



EM CASES SUMMARY

Episode 208 Ischemic Stroke Management Part 1: Disabling Stroke

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Major vs Minor Stroke – An impractical categorization of stroke

The historical “major (**NIHSS** ≥ 5) vs minor (NIHSS < 5)” dichotomy is convenient for research stratification but problematic clinically: so-called “minor” presentations (e.g., isolated aphasia, dense hemianopia, disabling distal limb weakness of the dominant hand) frequently carry marked functional morbidity and should not be excluded from reperfusion solely on the basis of a low NIHSS. The contemporary approach reframes categorization around disability and patient-centred outcomes rather than an arbitrary score threshold. NIHSS is a descriptor, not a decision tool. A low score can still be functionally catastrophic and should not exclude reperfusion.

Pitfall: *One pitfall in the decision to employ IV thrombolytics and/or endovascular therapy (EVT) is to assume that a minor stroke (NIHSS < 5) is not eligible for such therapies. Many patients who have an NIHSS < 5 have disabling stroke that do fulfill criteria for these aggressive, time dependent therapies.*

Disabling vs Non-disabling – The practical categorization of ischemic stroke

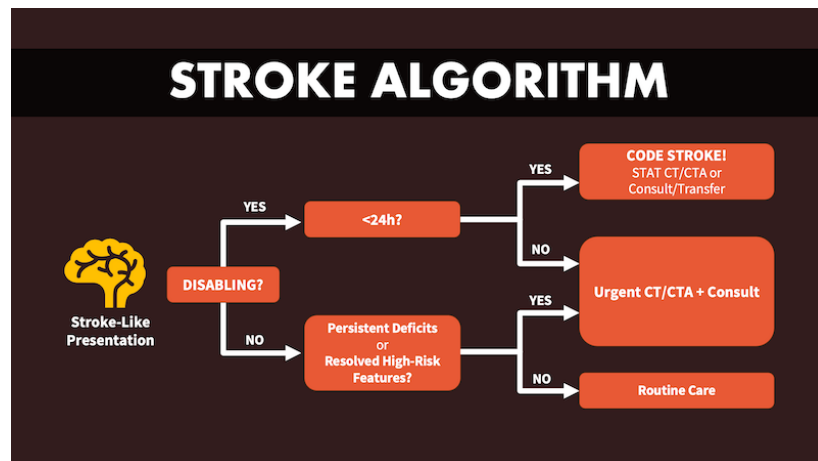
Reframe the first decision point as disabling vs non-disabling. A structured conversation around values helps determine whether a deficit is “disabling” for this patient. At the bedside, determine whether the deficit is disabling for this patient—i.e., likely to compromise independent living, employment, or meaningful communication. Cortical signs (aphasia/dysphasia, neglect, gaze deviation, hemianopia) combined with significant motor deficits imply a high pretest probability of large-vessel occlusion (LVO) and generally warrant aggressive reperfusion pathways when imaging and contraindication screening align with benefit. A patient-centred frame improves both selection for reperfusion and shared decision-making. Classify the presentation as disabling when it threatens independence or meaningful quality of life (speech/language, vision, ambulation, dominant-hand function, or level of consciousness), and nondisabling when deficits are unlikely to impact these domains if untreated. This “disability” lens operationalizes risk-benefit conversations around things patients value (home, work, communication), rather than a numerical threshold.

- **Core principle:** Focuses on deficits that disrupt independence and meaningful activities, e.g., speech, vision, motor, consciousness.
- **Features typically considered disabling:**
 - **Speech:** Major speech deficit (severe aphasia or dysarthria compromising functional communication)
 - **Motor:** Dense motor loss (especially dominant hand/arm, profound leg weakness)
 - **Vision:** Amaurosis fugax, cortical blindness, dense hemianopia.
 - **Consciousness/Brainstem:** depressed level of consciousness, locked-in syndrome from basilar occlusion.

- **Patient and family context:**
 - What is disabling varies with occupation, age, lifestyle.
 - Shared decision-making is vital for subtle deficits.
- **Implementation:** ED teams must weigh patient’s premorbid status, functional demands, and goals of care.

Bedside script (shared decision-making): “There are time-sensitive treatments that can help, but they carry bleeding risks (~3–5% symptomatic ICH with IV thrombolysis). Given your deficits and what matters to you, are these risks acceptable to try to preserve speech/hand/ambulation?”

Below is Dr. Lin’s basic ischemic stroke algorithm based on the ‘disabling’ vs ‘non-disabling’ categorizations of stroke to be used as a framework for these 2 EM Cases episodes on ED management of ischemic stroke.



The Importance of Time Windows in Disabling Ischemic Stroke Management

- **0–4.5 h:** May be eligible for IV thrombolysis (per local protocol); a subset also proceeds to EVT when CTA confirms large vessel occlusion (LVO) – see ‘bridge therapy’ below.
- **4.5–6 h:** IV thrombolysis generally excluded; EVT remains indicated when CTA demonstrates large vessel occlusion (LVO)—no additional imaging beyond CTA is required for selection in this interval.
- **6–24 h (late window):** Selection hinges on advanced imaging beyond CTA to demonstrate a small infarct core with a robust penumbra (e.g., favorable CTP, multiphase CTA collaterals, or MRI mismatch).

The Significance of ‘Last Seen Normal’ in Ischemic Stroke Management

- **Definition:** Last time patient was at neurologic baseline (not just symptom onset).
- **Utility:** Determines upper time boundary for treatment eligibility.
- **Application:** Especially critical in unwitnessed and “wake-up” strokes.
- **Acute therapies:** IV thrombolysis usually offered up to 4.5 hours, EVT up to 24 hours, all measured from “last seen normal.”
- **Evidence:** Late window trials (DAWN, DEFUSE3) justify aggressive intervention ≤24 hours with favorable imaging.

“Last seen normal” (LSN) anchors onset time when symptoms are unwitnessed; however, LSN should **not** be conflated with tissue viability. Patients presenting close to 24 h from LSN may still be candidates for late-window endovascular therapy (EVT) if imaging

reveals a small infarct core with a substantial penumbra. Practically, LSN documents chronology; selection for therapy is driven by imaging-demonstrated salvageable tissue.

“Wake Up” Strokes – Where urgent imaging is paramount

A wake up stroke occurs when precise onset is unknown, but “last seen normal” is when patient went to sleep. Most wake-up strokes occur just before awakening due to physiologic changes (cortisol/BP spikes), a time at which there is likely to be more salvageable tissue that can be saved by EVT than if the time of the stroke occurred upon falling asleep. Imaging may be more likely to reveal salvageable tissue, making many wake-up stroke patients candidates for EVT. Many patients treated in the extended (≤ 24 h) reperfusion window in landmark thrombectomy trials (Dawn, Extended IA, Diffuse 3) were wake-up strokes; physiology (diurnal BP/cortisol surge) suggests many such events occur shortly before waking. Unknown onset should trigger, not throttle, reperfusion work-up. Do not exclude patients from EVT on time grounds for wake up strokes; instead, expedite imaging for all suspected wake-up strokes.

Pitfall: Do not exclude wake up stroke patients from EVT on time grounds alone; instead, expedite imaging for all suspected wake-up strokes, as many of these strokes occur close to the time of awakening.

Treat wake up strokes as time-critical like any stroke: Non-contrast CT to exclude hemorrhage + CTA head/neck to assess for LVO; add advanced imaging (CTP, multiphase CTA, or MRI DWI–FLAIR mismatch) when beyond standard IV thrombolysis windows or onset is uncertain. Consider IV thrombolytics (TNK or tPA per local protocol) when advanced imaging shows salvageable tissue (e.g., DWI–FLAIR mismatch or favorable CTP profile) and there are no contraindications. If CTA shows LVO, proceed down your EVT pathway. In unknown/late windows, use CTP/multiphase CTA/MRI to confirm a small core with salvageable penumbra. Bridging lysis is still

reasonable when eligible (anatomy may preclude rapid catheter access, and early recanalization can occur while mobilizing the suite).

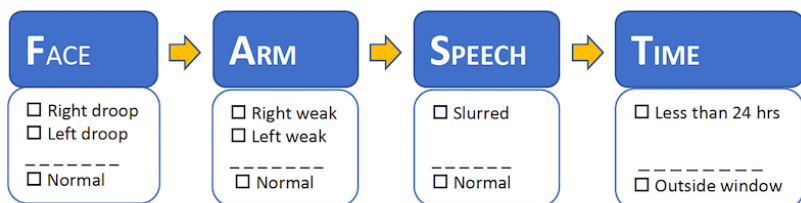
Bottom line: Wake-up strokes are imaging emergencies. Use vascular and perfusion/collateral imaging to identify candidates for IV thrombolysis and/or EVT, and keep decisions anchored to disability and salvageable tissue, not the clock. Wake-up strokes have an a priori higher probability of treatment eligibility than witnessed late-window strokes because the true ischemic duration may be short. The systems error is deprioritizing these patients as “too late.” Instead, prioritize expedited imaging (non-contrast CT to exclude hemorrhage; CTA head/neck to define occlusion; and—when beyond standard IV thrombolysis windows—advanced imaging such as CTP, multiphase CTA, or MRI for core-penumbra or DWI–FLAIR mismatch). Unknown onset should trigger, not throttle, reperfusion work-up.

Clinical Determination of Large Vessel Occlusion – The scores are not reliable!

Look for **dramatic arm weakness plus cortical signs** (aphasia/dysphasia, neglect, gaze deviation, hemianopia). This constellation implies high LVO probability → CTA ASAP to determine eligibility for EVT and rapid transfer if needed. Clinical LVO tools (e.g., **VAN**, **ACT-FAST** (see below), **Cincinnati**, **LAMS**) are reasonably sensitive (~80–90%) for pre-imaging triage, but lack specificity; when a disabling cortical syndrome is present, pursue vascular imaging even if a scale is “negative”.

FAST Stroke Screen positive:

- One or more symptoms from Face, Arm, Speech and
- LAST KNOWN WELL Time <24 hours



Pitfall: A “negative” FAST or VAN or Cincinnati score does not rule out a LVO stroke that may be eligible for EVT. Prioritize CTA for any disabling focal deficit whenever feasible.

Establishing Goals of Care and Determining Premorbid Status in Ischemic Stroke Management

Acute stroke decisions are time-critical; pair rapid medical assessment with a focused values discussion:

Dr. Lin’s 4 part approach to establishing goals of care:

1. **Signpost** the urgency/time-sensitivity and importance of the conversation.
2. **Summarize** what’s happening and the options (IV Thrombolysis/EVT or not), including best/worst-case outcomes and bleeding risk for both options.
3. **Align recommendations** with what matters most to the patient (include 1. home independence, 2. return to work, 3. acceptable long term disability).
4. Give your simplified recommendation.

Two-question premorbid screen:

1. Where does the patient live? (independent home vs assisted vs long-term care)
2. How do they mobilize? (independent vs aid vs bed-bound)
This rapidly informs whether aggressive therapy aligns with baseline quality of life.

Rapid, structured values clarification should occur in parallel with medical work-up. Discuss realistic best-/worst-case outcomes, bleeding risk, and likelihood of returning to independent living, home residence, and work—factors that most influence stroke survivors and families.

Systemic Thrombolytics in Ischemic Stroke Management

Indications for IV Thrombolysis in Ischemic Stroke Management

1. **Age:** 18 years or older.
2. **Disabling:** Symptoms suggestive of an acute ischemic stroke that are deemed to be disabling, regardless of whether there has been some early improvement. Disabling symptoms are specifically referenced as an inclusion criterion (e.g., aphasia, dominant-hand weakness, dense hemianopia, etc.). When in doubt, our experts advise erring on the side of treating if the patient is in window, has no contraindications, and the deficit is disabling — a normal CTA does *not* rule out eligibility.
3. **Time Window:** Ability to initiate treatment within 4.5 hours from the time the patient was last seen normal. **Unknown onset / wake-up stroke:** still consider IVT if imaging selection and local stroke protocol support it; wake-up patients are often *more likely* to be treatable—expedite imaging rather than exclude on the basis of the clock.

4. **Plain CT Head:** Diagnostic imaging (typically non-contrast CT) ruling out intracranial hemorrhage.
5. **Absence of Contraindications:** Absence of absolute exclusion criteria, including but not limited to: recent head trauma, previous intracerebral hemorrhage, active internal bleeding, recent major surgery, or severe uncontrolled hypertension. Blood pressure can be made safe for lysis: Able to reduce/maintain BP to <180/110 before thrombolysis and <180/105 after; avoid hypotension. Note that age >80 and prior stroke + diabetes are no longer absolute exclusions; warfarin acceptable if INR <1.7; UFH off ≥4 h with normal PTT; LMWH >24 h; DOACs >48 h; untreated intracranial AVM remains a contraindication; judgment required for recent GI/GU bleeding and intracranial tumors (e.g., meningioma generally acceptable).

Pitfall: A common pitfall is assuming that a normal CTA deems the patient ineligible for IV thrombolysis. It is age of patient, disability, time and absence of thrombolysis contraindications that dictates eligibility for IV thrombolysis, not the findings on CTA.

The Evidence for Systemic Thrombolytics in Ischemic Stroke Management

- Most evidence supports admin ≤4.5hr from onset (window opened from 3hr in 2008 to 4.5hr)
- Improves functional outcome (modified Rankin score, NNT ~7 for good outcome if given promptly)
- Best results ≤90min; efficacy diminishes with time but remains present ≤4.5hr
- **Risks:**
 - Symptomatic intracerebral hemorrhage 3–5%
- **Door-to-needle:**
 - Goal is ≤30–60 minutes

Tenecteplase (TNK) vs Alteplase (tPA) – Which one is better?

- **Tenecteplase (TNK):**

- - FDA approved (2025) and guideline-recommended
 - Single-bolus dosing simplifies workflow/logistics (versus continuous 1hr infusion for TPA)
 - May reduce dosing errors, improve EMS and transport process

Multiple trials—including the Canadian ACT-QUICKR—support non-inferiority of tenecteplase (TNK) to alteplase (tPA) for functional outcomes, with signals toward superior reperfusion and a favorable safety profile in some cohorts. Logistics strongly favor TNK: single-bolus administration is thought to reduce dosing errors and simplify interfacility transfer when bridging to EVT.

Given at least non-inferior efficacy and pragmatic advantages, many systems are transitioning to TNK as first-line IV thrombolytic where available; agent selection remains protocol-dependent and should be harmonized with regional stroke pathways.

Contraindications to IV Thrombolytics in Ischemic Stroke Management Update 2025

- **Absolute contraindications:**

- - Active major bleeding, intracranial mass (mets, AV malformations), recent neurosurgery, uncontrolled hypertension (>185/110 prior to administration)
 - Known coagulopathy (platelets <100,000, INR ≥1.7)

- **Relative contraindications—more liberal than before:**

- Minor GI/GU bleeds, age >80, prior stroke/diabetes no longer strict, but risk remains increased
- DOACs: Must be held ≥48hr, LMWH ≥24hr
- Oral anticoagulants: INR <1.7 required

Updates to contraindication to IV Thrombolytics for Stroke 2025

- **Age >80 y:** no longer a contraindication.
- **Prior stroke + diabetes:** no longer a contraindication.
- **Warfarin:** acceptable if **INR <1.7**.
- **UFH infusion:** off ≥4 h **and** normal PTT.
- **LMWH (e.g., enoxaparin, fragmin):** wait **24 h** since last dose.
- **DOACs:** (local protocols vary; many require ~48 h if normal renal function—confirm regionally).
- **Eye surgery:** recent corneal and lens surgery are generally *not* a contraindication while retinal surgery *is* a contraindication
- Small unruptured aneurysm (<10 mm) and meningioma not absolute contraindications; untreated AVM remains a contraindication; recent retinal surgery may be a concern.

These updates align TNK with historical alteplase criteria; *always confirm the dynamic local checklist at the bedside.*

Endovascular Therapy in Ischemic Stroke Management

The Evidence for Endovascular Therapy in Ischemic Stroke Management

EVT became standard of care for LVO with the 2015 NEJM trials (≤6 h), then expanded to up to 24 h in 2018–2019 based on late-window selection by advanced imaging (**DAWN**, **DEFUSE 3**). Across meta-analyses, NNT ≈4 for significant improved functional outcomes.

Selection criteria included clinical severity, imaging confirmation (large vessel occlusion, salvageable penumbra via advanced imaging; see below).

Bridge Endovascular Therapy – when are both IV thrombolysis and EVT indicated?

RCTs and recent meta-analyses suggest that giving intravenous thrombolysis—either with alteplase (tPA) or tenecteplase (TNK)—before or during endovascular therapy (EVT) for disabling ischemic stroke results in similar functional outcomes compared to EVT alone, but there are nuanced benefits in some analyses, especially when prompt IV lysis is possible. Whether to bridge with IV thrombolysis before EVT remains under active study and there is no clear consensus on specific indications. Practical reasons to still give IV thrombolysis when eligible: EVT access failures (tortuous anatomy, dense clot) and potential for earlier recanalization while mobilizing the suite. Practice varies (US, Canada, Europe); always confirm guideline for local variant.

Summary of Key Evidence for bridge therapy in ischemic stroke

- Multiple RCTs and meta-analyses involving thousands of patients with large vessel occlusion have directly compared combination therapy (IV tPA or TNK plus EVT) versus EVT alone.
- Most data indicate no statistically significant difference in the primary endpoint of functional independence (modified Rankin Scale 0–2 at 90 days) between the two strategies.
- Some large observational studies and recent meta-analyses suggest that combination therapy may reduce disability (shift analysis), increase successful reperfusion rates, and shorten time to reperfusion, translating to higher likelihood of home discharge and better ambulation at discharge, albeit with a small increased risk of symptomatic intracranial hemorrhage.

- No significant difference in all-cause mortality, excellent outcome (mRS 0–1), or symptomatic intracranial hemorrhage has been consistently reported between groups; however, patients with faster access to thrombolysis, or in whom EVT might be delayed, may benefit more from IV therapy in addition to EVT.
- Analysis of tenecteplase (0.25 mg/kg or 0.4 mg/kg) and alteplase (0.9 mg/kg) in RCTs found higher successful reperfusion with pre-EVT tPA or TNK, but overall functional outcomes remained similar to EVT alone. Subgroup analyses stress the importance of patient and workflow selection.

The bottom line for bridge therapy in ischemic stroke

Combination therapy with IV tPA or TNK plus EVT is not inferior to EVT alone and is associated with improved reperfusion and potential functional advantages in certain patients, especially with prompt administration, but does carry a small risk increase for intracerebral hemorrhage. Clinical guidelines frequently recommend combination therapy when feasible and not delayed, particularly for patients with disabling symptoms who are eligible for both treatments

The Importance of the Penumbra in Ischemic Stroke Management

Conceptually, every stroke comprises core, penumbra, and normal tissue. Reperfusion therapies aim to salvage the penumbra; the likelihood of benefit depends on collateral perfusion and the tempo of penumbral collapse. Advanced imaging that demonstrates a small core with a large penumbra identifies patients most likely to achieve substantial functional recovery—even deep into the late window. Treatment aims to salvage hypoperfused but viable tissue; robust collaterals can keep penumbra alive into the late window, while poor collaterals collapse fast—hence the centrality of imaging-based selection.

Clinical Criteria Summary Table for Endovascular Therapy for Ischemic Stroke

Requirement	0–6 hr window	6–24 hr window
Age	Any adult (no strict)	Some trials >18, <80/85
LVO on CTA	Required	Required
Disabling deficit	Required	Required
Infarct core (ASPECTS/core volume)	ASPECTS ≥6	ASPECTS ≥6, <50–70 mL
Clinical–core mismatch	Not mandatory	Mandatory
Multiphase CTA/collaterals	Supportive	Mandatory/strongly rec.
Informed consent	Best practice	Best practice

Time-based criteria for endovascular therapy in ischemic stroke

- **0–6 hours from last seen normal:**
 - EVT indicated for most eligible patients with LVO, disabling symptoms, and minimal infarct core seen on non-contrast CT.
 - Imaging: Plain CT to rule out hemorrhage, CTA for LVO; go directly to EVT center (do not delay for advanced imaging).
- **6–24 hours window (“extended” or “late” window):**
 - EVT is considered only if advanced imaging (CT perfusion, MRI DWI/FLAIR, or multiphase CTA) shows:

- Small infarct core (e.g., <70 mL by RAPID or similar algorithms).
- Large viable penumbra (ischemic but salvageable tissue).
- Clinical–imaging mismatch (NIHSS relative to core size).

Imaging requirements for endovascular therapy in ischemic stroke

- **Non-contrast CT:**
 - Excludes intracranial hemorrhage.
 - Assesses established infarct core using ASPECTS (Alberta Stroke Program Early CT Score; ≥ 6 preferred for benefit).
- **CT Angiogram (CTA):**
 - Confirms presence and site of LVO.
 - Assesses for tandem lesions (extracranial/intracranial) and dissection.
- **Advanced imaging for late window:**
 - CT perfusion or MRI DWI/FLAIR:
 - Measures infarct core and penumbra (thresholds: DAWN used <21 mL for >80 years and high NIHSS, <31 mL for 60–79, <51 mL for <60).
 - Clinical–core mismatch: e.g., NIHSS ≥ 10 , core <31 mL.
 - Multiphase CTA:

- Evaluates collateral flow to predict tissue at risk and possible benefit.

Relative or exclusion criteria for endovascular therapy

- **Large established infarct (ASPECTS ≤ 5 , core >70 mL):** Associated with higher risk of hemorrhagic transformation and poorer outcome; EVT generally not recommended unless compelling clinical rationale.
- **Minor, nondisabling symptoms:** Benefit–risk does not favor EVT.
- **Premorbid disability (mRS >2):** Usually excluded, but individualized if new deficit prevents return to meaningful baseline function.
- **Poor vascular access or life expectancy <6 months.**
- **Other severe comorbidities limiting benefit from intervention.**

Special clinical scenarios for endovascular therapy consideration

- **Basilar artery occlusion:** EVT can be considered beyond 6 hr if clinical and imaging profile favorable; no strict upper time limit in some guidelines due to devastating natural history.
- **Tandem occlusions (carotid + intracranial):** May require acute stenting + thrombectomy; requires coordination with neurointerventional team.
- **Stroke on anticoagulation:** Relative contraindication; consult stroke team for individualized risk assessment.
- **Rapid clinical improvement:** Not typically offered EVT unless there is residual significant LVO and imaging suggests salvageable tissue.

Blood Pressure Targets in Ischemic Stroke Management

Avoid **hypotension at all costs**, as it accelerates penumbral infarction. For patients **not** receiving IV thrombolysis/EVT, early guidelines permit observation unless **SBP >220 mmHg** (with DBP ~110–120 mmHg), at which point gentle reductions (~10–20% over hours) are reasonable. If IVT or EVT is planned or in progress, target **<180/105 mmHg** while strictly avoiding overshoot hypotension.

- **Recommended agents:**
 - Labetalol, Nicardipine (titrate to avoid overshooting low BP)
 - Monitor frequently after reperfusion

Imaging Decision Making in Ischemic Stroke Management

Dr. Lin's 4 items the ED physician should have ready for the stroke neurologist on the first call:

1. **Last Seen Normal (LSN) time** — the timestamp that starts the treatment clock.
2. **Exact neurologic deficits, with disability framing and severity** (e.g., aphasia, dominant-hand weakness, dense hemianopia).
3. **Thrombolysis contraindications/bleeding risk** — anticoagulation status, recent trauma, bleeding history, structural brain concerns (e.g., tumor, prior ICH).
4. **Goals of care & premorbid status** — baseline function and whether aggressive therapy aligns with values.

Imaging algorithm:

Step 1: Noncontrast CT (rules out hemorrhage)

Step 2: CTA head/neck (identifies large vessel occlusion, tandem/distal lesions, dissection)

Step 3: Advanced imaging in 6–24hr or wake-up scenarios or unclear presentations (CT perfusion, multiphase CTA, MRI) assesses penumbra, collateral flow, infarct core size

CT and CTA Findings

In the 0–6 h window, non-contrast CT (exclude hemorrhage) plus CTA generally suffices for IVT eligibility (when otherwise indicated) and EVT selection (when LVO present). In the 6–24 h window, selection is based on advanced imaging (e.g., CTP, multiphase CTA collateral assessment, or MRI DWI–FLAIR mismatch) to demonstrate salvageable tissue. Order the right CTA: a stroke-protocol multiphase CTA (now) is distinct from a carotid/stenosis-oriented CTA (later). Make sure your requisition triggers the stroke pathway, not “see-you-tomorrow” imaging.

Pitfall After Clean CT/CTA

A “perfectly normal” NCCT/CTA does not exclude ischemic stroke—particularly lacunar or early small-core presentations. If the clinical exam indicates a disabling stroke and the time window is treatable, do **not** withhold IVT thrombolysis on the basis of a “clean” initial scan; escalate to advanced imaging or MRI and treat the patient, not the first read. Also consider stroke mimics. Early or subtle LVOs can be missed on initial reads, especially with small cores or distal occlusions. If clinical probability remains high (e.g., disabling cortical syndrome), treat the patient, not the preliminary report—escalate communication with radiology and consider repeat or advanced imaging to reconcile discordant data.

Pearls & Pitfalls in the ED Management of Acute Ischemic Stroke

- **Don't anchor on NIHSS**—low score can still be disabling (e.g., aphasia).
- **Wake-up ≠ too late**—they may be **more** likely eligible near 24 h than witnessed late-presenters; expedite imaging.
- **Order the right CTA**—stroke-protocol multiphase, not a delayed carotid CTA meant for stenosis.
- **“Clean” CT/CTA** does not exclude stroke—prioritize clinical phenotype; consider lacunar and escalate imaging.
- **Protect the penumbra**—avoid hypotension; if treating, keep SBP <180 (DBP thresholds as above); if not treating, intervene only for very high pressures initially.
- **Collaterals determine tempo**—good collaterals extend the window; poor collaterals collapse penumbra fast. Let imaging guide urgency.

Key take home points for management of disabling ischemic stroke

- Categorize strokes as disabling vs nondisabling to guide action; abandon major/minor NIHSS binary; focus on disability/functional impact
- Disabling symptoms and “last seen normal” are key triggers for acute pathway activation
- Early—≤4.5hr—IV thrombolysis; late—≤24hr—EVT for select patients via advanced imaging
- Wake-up strokes may be eligible—never exclude based on overnight onset; rapid imaging guides decision
- Clinical scoring for LVO triage is quite sensitive—use when imaging/transfer delayed

- Goals-of-care and premorbid status determination are critical for therapy appropriateness; acute intervention never exceeds baseline function
- TNK is at least non-inferior to tPA, with major logistical advantages.
- Contraindications for thrombolysis have relaxed; updated checklists and consultation recommended
- Blood pressure management: target <180/105 when giving IV thrombolysis/EVT, permissive hypertension otherwise; protect the penumbra: avoid hypotension
- Imaging drives clinical pathway—advanced scans required for ambiguous/late-onset cases

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