



A Practical Guide To Acute Stroke In Rural Emergency Departments

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Emergency Medicine For Rural & Indigenous Communities Conference

April 28, 2026

Disclosures & Expectations

Disclosures

I write questions for the American Academy of Neurology Question of the Day App
Claude (AI) was used to aid in the creation of certain portions of this presentation.

What This Talk IS

- Designed primarily for sites without neurology
- Based on NCHCT ± CTA (no MRI/CTP required)
- Focused on acute stroke management

What This Talk Is NOT

- A substitute for local protocols
- One-size-fits-all (adapt to your site)
- Focused on long term stroke management

Learning Objectives

By the end of this session, you will understand:

1. High-yield bedside stroke assessments
2. The importance of emergent neuroimaging (NCHCT and CTA) to guide immediate treatment decisions.
3. How to safely determine eligibility for IV thrombolytics.
4. How to identify patients who require urgent transfer for endovascular thrombectomy.
5. How to integrate telestroke consultation effectively into local stroke workflows when available.
6. A few bonus things about MRI.







Rapid Stroke Recognition & Exam

Time is Brain!
Act FAST!



BE FAST Stroke Screening

B

Balance

Sudden loss of balance or coordination

E

Eyes

Sudden vision change in one or both eyes

F

Face

Facial droop — ask to smile

A

Arms

Arm weakness — ask to raise both arms

S

Speech

Slurred or strange speech — ask to repeat a phrase

T

Time

Time to call 911 and note time of onset

Why BE FAST > FAST?

FAST misses posterior circulation strokes. Adding Balance and Eyes improves sensitivity for vertebrobasilar events (cerebellar stroke, basilar occlusion).

Other Pre-Hospital Screening Scales

Cincinnati Prehospital Stroke Scale
Los Angeles Prehospital Stroke Screen
LAMS
RACE
ROSIER.

Scale	Typical Cut-off	Sensitivity	Specificity
FAST	Any abnormal	~77%	~60%
BEFAST	Any abnormal	~68%	~85%
Cincinnati Prehospital Stroke Scale (CPSS)	≥1 abnormal	~81%	~57–81%
Los Angeles Prehospital Stroke Screen (LAPSS)	Positive screen	~74–91%	~85–97%
Los Angeles Motor Scale (LAMS)	≥4	~65–80%*	~60–85%*
Rapid Arterial Occlusion Evaluation (RACE)	≥5	~68–85%*	~60–79%*
Recognition of Stroke in the Emergency Room (ROSIER)	≥1	~80–92%	~70–86%

VAN Score

Step 1: Motor Weakness



V

Vision

Gaze Deviation or VF Deficit

A

Aphasia

Expressive or Receptive

N

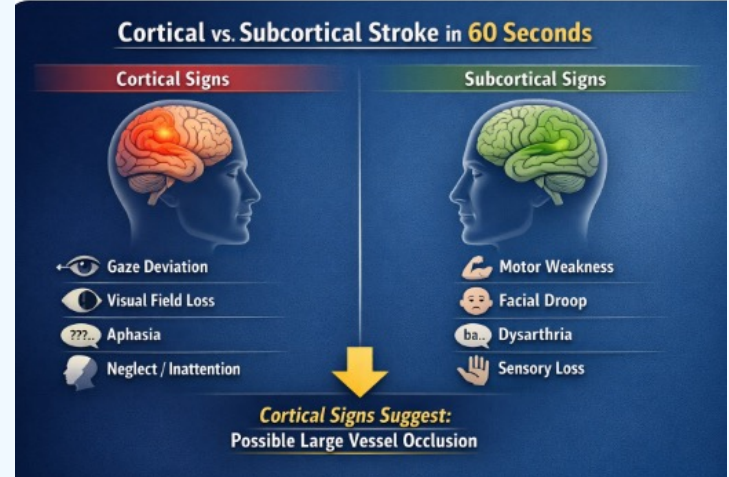
Neglect

Benefits

Faster than RACE (only takes 30 seconds)

More specific than LAMS










Screen positive or negative rather than complicated score



NIHSS: What You Need to Know

Essentials

- Score 0–42; higher = more severe deficit
- Useful for communication & tracking change
- Weighted toward anterior circulation — underestimates posterior strokes

1	Level of Consciousness	0-3	Assess alertness, report
2	Gaze 	0-2	Gaze palsy
3	Visual Fields 	0-3	Visual field loss
4	Facial Weakness 	0-3	Facial asymmetry
5	Arm Weakness 	0-4	Use o either arm
6	Leg Weakness 	0-4	Use o either leg
7	Limb Ataxia 	0-2	Finger-nose or heel-shin testing
8	Sensation 	0-2	Sensory loss
9	Language 	0-3	Naming, repetition, commands
10	Dysarthria 	0-2	Slurred/unclear speech
11	Extinction & Inattention	0-2	Visual/sensory neglect, dual extinction

Total Score: _____ / 42

Debilitating Symptoms

0–5

Would the symptoms be debilitating?

Debilitating – Unable to BATHE, complete hemianopsia, severe aphasia, severe neglect, motor deficits with inability to keep the extremity off the bed

6 OR HIGHER

Should consider lytic; greater chance of LVO

Posterior Circulation

Posterior Circulation Red Flags

- Acute vertigo + any neurologic sign
 - Diplopia
 - Facial droop
 - Dysarthria or dysphagia
 - Ataxia (truncal or limb) — out of proportion to weakness
 - Crossed findings (ipsilateral face + contralateral body)
 - Decreased consciousness with any of the above



Stroke Mimics: Don't Get Fooled

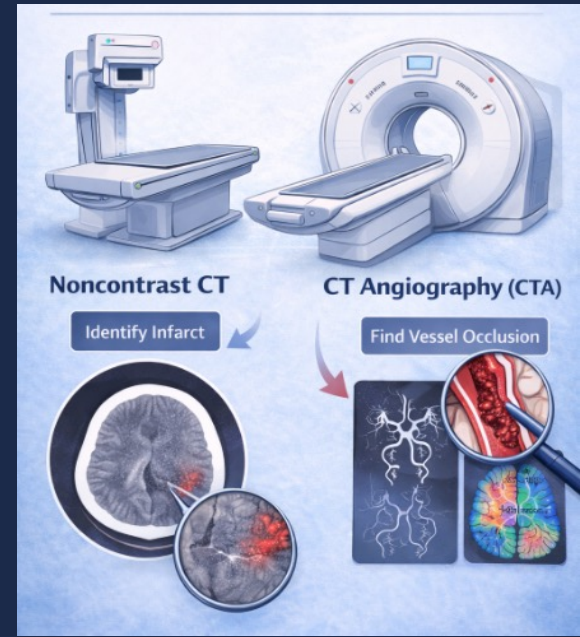
Up to 30% of stroke codes are mimics — but don't let that delay treatment

Mimic	Key Differentiating Features	ED Action
Hypoglycemia	Focal deficits resolve with glucose correction	Treat glucose first and then reassess
Todd's paralysis (postictal)	Witnessed seizure; deficits typically resolve over minutes–hours	If no witnessed seizure or unclear history, often <u>have to treat</u> as stroke until proven otherwise
Complex migraine (hemiplegic)	Prior similar episodes; gradual onset with positive symptoms ("march"); headache; younger patient	If first episode or unclear, often <u>have to treat</u> as stroke until proven otherwise
Functional neurological disorder (FND)	Inconsistent exam; Hoover's sign; give-way weakness; non-anatomic pattern	Do NOT delay imaging to "prove" FND



Imaging:

What You Need, When You Need It



Imaging in Your ED

Non-Contrast Head CT (NCHCT)

Purpose: Rule out hemorrhage BEFORE thrombolytics

What to look for:

- Hemorrhage → no thrombolytics
- Large Hypodensity
- Hyperdense vessel sign → suggests LVO

Normal CT does not rule out stroke

CT Angiography (CTA)

Purpose: Identify LVO for EVT triage

Make sure to get CTA for:

- NIHSS ≥ 6 and/or VAN positive
- Cortical signs (gaze deviation, neglect, aphasia)
- Clinical suspicion for LVO

Do NOT delay thrombolytics for CTA

CTA identifies who needs transfer for EVT and determines transfer urgency

What about CT Perfusion

2a

B-R

1. In patients with AIS who (a) have unknown time of onset and are within 4.5 hours from symptom recognition and (b) have an MRI-DWI lesion smaller than one-third of the MCA territory and no marked signal change on FLAIR, IVT administered within 4.5 hours of stroke symptom recognition can be beneficial to improve functional outcomes.¹

2a

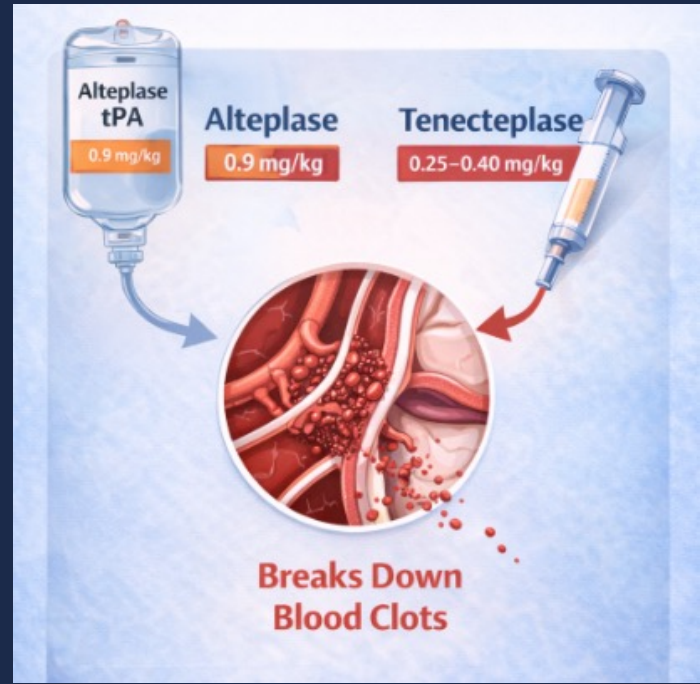
B-R

2. In patients with AIS who have salvageable ischemic penumbra detected on automated perfusion imaging and who (a) awake with stroke symptoms within 9 hours from the midpoint of sleep or (b) are 4.5–9 hours from last known well, IV thrombolysis may be reasonable to improve functional outcomes.^{2,3}

2b

B-R

3. In patients with AIS due to LVO with salvageable ischemic penumbra, presenting within 4.5 to 24 hours from symptom onset or last known well, and who cannot receive EVT, treatment with IVT directed by individuals with expertise in thrombolytic stroke care may be beneficial to improve functional outcomes.²⁻⁵



Thrombolytics: Who Gets Treated & How

Thrombolytic Eligibility: The Basics

Last Known Well (LKW) — The last time the patient was seen at their neurological baseline. This is NOT time of symptom discovery.

Inclusion Criteria

Clinical diagnosis of suspected ischemic stroke with measurable, disabling deficit.

LKW within 4.5 hours. If access to telestroke, CTP, or MRI then can consider extended window administration.

Generally age ≥ 18 years. However, pediatric patients can be considered based off the 2026 AHA guidelines.

Absolute Exclusion Criteria

CT with hemorrhage or extensive hypodensity

Moderate to severe TBI w/in 14 days

Neurosurgery w/in 14 days

Spinal cord injury w/in 3 months

Intra-axial neoplasm

Infective endocarditis

Coagulopathy/thrombocytopenia

Aortic arch dissection

ARIA

SBP $> 185/110$

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WHAT...these aren't contraindications anymore

Benefits = Risks

DOAC exposure w/in 48
Prior IPH
Ischemic stroke w/in 3 months
Body trauma or TBI w/in 14 days to 3 months
Surgery w/in 10 days
Neurosurgery w/in 14 days to 3 months
GI/GU bleed w/in 21 days
Recent MI w/in 3 months
Cardiac thrombus or pericarditis
Active malignancy
Pregnancy or post-partum
Arterial stick w/in 7 days
Intracranial dissections or AVMS
Pre-existing disability

Benefits > Risks

Extracranial dissections
Extra axial neoplasms
Unruptured aneurysms
History of GI/GU bleed > 21 days prior
History of MI > 3 months prior
MoyaMoya Disease
Post-angiography

Consenting for Thrombolytics

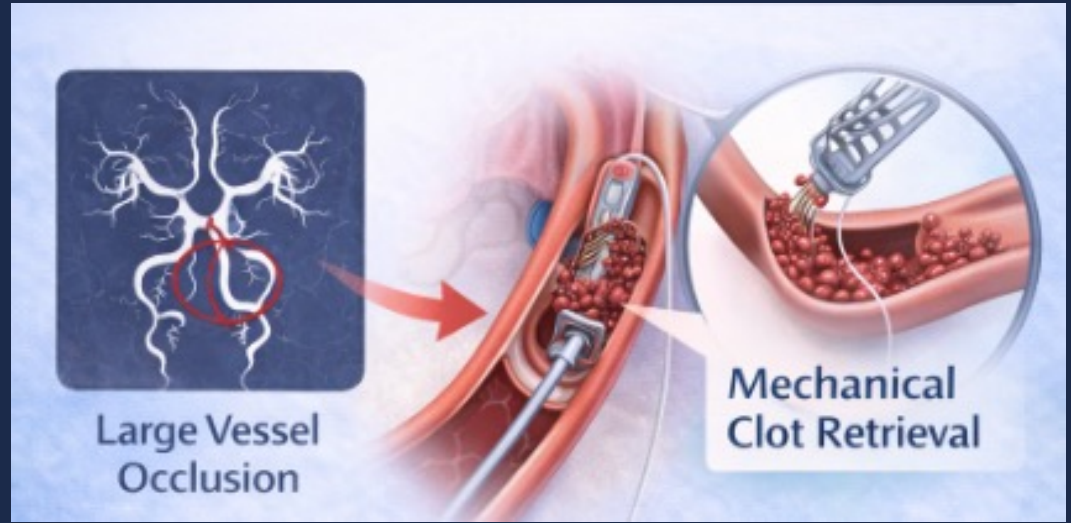
What to tell the patient and/or family:

1. **We are worried your loved one is having a stroke. We need to act quickly.**
2. We have a medication that is designed to dissolve the clot causing the stroke.
3. The main risk is bleeding, including a ~6% chance of bleeding in the brain, which can be life-threatening. Other risks include bleeding in the body and swelling around the mouth and face.
4. The medication does not always work, but without treatment, I worry there is a high chance of ongoing disability from this stroke.
5. You do not have to choose this medication, but I feel the benefits outweigh the risks.

Alteplase (tPA) vs. Tenecteplase (TNK)

	Alteplase (tPA)	Tenecteplase (TNK)
Dose	0.9 mg/kg (max 90 mg) 10% bolus + 60 min infusion	0.25 mg/kg (max 25 mg) Single IV bolus
Administration	Infusion pump required Patient tethered for 1 hour	Push dose over 5 to 10 seconds Patient mobile immediately
Transfer Impact	Must continue infusion during transport	Bolus → immediate transfer Ideal for drip-and-ship
Cost (est.)	\$9,300 per 100 mg vial	~\$7,800 per 50 mg kit
Efficacy	Gold standard since 1996	Non-inferior (AcT trial, multiple RCTs) Higher early recanalization in LVO

AHA 2026 Guidelines: In adult patients with AIS presenting within 4.5 hours of LKW eligible for IVT, tnk or alteplase is recommended to improve functional outcomes



EVT & When to Transfer

EVT: What It Is & Who Needs It

Mechanical thrombectomy — direct clot retrieval from a large occluded artery

2026 EVT Eligibility (Class I)

Anterior Circulation (0–6 hrs):

ICA or M1 (1a rec) or dominant proximal M2 (2b rec), NIHSS ≥ 6 , pre-stroke mRS 0–1 (1a rec) vs 2 (2a rec) vs 3–4 (2b rec), ASPECTS 3–10

Anterior Circulation (6–24 hrs):

ICA or M1, NIHSS ≥ 6 , pre-stroke mRS 0–1, ASPECTS ≥ 6 , if age < 80 then ASPECTS 3–5 can be considered

Posterior Circulation (0–24 hrs):

Basilar artery occlusion, baseline mRS 0–1, NIHSS ≥ 10 , within 24 hrs, PC-ASPECTS ≥ 6



Transfer Checklist



Your Transfer Checklist

1. Give TNK/tPA first if candidate — do not delay for transfer
2. Call receiving center early
3. Send CTA images electronically if possible
4. Document: LKW, NIHSS, BP, thrombolytic time, imaging findings, PMH, allergies, other acute problems identified, surrogate decision maker and contact info
5. Helicopter vs. fixed wing vs ground — consider distance, traffic, weather

TNK makes this easier: push and ship.

Others who may need to transfer

Transfer:

- Large strokes with concern for edema or midline shift
- Hemorrhagic transformation
- LKW ≤ 24 hours and patient may be a candidate for extended window tnk

May Not Need Emergent Transfer:

- CTA shows no LVO and symptoms improving after lysis
- Minor stroke (NIHSS ≤ 5) with no LVO
- Stroke mimic confirmed





Telestroke

Telestroke: If You Can Get It



What Is Telestroke?

Real-time video consultation with a vascular/stroke neurologist at a comprehensive center. They review imaging, examine the patient remotely, and help guide treatment decisions.



When It Helps Most

Uncertain cases (borderline eligibility, unusual presentation), extended window decisions, posterior circulation uncertainty, family counseling for high-risk treatments.



Building a Relationship

Contact your regional stroke center proactively. Establish transfer agreements and telestroke protocols **BEFORE** you need them.

Critical: Telestroke should NEVER delay thrombolytic administration in a clearly eligible patient.

MRI & Secondary Prevention

MRI Timing & Antiplatelet Summary

Who Needs MRI & When?

MRI is NOT required for acute treatment

Urgent inpatient MRI (before discharge):

- Stroke etiology unclear or needed to confirm stroke vs mimic
- Posterior fossa stroke (CT misses many)
- Hemorrhagic transformation assessment

Outpatient MRI (within 1–2 weeks):

- Some cases of TIA with resolved symptoms and negative CT
- Minor stroke for secondary prevention workup

AP/AC Quick Reference

Non-disabling stroke (NIHSS ≤ 3) or TIA without a-fib:

DAPT

- Load: ASA 325 mg + clopidogrel 300 mg
- Maintenance: ASA 81 mg + clopidogrel 75 mg daily
- Then single antiplatelet after 21 days (90 days if > 70% stenosis of an intracranial vessel supplying that area)

Moderate-severe stroke without a-fib:

- Single antiplatelet agent

A-fib associated TIA or stroke:

Anticoagulation, not DAPT — timing varies

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You Don't Need a Neurologist to Save a Brain.

 Questions?

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