-operative NIHSS score was 2

NO stroke within 3 months of CEA

30 d mRS 0-2 (n)	10
3 mo mRS 0-1 (n)	9
3 mo mRS 0-2 (n)	1



# Conclusion

The present case series suggests that a fast surgical approach to acute extracranial carotid occlusion could be considered

**THERAPEUTIC**

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Very early carotid endarterectomy after thrombolysis

**MAY BE SAFE**

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Careful presurgical evaluation, including penumbra imaging, is essential.

