When Is Urgent (Within 48 Hours) CEA Or CAS Fairly Indicated After A Stroke: How Does Use Of tPA Influence Indications And Neurologic Outcomes In This Setting?

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Ochsner Health

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Crescendo TIAs & Stroke-in-Evolution (SIE) Fluctuating Neurologic Symptoms

Vulnerable (Unstable) Plaque

Fibrous cap thinning → Plaque rupture mechanism for a recurrent stroke following a TIA or stroke

Risk of ipsilateral ischemic stroke recurrence after initial carotid-related TIA or stroke

% Risk	Days	
2 - 8	2	Fluctuating Symptoms
4 - 17	3	
4 - 22	7	
7.5 - 25	14	

Emergent (Within 48 Hours) CEA Or CAS for Crescendo TIAs and SIE

How Thrombolysis & NIHSS Influence Neurologic Outcomes

NIHSS → Objective Criteria to Assess Stroke Severity
mRS → Outcome Measure for Post-Stroke Functional Dependence

Ischemic brain lesion on imaging has strong correlation with NIHSS

Stroke severity NIHSS		
< 4	minor	
5 – 15	moderate	
16 – 20	moderate-severe	
21 – 24	severe	

Impacted Brain Density

Neurologic Outcomes	mRS		
0	asymptomatic	
1	no significant disability (facial droop)	Functional Independence
2	slight disability (grip problems)	
3	moderate disability (walks w/out assistance)	
4	moderate severe disability (needs assistance to walk)	Functional Dependence (on caregiver)
5	Severe disability (bedridden)	
6	Death	

modified Rankin Scale

U.S. 'Stroke Belt'

Regionalization Stroke Care with Increasing Comprehensive Stroke Centers

CDC, U.S. Stroke Death Rates, 2018 - 2020

Ochsner Tele-Stroke Network

Urgent CEA/CAS

New Orleans, LA

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Crescendo TIAs & Stroke-in-Evolution

These are **Rare cases**
- ✓ Previously **functional**
- ✓ No **ICH**
- ✓ Core **infarct (small)** and penumbra **(large)**

Consider going for it

Emergent CAS MoMA (Proximal Protection) + Aspiration

Emergent CEA + Aspiration

Pre-   Post-

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Presenting Stroke Severity & Outcomes in all Acute Stroke Interventions

For acute carotid interventions

Presenting NIHSS Score Influences Odds of Functional Independence (mRS ≤ 2)

Functional independence (mRS of ≤2)[c]	
NIHSS 0-10 vs >10	**3.11 (1.33-7.33)**

- ✓ The **odds** of **functional independence** (**mRS ≤ 2**) following uCEA/uCAS are **3x-higher** if the presenting **NIHSS ≤ 10** vs. NIHSS > 10

- ✓ Those presenting with an **NIHSS ≤ 10** do significantly better with urgent carotid interventions (**3x better**) compared to NIHSS > 10

Rivera A...Bazan HA. Neurologic outcomes of carotid and other emergent interventions for ischemic stroke over 6 years with dataset enhanced by machine learning. J Vasc Surg 2022

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Thrombolysis may Pose Increased Risk

Stroke & Death; ICH / bleeding

A Systematic Review and Meta-analysis of Peri-Procedural Outcomes in Patients Undergoing Carotid Interventions Following Thrombolysis

Kakkos SK, Vega de Ceniga M, Naylor R. A Systematic Review and Meta-Analysis of Peri-Procedural Outcomes in Patients Undergoing Carotid Interventions Following Thrombolysis. Eur J Vasc Endovasc Surg 2022

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Thrombolysis Patients Presenting with Higher Stroke Severity

Higher mortality

- ✓ Patients receiving thrombolysis are presenting with **more severe stroke (higher NIHSS scores)**, requiring more aggressive intervention

  - **Stroke Severity** (NIHSS): **7.6** vs. **3.8**
  P < 0.001

Hayson A...Bazan HA. Impact of presenting stroke severity and thrombolysis on outcomes following urgent carotid interventions. J Vasc Surg 2023

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Guidelines Urge Caution Amid Limited Evidence

CEA within 24h for cTIAs & SIE

		Strength of Recommendation	Evidence Quality
ESVS 2023	✓ Stroke-in-evolution or crescendo TIAs < 24h	IIA: Moderate	Low

Recommendation for 'Acute neurologic syndrome'

- ✓ **Repetitive** episodes (cTIAs) unresponsive to antiplatelet therapy should be considered for **urgent CEA**.

SVS 2022
- ✓ SIE/cTIAs **within 24 hours**
- ✓ After IV thrombolysis, early CEA (≤14 days) is viable **if rapid recovery (mRS 0–2), infarct <30% MCA,** recanalized MCA, **no ICH** and minimal brain edema.

Naylor AR et al. European Society for Vascular Surgery (ESVS) 2023 Clinical Practice Guidelines on the Management of Atherosclerotic Carotid and Vertebral Artery Disease. Eur J Vasc Endovasc Surg 2023
AbuRahma, AH et al. SVS Clinical Practice Guidelines for Management of Extracranial Cerebrovascular Disease. J Vasc Surg 2022

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Conclusions: CEA or CAS within 48 hours

Crescendo TIAs & Stroke-in-Evolution: Rare cases – Fluctuating Symptoms < 24 hrs
- ✓ Consider CEA / CAS:
  - No ICH
  - Previously highly functional
  - Small core infarct & large ischemic penumbra

- ✓ Stroke severity (NIHSS) is **strongest predictor** of **neurologic outcomes (mRS)**

- ✓ Thrombolysis increases bleeding risk, but it's associated with **better neurologic outcomes**

- ✓ Don't deny a patient CEA or CAS simply because they received thrombolysis, **especially in cTIAs/SIE**

Vulnerable Carotid Plaque | Crescendo TIAs Stroke-in-evolution | Thrombolysis | Mechanical Endovascular Reperfusion (MER) | Stroke Severity (NIHSS) & Timing to CEA / CAS | Emergent / Urgent CEA or CAS | Neurologic Outcomes modified Rankin Scale (mRS)

t = 0   t < 4.5h   Critical Intervention Window   t < 24h

Functional Independence mRS = 0 – 2

Dependence mRS = 3 – 5

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Thank you