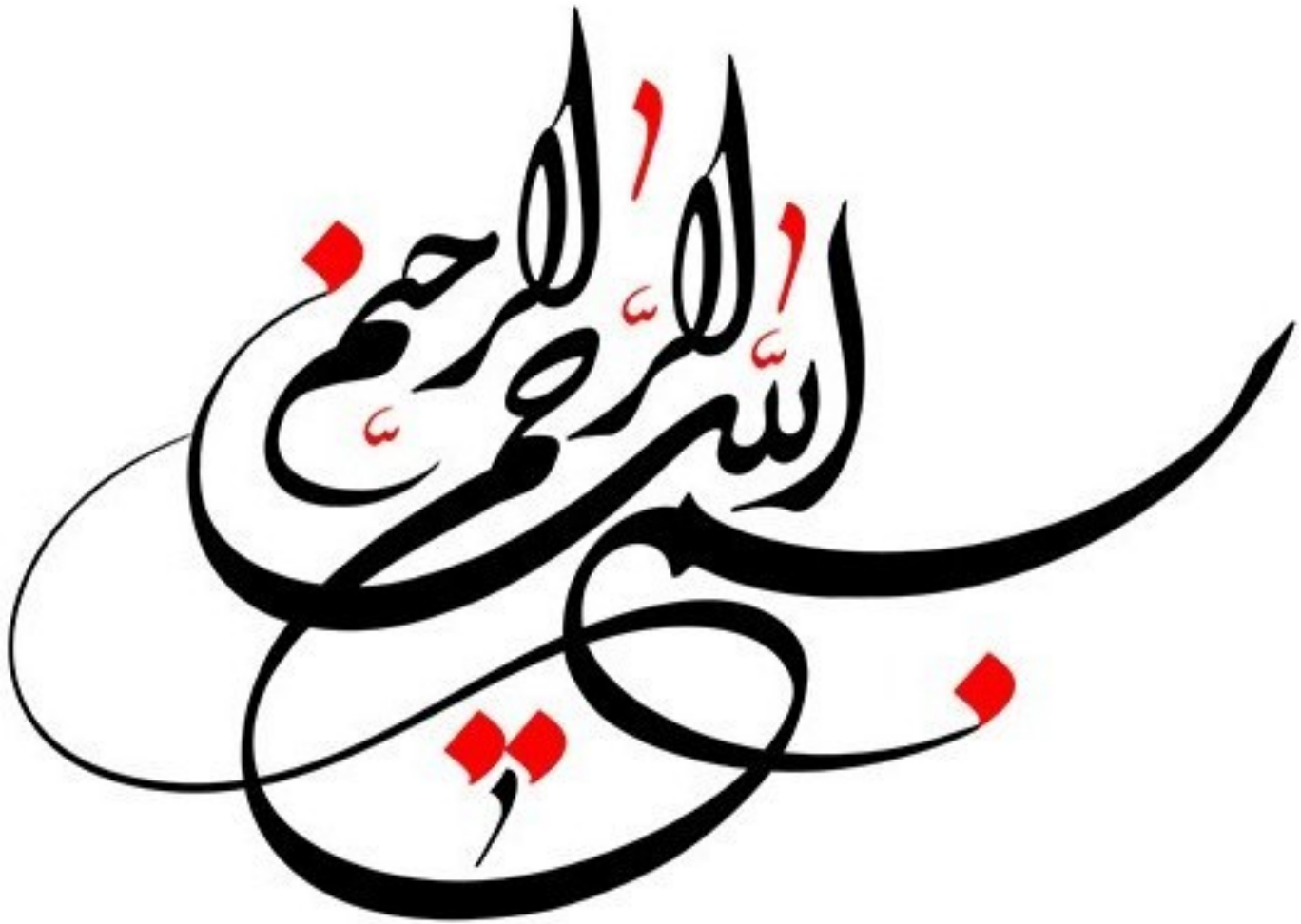

بسم الله الرحمن الرحيم

Acute Stroke Management & Code 724

Objectives

- Understand **nursing roles** in acute stroke care
- Recognize **stroke symptoms** triggering Code 724
- Learn **nursing interventions** for thrombolysis and thrombectomy
- Identify **monitoring, safety, and documentation best practices**

Definition and Classification of AIS

- Stroke = apoplexy
- brain attack
- AHA/ASA: stroke is an acute episode of focal neurological dysfunction that persists for more than 24 hours.

Why Acute Stroke Care is Critical

- Second mortality
- 3rd morbidity
- Stroke imposes a considerable financial burden due to the costs associated with prehospital, hospital, and posthospital care.
- Fewer than 5% of patients with acute ischemic stroke received IVT globally in the eligible therapeutic time window and fewer than 100,000 MTs were performed worldwide in 2016.
- Both men and women worldwide face an approximate lifetime risk of stroke of 25% starting from age 25.
- The risk is notably high in East Asia and Central and Eastern Europe

2021

شاخص	جهان	ایران
موارد جدید سالانه	۱۲ میلیون	۱۰۳ هزار
کل مبتلایان	۹۳ میلیون	۹۶۴ هزار
نرخ مرگ (در ۱۰۰,۰۰۰)	۸۷	۶۴
شایع‌ترین نوع	ایسکمیک	ایسکمیک
گروه سنی با بیشترین بار	۵۵ سال به بالا	۵۵ سال به بالا
رتبه موربیدیتی	سومین عامل اصلی DALY	سومین عامل اصلی DALY
رتبه مورتالیتی	دومین عامل اصلی مرگ	دومین عامل اصلی مرگ

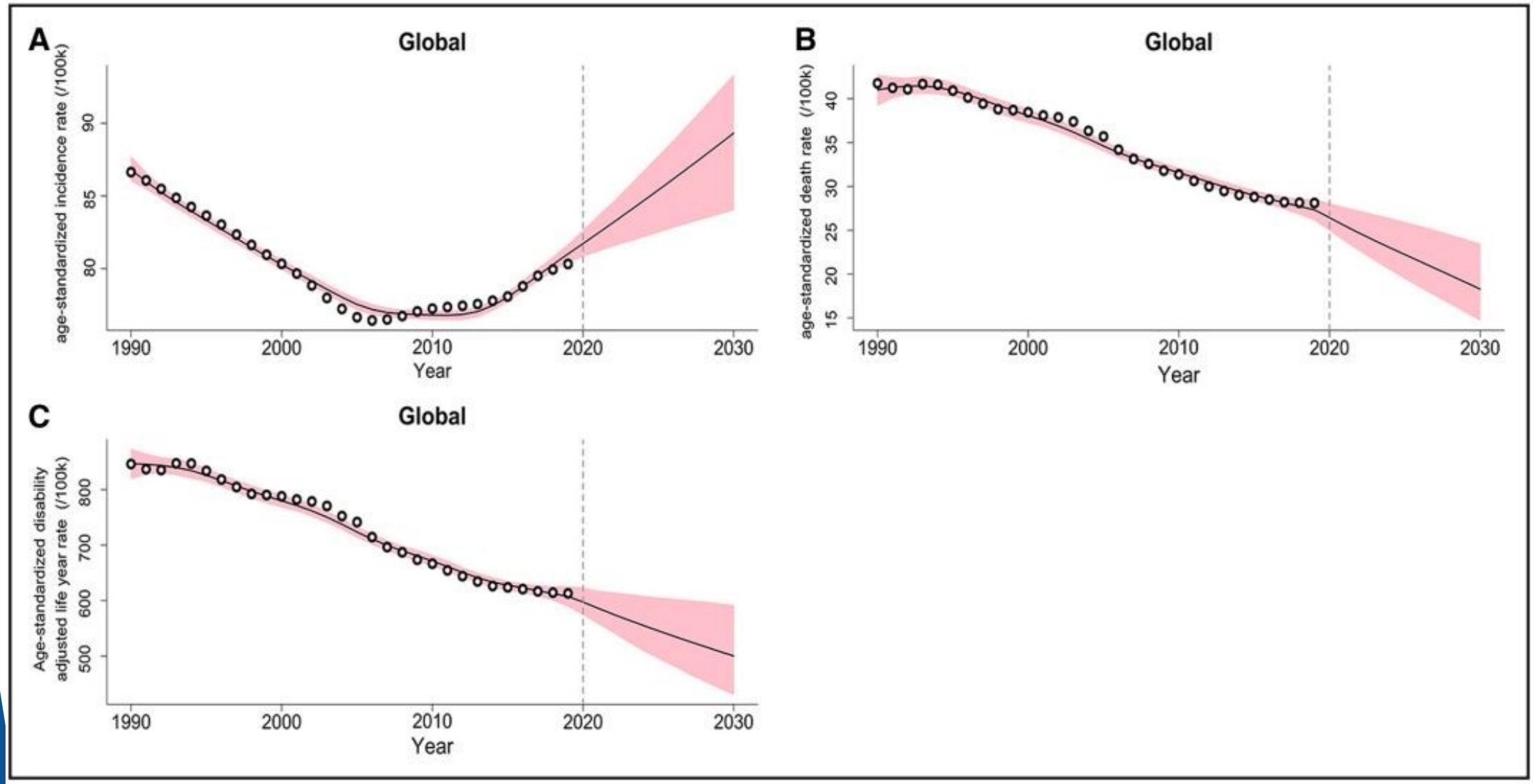


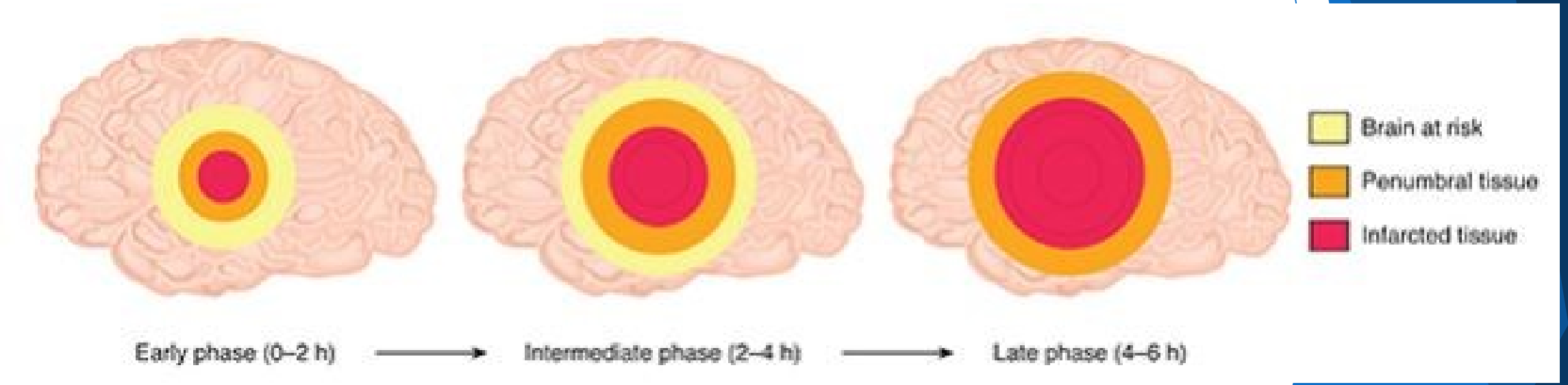
Figure 1. **The trends and projections of age-standardized incidence rate, death rate, and disability-adjusted life years rate of**

TIME IS BRAIN

TIME IS BRAIN

- shorter time to rtPA bolus - reduced disability at 90 days
  1. collateral circulation
     - a study in primates demonstrated that the middle cerebral artery can be occluded for up to an hour without causing infarction (collateral circulation)
  2. fresher clots are more porous with a higher ratio of red blood cells to platelets, and thereby are more easily lysed by rtPA compared with more mature clots.

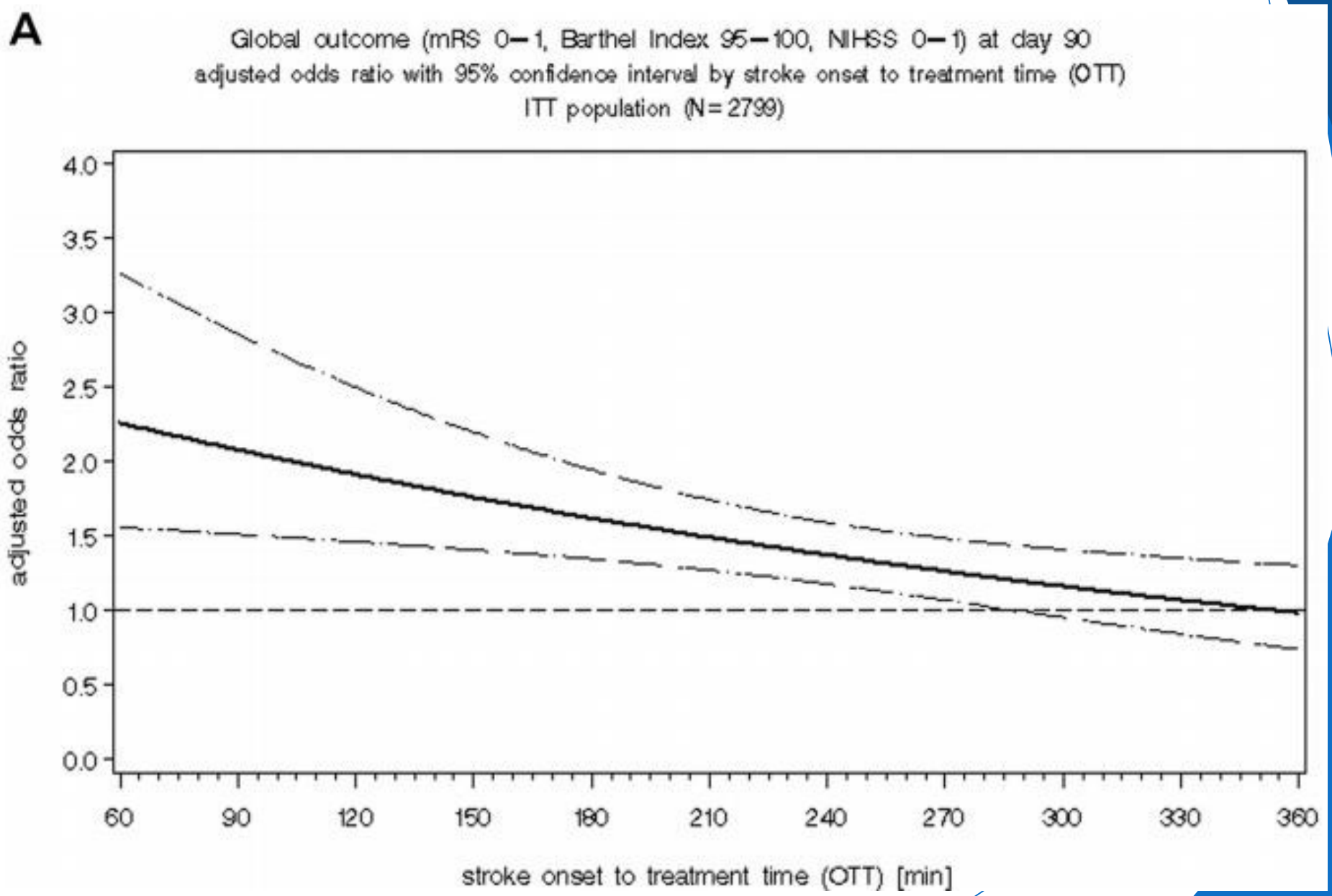
Infarct Core and Penumbra

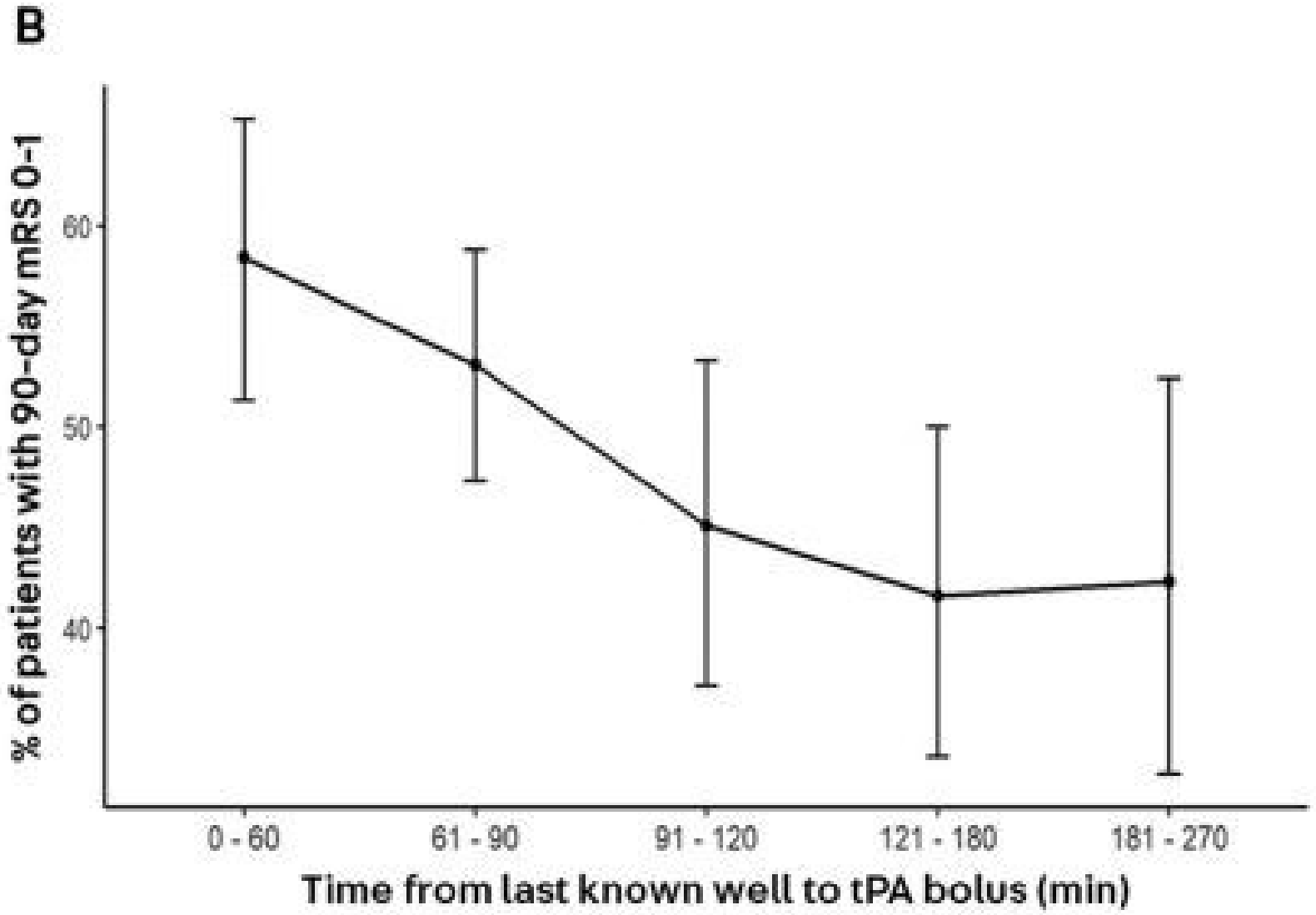


irreversibly damaged “core,”

- by 90 days With treatment=patient with an mRS score of 0 or 1 (eg, no disability)
  - in the first hour, approximately 60%
  - at 3 hours approximately 40%

- 1.9 million neurons die each minute prior to reperfusion.
- Every 15-minute reduction in onset-to-treatment time translates into a meaningful reduction in the risk of long-term disability at 3 months.
- In the registry(over 58,000 patients), each 15-minute reduction in the time to initiation of tPA treatment was associated with an
  - **increase** in the odds of walking independently at discharge (4 percent)
  - being discharged to home rather than an institution (3 percent);
  - **decrease** in the odds of death before discharge (4 percent)
  - symptomatic hemorrhagic transformation of infarction (4 percent).


A
Global outcome (mRS 0–1, Barthel Index 95–100, NIHSS 0–1) at day 90
adjusted odds ratio with 95% confidence interval by stroke onset to treatment time (OTT)
ITT population (N=2799)
adjusted odds ratio
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
60
90
120
150
180
210
240
270
300
330
360
stroke onset to treatment time (OTT) [min]


B
% of patients with 90-day mRS 0-1
60
50
40
0 - 60
61 - 90
91 - 120
121 - 180
181 - 270
Time from last known well to tPA bolus (min)

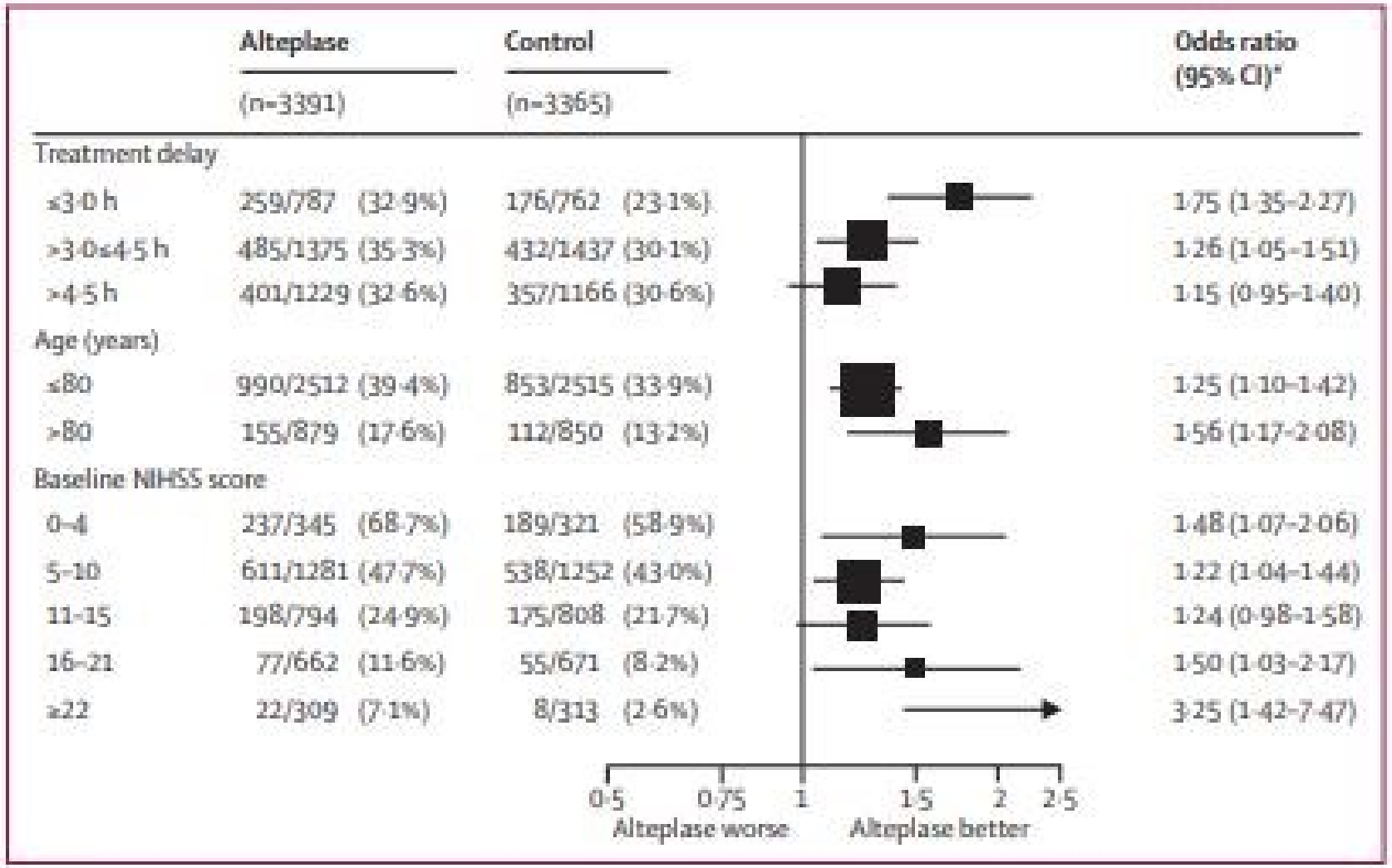


Figure 2: Effect of alteplase on good stroke outcome (mRS 0–1), by treatment delay, age, and stroke severity
*For each of the three baseline characteristics, estimates were derived from a single logistic regression model stratified by trial, which enables separate estimation of the OR for each subgroup after adjustment for the other two baseline characteristics (but not for possible interactions with those characteristics). mRS=modified Rankin Scale.

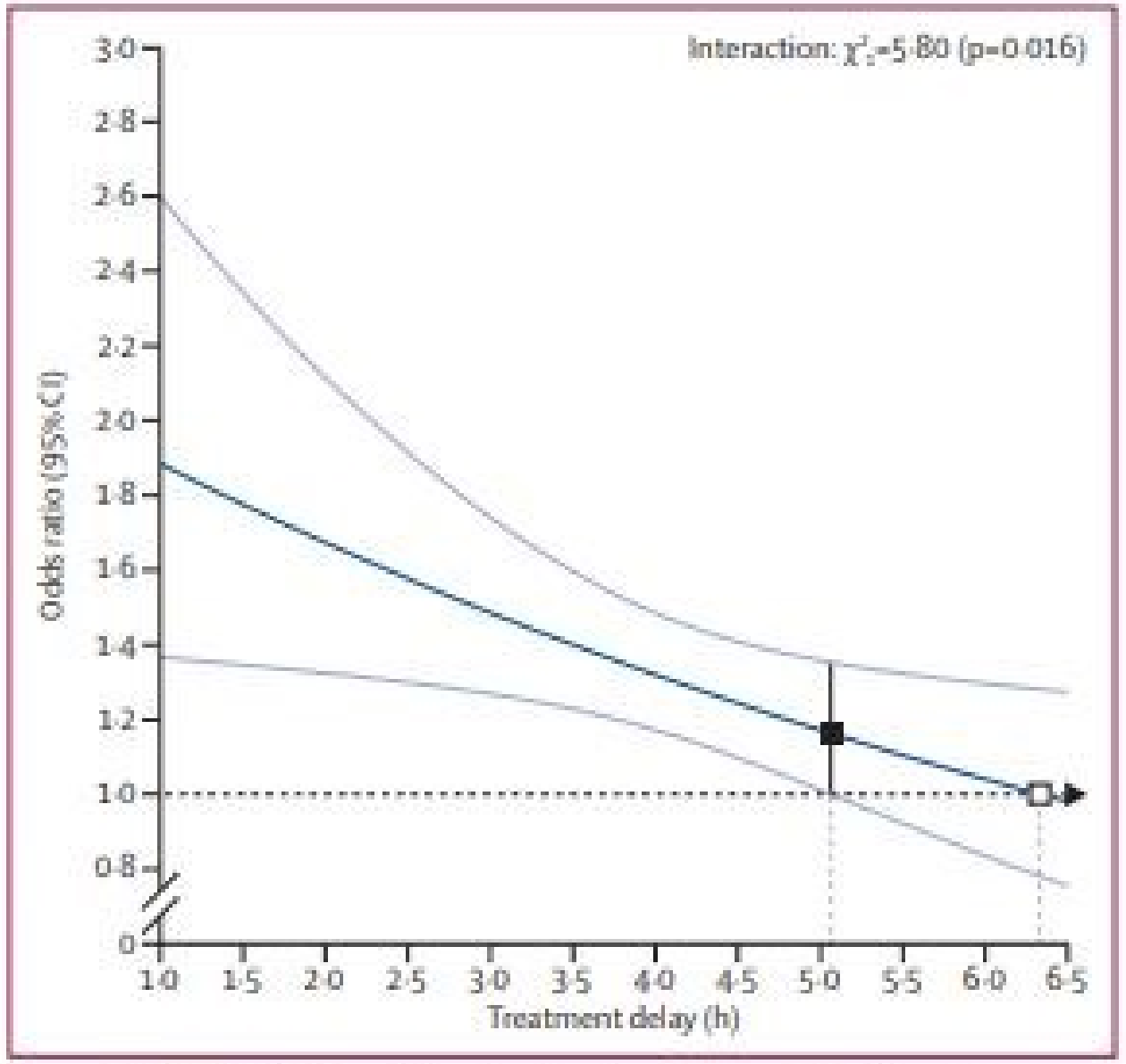
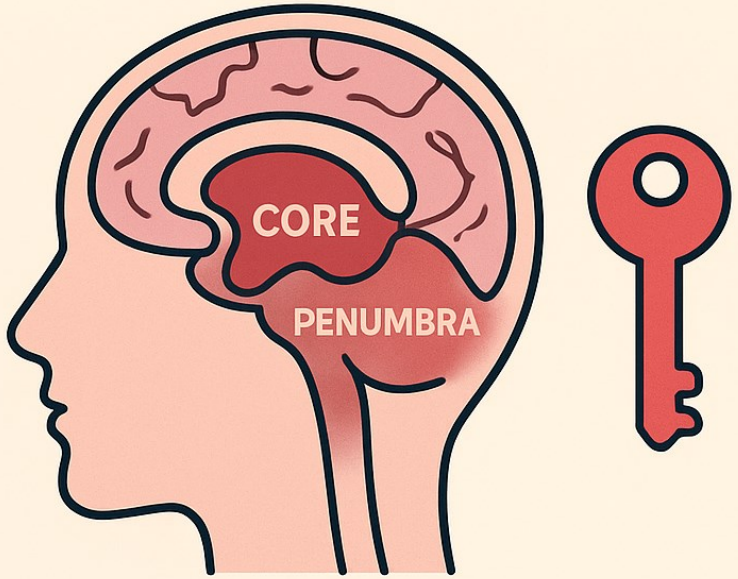


Figure 1: Effect of timing of alteplase treatment on good stroke outcome (mRS 0–1)

Time is Brain, but Tissue is Key



Time is Brain

Tissue is Key

- Tissue clock
  - The tissue clock can be read on each patient using MRP or CT perfusion techniques demonstrating a favorable ratio of penumbral tissue volume compared with irreversibly damaged ischemic core volume.
  - The tissue clock concept opens the window of treatment to substantially more patients

Trial	Design & Population	Key Points / Results / Clinical Takeaways
TRACE-III	- Multicenter, prospective, randomized, open-label, blinded-endpoint trial. - AIS patients with anterior circulation LVO (ICA, MCA M1/M2). - Time window: 4.5–24 h from last known well. - Required *salvageable tissue* on CT/MRI perfusion (core <70 mL, mismatch ratio ≥1.8, mismatch volume ≥15 mL). - No planned thrombectomy at randomization.	- Intervention: Tenecteplase 0.25 mg/kg IV single bolus (max 25 mg). - Control: standard medical therapy. - **Primary outcome (mRS 0-1 at 90 days):** TNK 33% vs control 24.2% (RR 1.37; 95% CI 1.04–1.81; p=0.03). - **Secondary (mRS ≤2 at 90 days):** 43.6% vs 33.3%. - **sICH:** TNK 3% vs control 0.8%. - **Mortality:** similar (TNK 13.3% vs control 13.1%). - **Interpretation:** TNK improves functional outcome in selected patients with salvageable tissue, even in extended 4.5–24 h window. - **Teaching point:** *"Time is Brain, but Tissue is Key"* — imaging selection determines eligibility and outcome; extended window possible with preserved tissue.

Intravenous Thrombolysis for Acute Ischemic Stroke

REVIEW ARTICLE

CONTINUUM AUDIO INTERVIEW AVAILABLE ONLINE

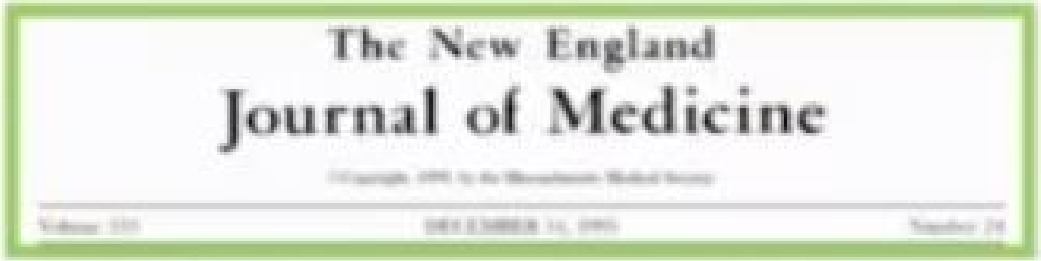
By James C. Grotta, MD, FAAN

1. Alteplase

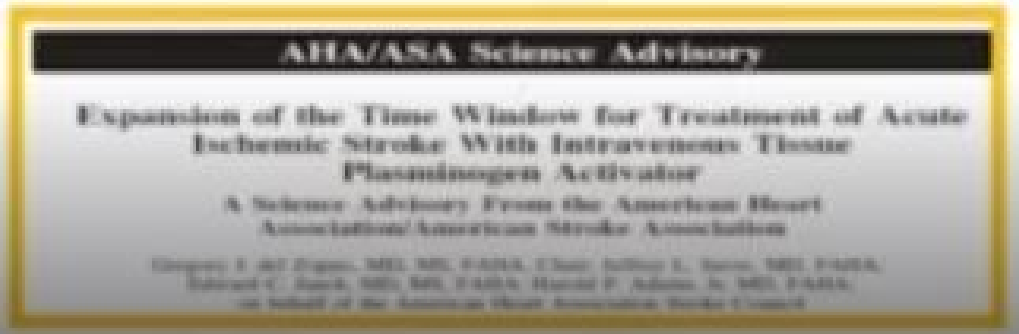
2. Tenecteplase

Approved IV thrombolysis windows:

- **1996:** Less than 3 hours- IV thrombolysis


The New England
Journal of Medicine

- **2009:** 3-4.5 hours- IV thrombolysis in more selected cases


AHA/ASA Science Advisory

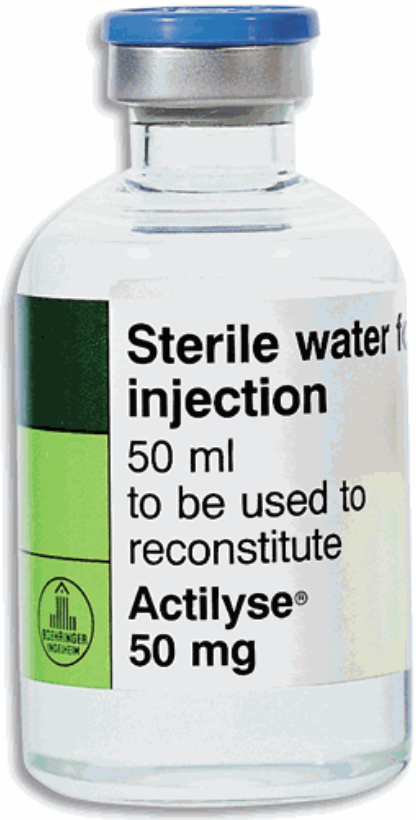
Expansion of the Time Window for Treatment of Acute Ischemic Stroke With Intravenous Tissue Plasminogen Activator

A Science Advisory From the American Heart Association/American Stroke Association

Here's a table summarizing the FDA approval dates and typical dosage regimens for Alteplase (brand Activase) for its major U.S. indications:

Indication	FDA Approval Date	Typical Adult Dosage*
Acute Myocardial Infarction (AMI)	November 13 1987 National Museum ... +3	Weight-based regimens: e.g., *Accelerated infusion* — ≤ 67 kg: 15 mg bolus, then 0.75 mg/kg over 30 min (max 50 mg), then 0.5 mg/kg over 60 min (max 35 mg); > 67 kg: 15 mg bolus, then 50 mg over 30 min, then 35 mg over 60 min (total up to ~100 mg). Medscape Refere... +2
Acute Ischemic Stroke (AIS)	June 23 1996 The Pharma Letter +2	0.9 mg/kg IV (max 90 mg); 10% of dose given as bolus over ~1 minute, the remainder infused over 60 minutes. Drugs.com +2
Acute Massive Pulmonary Embolism (PE)	(part of labeling; full date may be later) FDA Access Data +1	Example: 100 mg IV over 2 hours. Medscape Refere...


Altelyse® 50 mg
Treatment-Set
For fibrinolytic therapy
For i.v. infusion
Each Treatment-Set contains:
2 injections vials Altelyse 50 mg
2 vials of 50 ml water for injection
آلتلایز®
آب مقطر برای تزریق
۵۰ میلی لیتر
Altelyse®
50 mg
For fibrinolytic therapy
For i.v. infusion
آلتلایز®
۵۰ میلی گرم
جهت درمان فیبرینولیتیک
برای انفوزیون وریدی


Sterile water f
injection
50 ml
to be used to
reconstitute
Actilyse®
50 mg


Actilyse®
50 mg
For i.v. infusion
HK-30511
Protect from light.
Store below 30° C
Boehringer
Ingelheim

TENECTEPLASE

- Tenecteplase is under evaluation as an alternative to rtPA for acute stroke treatment and has a class 2b recommendation in patients with acute stroke due to large vessel occlusion.
- Tenecteplase has a longer half-life
- is given as an IV bolus without infusion.
- This provides important logistic advantages; specifically, it is not necessary to insert a dedicated IV line for the infusion.
- It is more fibrin specific and therefore may achieve superior clot lysis, as was demonstrated in at least one study of large vessel occlusions,
- and may also be associated with fewer bleeding complications.
- Several studies of tenecteplase versus rtPA are ongoing and should provide a definitive answer about best dose and relative efficacy.
- Three different meta-analyses of studies, shows that tenecteplase is “noninferior” to rtPA, meaning their outcomes and safety are similar.

	Alteplase (tPA)	Tenecteplase (TNK)
Mechanism	Recombinant version of naturally occurring tissue plasminogen activator *Binds only semi-selectively to fibrin bound plasminogen	Bioengineered variant of tPA * More fibrin specific * More resistant to degradation by endogenous PAI-1
Half life	5 minutes; Terminal: 72 minutes	Initial: 20–24 minutes; Terminal: 90–130 minutes
Preparation	More complex, approx. 5 mins	Simple, approx. 1 min
Administration	60 minutes (Bolus + infusion)	5-10 seconds (IV Bolus)

Here is a table summarizing the FDA approval dates and recommended dosage regimens for Tenecteplase (brand TNKase) for its primary U.S. indications:

Indication	FDA Approval Date	Recommended Dosage*
Acute ST Elevation Myocardial Infarction (STEMI)	June 2, 2000 Drugs.com +2	Single IV bolus over 5 seconds. Weight-based: < 60 kg → 30 mg; 60–<70 kg → 35 mg; 70–<80 kg → 40 mg; 80–<90 kg → 45 mg; ≥90 kg → 50 mg. FDA Access Data +1
Acute Ischemic Stroke (AIS) in adults	March 3, 2025 Gene +3	Single IV bolus over 5 seconds. Weight-tiered: < 60 kg → 15 mg; 60–<70 kg → 17.5 mg; 70–<80 kg → 20 mg; 80–<90 kg → 22.5 mg; ≥90 kg → 25 mg. Medscape Refere... +2

CLASS IIb (WEAK)

Tenecteplase (TNK)

- Choosing tenecteplase (single IV bolus of 0.25-mg/kg, maximum mg) over IV alteplase in patients without contraindications for IV fibrinolysis who are also eligible to undergo mechanical thrombectomy.
- Tenecteplase administered as a 0.4-mg/kg single IV bolus has not been proven to be superior or noninferior to alteplase but might considered as an alternative to alteplase in patients with minor neurological impairment and no major intracranial occlusion.


NDC 50242-014-03
TNKase®
(tenecteplase)
For Injection
25 mg per vial
For Intravenous Use
after Reconstitution
Single-Dose Vial
Discard Unused Portion
Carton contents:
One 25 mg vial TNKase
One 5.2 mL vial Sterile
Water for Injection, USP
℞ only
Genentech
NDC 50242-176-01
TNKase®
(tenecteplase)
For Injection
50 mg per vial
For Intravenous Use
after Reconstitution
Single-Dose Vial
Discard Unused Portion
Carton contents:
One 50 mg vial TNKase
One 10 mL vial Sterile
Water for Injection, USP
℞ only
Genentech

🧴 جدول ۱. ویژگی‌های عمومی و آماده‌سازی داروها

ویژگی	آلتپلاز (Alteplase / rt-PA)	تنکتپلاز (Tenecteplase / TNK-tPA)
نام تجاری	Activase®	TNKase®
فرم دارویی	پودر لیوفیلیزه برای تزریق وریدی	پودر لیوفیلیزه برای تزریق وریدی
مقدار ویال دارو	20 mg و 50 mg	50 mg
حلال همراه	آب استریل برای تزریق (SWFI)	10 mL آب استریل برای تزریق
غلظت پس از حل شدن	1 mg/mL (مثلاً 50 mg در 50 mL)	5 mg/mL (50 mg در 10 mL)
روش آماده‌سازی	افزودن کل حجم حلال → چرخش آرام (بدون تکان دادن)	افزودن 10 mL حلال → چرخش آرام (بدون تکان دادن)
پایداری محلول آماده	تا ۸ ساعت در دمای اتاق (≤30°C)	تا ۸ ساعت در دمای اتاق (≤30°C)

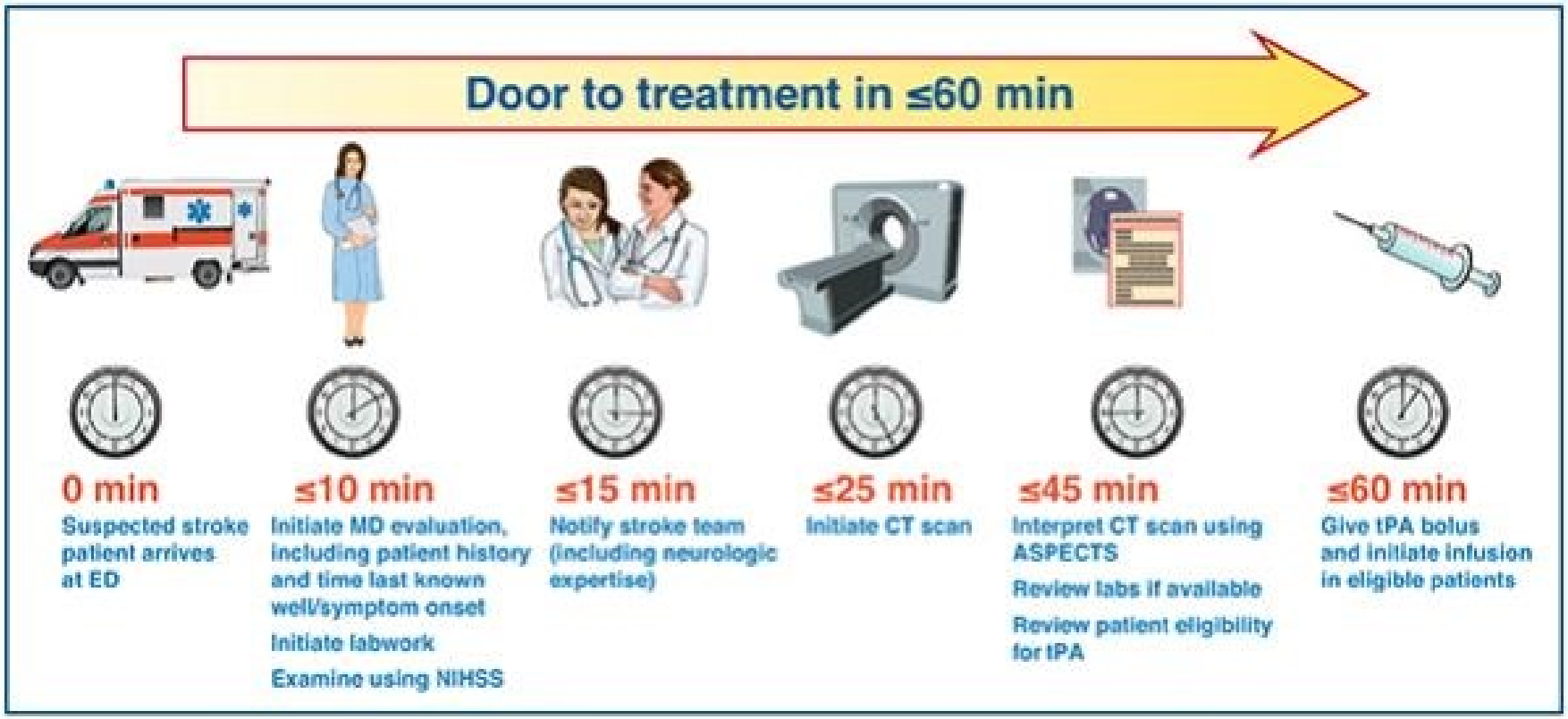
💉 جدول ۲. دوز و نحوه تجویز داروها

ویژگی	آلتپلاز (Alteplase)	تنکتپلاز (Tenecteplase)
مسیر تجویز	وریدی (IV infusion)	وریدی (IV bolus)
نیاز به پمپ انفوزیون	بله	خیر
دوز درمانی در سکته مغزی	0.9 mg/kg (حداکثر 90 mg)	0.25 mg/kg (حداکثر 25 mg)
نحوه تزریق	۱۰٪ دوز بولوس در 1 دقیقه + ۹۰٪ طی 60 دقیقه انفوزیون	یک بولوس منفرد طی 5–10 ثانیه
محلول تزریق	نرمال سالین 0.9%	نیازی ندارد (تزریق مستقیم)
مثال برای بیمار 70 kg	کل دوز 63 mg: 6.3 mg بولوس + 56.7 mg طی 60 دقیقه	دوز 17.5 mg (3.5 mL از محلول 5 mg/mL) طی 5–10 ثانیه
لاین وریدی	اختصاصی و بدون داروی دیگر	اختصاصی و بدون داروی دیگر

جدول ۳. مانیتورینگ، احتیاطات و ویژگی‌های بالینی

ویژگی	آلتپلاز (Alteplase)	تنکتپلاز (Tenecteplase)
فشار خون مجاز قبل از تزریق	< 185/110 mmHg	< 185/110 mmHg
زمان شروع مجاز درمان	تا ۴٫۵ ساعت پس از شروع علائم	تا ۴٫۵ ساعت پس از شروع علائم
پایش بالینی پس از تزریق	فشار خون و NIHSS هر ۱۵ دقیقه × ۲ ساعت، هر ۳۰ دقیقه × ۶ ساعت، سپس هر ۱ ساعت × ۱۶ ساعت	همان پروتکل
تصویربرداری کنترل پس از درمان	CT یا MRI در ۲۴ ساعت یا در صورت افت هوشیاری	همان
شروع داروهای ضدپلاکتی/ضدانعقادی	≥ ۲۴ ساعت بعد از تزریق و پس از CT نرمال	همان
مزیت‌ها	شواهد زیاد، استاندارد طلایی	تزریق آسان، سریع، بدون پمپ
معایب	آماده‌سازی و تزریق پیچیده‌تر	هنوز در برخی کشورها مجوز کامل برای سکته مغزی ندارد
تفاوت ساختمانی	rt-PA انسانی	جهش‌یافته با نیمه‌عمر طولانی‌تر و اختصاصیت بیشتر به فیبرین

- بلافاصله قبل مصرف هر ویال با ۱۰ ml آب مقطر استریل قابل تزریق حل شود. تا محلول ۵ mg/ml بدست آید. برای تجویز حجم مورد نظر به صورت بولوس تزریق میگردد.
- از تکان دادن شدید ویال خودداری شود. در صورت عدم مصرف داروی حل شده، تا ۸ ساعت در دمای ۲ تا ۸ درجه قابل نگهداری است.
- به دلیل نیمه عمر بالا قابلیت تجویز به صورت بلوس تک دوز را دارد ، به همین دلیل تجویز دارو آسان تر می باشد.
- پودر لیوفیلیزه در دمای زیر ۳۰ درجه سانتی گراد یا در یخچال قابل نگهداری است.
- داروی تنکتپلاز با محلول دکستروز ناسازگار است. در صورتیکه در لاین تزریق محلول دکستروز استفاده شده است قبل و بعد از تزریق تنکتپلاز با محلول سالین شست و شو داد شود.


Door to treatment in ≤60 min
0 min
Suspected stroke patient arrives at ED
≤10 min
Initiate MD evaluation, including patient history and time last known well/symptom onset
Initiate labwork
Examine using NIHSS
≤15 min
Notify stroke team (including neurologic expertise)
≤25 min
Initiate CT scan
≤45 min
Interpret CT scan using ASPECTS
Review labs if available
Review patient eligibility for tPA
≤60 min
Give tPA bolus and initiate infusion in eligible patients

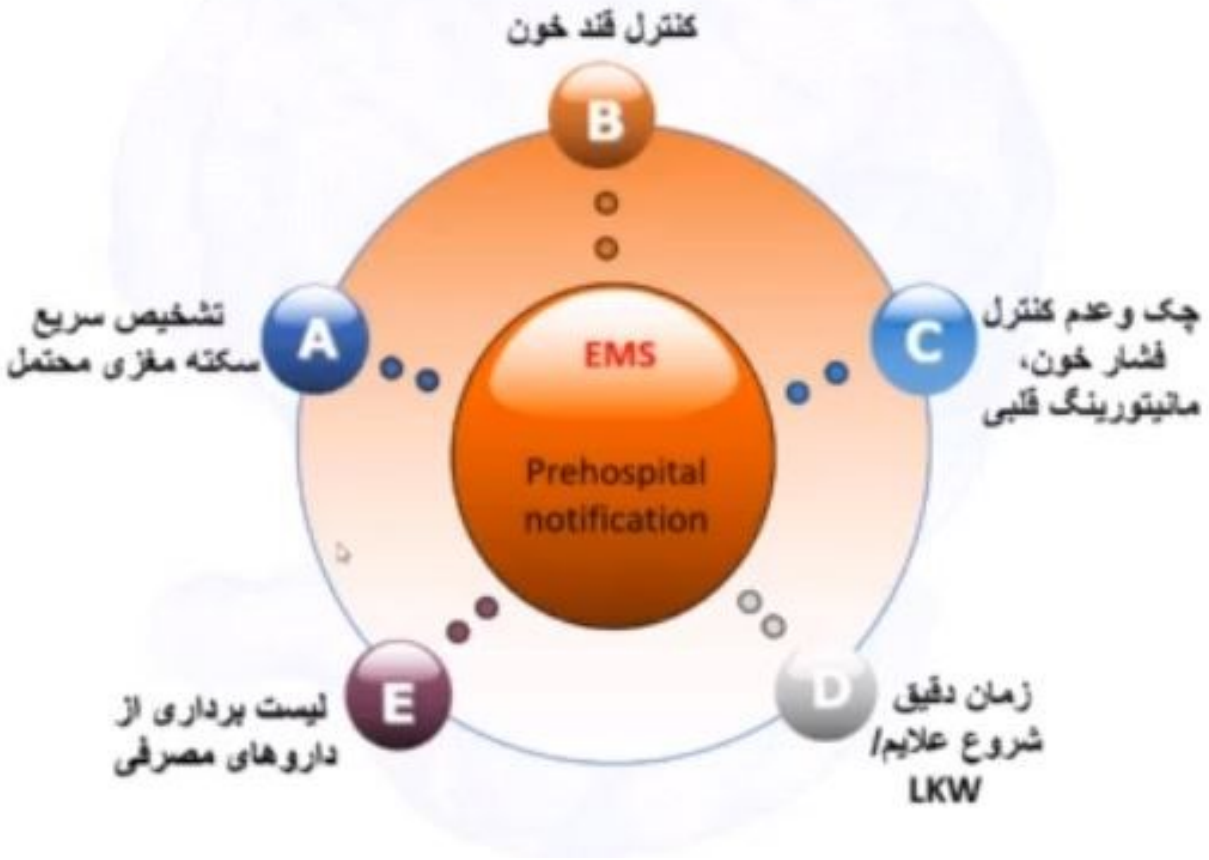
Good is not Good Enough: The Benchmark Stroke Door-to-Needle Time Should be 30 Minutes

Published online by Cambridge University Press: **20 October 2014**

Noreen Kamal, Oscar Benavente, Karl Boyle, Brian Buck, Ken Butcher, Leanne K. Casaubon, Robert Côté, Andrew M Demchuk, Yan Deschaintre and Dar Dowlatshahi ...Show all authors Show author details

- Administering alteplase in the diagnostic imaging area reduced DTN time by 32%
- Moving the patient to the diagnostic imaging area on the EMS stretcher reduced DTN time by 30%
- Registering the patient as unknown, prior to full identification by family members or an informant, reduced DTN time by 12%
- Simultaneous notification by group pager of an incoming patient with high stroke severity reduced DTN time by 11%

فوریت های پیش بیمارستانی




HOM CT 10

Symptoms of stroke

- Trouble speaking and understanding what others are saying
- Numbness,
- weakness or paralysis in the face, arm or leg
- Problems seeing in one or both eyes. Headache
- Trouble walking
- Sudden confusion
- Vertigo
- Difficulty understanding what others are saying
- Difficulty swallowing (dysphagia)

Stroke Scale

Face Arm Speech Test (FAST)

- **F—Face:** Ask the person to smile. Does one side of the face droop?
- **A—Arms:** Ask the person to raise both arms. Does one arm drift downward?
- **S—Speech:** Ask the person to repeat a simple phrase. Is the speech slurred or strange?
- **T—Time:** If you see any of these signs, call 9-1-1 right away.
- The scale is insensitive to:
  - isolated stroke-related visual or
  - sensory impairments,
  - vertigo,
  - and gait disturbances

BE-FAST

- The BE-FAST test is a modification of FAST that accounts for
  - imbalance or leg weakness (B for balance)
  - and visual symptoms (E for eyes)

National Institutes of Health Stroke Scale Examination NIHSS

- Eleven items are tested
- a scale ranging from 0 (no deficit) to 42 (comatose and quadriplegic).
- In expert hands, the test takes only several minutes to administer.
- > 7 LVO
- >9 increased hemorrhagic conversion after tPA
- <= 5 minor stroke
- Scores higher than 20 in patients with AIS imply a high risk of large territory infarction and a very poor prognosis if reperfusion is not attained.

NATIONAL INSTITUTES OF HEALTH STROKE SCALE (NIHSS)

Item	Title	Responses and Scores
1a.	Level of consciousness	0—alert 1—drowsy 2—obtunded 3—coma/unresponsive
1b.	Orientation questions (2)	0—answers both correctly 1—answers one correctly 2—answers neither correctly
1c.	Response to commands (2)	0—performs both tasks correctly 1—performs one task correctly 2—performs neither
2.	Gaze	0—normal horizontal movements 1—partial gaze palsy 2—complete gaze palsy
3.	Visual fields	0—no visual field defect 1—partial hemianopia 2—complete hemianopia 3—bilateral hemianopia
4.	Facial movement	0—normal 1—minor facial weakness 2—partial facial weakness 3—complete unilateral palsy
5.	Motor function (arm) a. Left b. Right	0—no drift 1—drift before 10 seconds 2—falls before 10 seconds 3—no effort against gravity 4—no movement
6.	Motor function (leg) a. Left b. Right	0—no drift 1—drift before 5 seconds 2—falls before 5 seconds 3—no effort against gravity 4—no movement
7.	Limb ataxia	0—no ataxia 1—ataxia in 1 limb 2—ataxia in 2 limbs
8.	Sensory	0—no sensory loss 1—mild sensory loss 2—severe sensory loss
9.	Language	0—normal 1—mild aphasia 2—severe aphasia 3—mute or global aphasia
10.	Articulation	0—normal 1—mild dysarthria 2—severe dysarthria
11.	Extinction or inattention	0—absent 1—mild loss (1 sensory modality lost) 2—severe loss (2 modalities lost)

Scoring range is 0-42 points. The higher the number, the greater the severity.

Score	Stroke Severity
0	No stroke symptoms
1-4	Minor stroke
5-15	Moderate stroke
16-20	Moderate to severe stroke
21-42	Severe stroke

Tissue Plasminogen Activator and Stroke Mimics

- The prevalence of potential AIS that proves to be a stroke mimic is as high as 20% to 25% in some regions, most of which represent seizure, complicated migraine, or conversion disorder.
- MRI, which can more definitively differentiate stroke from mimics, leads to delays that reduce the efficacy of tPA in improving neurologic outcomes.
- Fortunately, several studies show that tPA administration to stroke mimics is not associated with ICH or other complications.(≈0–1.2%)
- A rate of treating stroke mimics with thrombolysis of up to 15% is considered acceptable in most active stroke centers.

Risk of intracerebral hemorrhage

- Symptomatic ICH were 5 to 7 percent.
- 6 % symptomatic + 4 % assymptomatic

نوع خونریزی	تعریف	شیوع با آلتپلاز (rtPA)	شیوع با تنکتپلاز (TNK)	توضیحات کلیدی
Symptomatic intracerebral hemorrhage (sICH)	خونریزی در مغز با بدتر شدن بالینی (افزایش ≥4 امتیاز در NIHSS) و شواهد تصویربرداری	**6.0%–2.5** (متوسط ≈ **4%**)	**4%–2** (در اغلب کارآزمایی‌ها مشابه یا اندکی کمتر از آلتپلاز)	مهم‌ترین عارضهٔ جدی درمان؛ در بیشتر بیماران طی 24 ساعت اول رخ می‌دهد.
Any intracranial hemorrhage (ICH)	خونریزی بدون الزام به بدتر شدن بالینی	**12%–10**	**10%–8**	اغلب بدون علامت یا با علائم خفیف.
Systemic bleeding (غیر مغزی)	خونریزی گوارشی، ادراری، یا محل تزریق	**3%–1**	**2%–1**	در بیماران مسن‌تر یا با مصرف آنتی‌پلاکت‌ها شایع‌تر است.
Fatal ICH	خونریزی علامت‌دار با مرگ ناشی از آن	**2%–1**	**1% یا کمتر**	بیشتر در بیماران با فشار خون بالا یا حجم سکتهٔ بزرگ.

📊 جمع‌بندی بالینی (طبق AHA/ASA 2024)

نتیجه	درصد تقریبی
بهبود عملکردی (mRS 0–1 در 3 ماه)	30–35% بیماران دریافت‌کننده tPA
sICH	3–4%
مرگ ناشی از sICH	1–2%
سود خالص عملکردی (Benefit > Risk)	حدود 1 بیمار مفید به ازای هر 8–10 درمان‌شده (NNT ≈ 8–10)

Airway, breathing and circulation

- Assessing vital signs
- ensuring stabilization of airway, breathing, and circulation
- Patients with decreased consciousness or bulbar dysfunction may be unable to protect their airway, and those with increased intracranial pressure due to hemorrhage, vertebrobasilar ischemia, or bihemispheric ischemia can present with vomiting, decreased respiratory drive, or muscular airway obstruction.
- Hypoventilation, with a resulting increase in carbon dioxide, may lead to cerebral vasodilation and elevate intracranial pressure.
- In these cases, intubation may be necessary to restore adequate ventilation and to protect the airway from aspiration.
- Patients with adequate ventilation should have the oxygen saturation monitored.
- Patients who are hypoxic should receive supplemental oxygen to maintain oxygen saturation >94 percent
- Supplemental oxygen should not routinely be given to nonhypoxic patients with acute ischemic stroke.

History and physical

- Last known to be normal
- Assess contraindications
- Stroke mimics: seizures, syncope, migraine, hypoglycemia hyperglycemia, or drug toxicity
- The most difficult cases involve patients with altered level of consciousness.
- Accurate body weight has been determined
- Anticoagulant drugs

History and physical

- The presence of onset headache and vomiting favor the diagnosis of ICH or SAH (compared with a thromboembolic stroke)
- It is important to assess and stabilize vital physiologic functions **before** sending the patient for an imaging study.
- The head should be examined for signs of trauma.
- A tongue laceration may suggest a seizure.
- In cases where there is a report or suspicion of a fall, the neck should be immobilized until evaluated radiographically for evidence of serious trauma.
- Examination of the extremities is important to look for evidence of systemic arterial emboli, distal ischemic, cellulitis, and deep vein thrombosis

Immediate laboratory studies

- All patients with suspected stroke should have the following studies urgently as part of the acute stroke evaluation :
  - Noncontrast brain CT or brain MRI
  - Finger stick blood glucose
  - Oxygen saturation
  - Blood Pressure
- Other immediate tests but should not delay initiation of IV alteplase:
  - EKG
  - CBC
  - Troponin
  - PT (INR)
  - aPTT

- Two intravenous lines, preferably large-bore (preferably 18 gauge) intravenous access and obtain admission labs.
- NPO status confirmed
- Brain MRI for wake up stroke or for stroke mimics
-

Management of blood pressure

- Before administration at or below 185 mmHg systolic and 110
- After administration: below 180/105 mmHg during and for 24 hours
- Intravenous labetalol, nicardipine, or clevidipine are suggested agents of first choice.
- Frequent blood pressure monitoring is recommended :
  - every 15 minutes for the first 2 hours
  - then every 30 minutes for the next 6 hours,
  - then every hour until 24 hours

Time After Starting Thrombolytic Therapy	Monitoring Frequency
0–2 hours	Every 15 minutes
2–8 hours	Every 30 minutes
8–24 hours	Every 60 minutes

Table 5. Options to Treat Arterial Hypertension in Patients With AIS Who Are Candidates for Acute Reperfusion Therapy*

Class IIb, LOE C-EO
Patient otherwise eligible for acute reperfusion therapy except that BP is >185/110 mm Hg:
Labetalol 10–20 mg IV over 1–2 min, may repeat 1 time; or
Nicardipine 5 mg/h IV, titrate up by 2.5 mg/h every 5–15 min, maximum 15 mg/h; when desired BP reached, adjust to maintain proper BP limits; or
Clevidipine 1–2 mg/h IV, titrate by doubling the dose every 2–5 min until desired BP reached; maximum 21 mg/h
Other agents (eg, hydralazine, enalaprilat) may also be considered
If BP is not maintained ≤185/110 mm Hg, do not administer alteplase
Management of BP during and after alteplase or other acute reperfusion therapy to maintain BP ≤180/105 mm Hg:
Monitor BP every 15 min for 2 h from the start of alteplase therapy, then every 30 min for 6 h, and then every hour for 16 h
If systolic BP >180–230 mm Hg or diastolic BP >105–120 mm Hg:
Labetalol 10 mg IV followed by continuous IV infusion 2–8 mg/min; or
Nicardipine 5 mg/h IV, titrate up to desired effect by 2.5 mg/h every 5–15 min, maximum 15 mg/h; or
Clevidipine 1–2 mg/h IV, titrate by doubling the dose every 2–5 min until desired BP reached; maximum 21 mg/h
If BP not controlled or diastolic BP >140 mm Hg, consider IV sodium nitroprusside

AIS indicates acute ischemic stroke; BP, blood pressure; IV, intravenous; and LOE, Level of Evidence.

*Different treatment options may be appropriate in patients who have comorbid conditions that may benefit from acute reductions in BP such as acute coronary event, acute heart failure, aortic dissection, or preeclampsia/eclampsia.

Data derived from Jauch et al.[1]

- Elevated BP is a strong indicator that the patient is actually having a stroke as opposed to a stroke mimic.
- Aggressive BP reduction within the first few hours of AIS onset can lead to worsening of the neurologic deficit and therefore should be avoided.
- **The BP should only be lowered(SBP: 180) prior to noncontrast CT if**
  - **the systolic BP is higher than 220 mm Hg,**
  - **diastolic BP is higher than 120 mm Hg**
  - **acute end-organ damage**
    - **acute myocardial infarction,**
    - **aortic dissection**
    - **cardiogenic pulmonary edema**
    - **Preeclampsia**

Monitoring

- All patients treated with tPA :intensive care unit or dedicated stroke unit for at least 24
- Discontinue the infusion and obtain emergency head CT:
  - sudden neurologic deterioration,
  - new headache
  - Nausea or vomiting
  - a sudden rise in blood pressure

- first 24 hours of alteplase treatment include:

1. Vital signs and neurologic status should be checked every 15 minutes for two hours, then every 30 minutes for six hours, then every 60 minutes until 24 hours from the start of alteplase treatment.
2. Blood pressure must be maintained at or below 180/105 mmHg during the first 24 hours.
3. Anticoagulant and antithrombotic agents, such as heparin, warfarin, or antiplatelet drugs, should **not** be administered for at least 24 hours after the alteplase infusion is completed.
4. Placement **of intra-arterial catheters, indwelling bladder catheters, and nasogastric tubes** should be avoided for at least 24 hours if the patient can be safely managed without them.
5. A follow-up noncontrast CT (or MRI) brain scan should be obtained 24 hours after alteplase is initiated before starting treatment with antiplatelet or anticoagulant agents

Temperature

1. Sources of hyperthermia (temperature >38°C) should be identified and treated, and antipyretic medications should be administered to lower temperature in hyperthermic patients with stroke.
2. The benefit of induced hypothermia for treating patients with ischemic stroke is not well established. Hypothermia should be offered only in the context of ongoing clinical trials.
3. Temperature In general, it is not necessary to measure body temperature prior to CT in a patient with acute stroke unless meningitis is suspected.

Blood Glucose

1. Evidence indicates that persistent in-hospital hyperglycemia during the first 24 hours after AIS is associated with worse outcomes than normoglycemia and thus, it is reasonable to treat hyperglycemia to achieve blood glucose levels in a range of 140 to 180 mg/dL and to closely monitor to prevent hypoglycemia in patients with AIS
2. Hypoglycemia (blood glucose <60 mg/dL) should be treated in patients with AIS

Indication

1. Symptom onset Within 3 hours: last known well or at baseline state.
    1. Age≥18 years
    2. Diagnosis of ischemic stroke with disabling neurologic deficit (regardless of severity)
2. IV alteplase treatment in the 3- to 4.5-h time window is recommended for those patients:
    1. ≤80 y of age,
    2. without a history of both diabetes mellitus and prior stroke,
    3. NIHSS score ≤25,
    4. not taking any OACs,
    5. and without imaging evidence of ischemic injury involving more than one third of the MCA territory.
3. Wake-up stroke with diffusion-weighted imaging FLAIR mismatch on MRI

Disabling deficits:

1. Complete hemianopia: ≥2 on NIHSS question 3, or
2. Severe aphasia: ≥2 on NIHSS question 9, or
3. Visual or sensory extinction: ≥1 on NIHSS question 11, or
4. Any weakness limiting sustained effort against gravity: ≥2 on NIHSS question 5 or 6, or
5. Any deficits that lead to a total NIHSS >5, or
6. Any remaining deficit considered potentially disabling in the view of the patient and the treating practitioner using clinical judgment

Contraindications
Severe head trauma within 3 months
Ischemic stroke within 3 months
Previous intracranial hemorrhage
Suspected subarachnoid hemorrhage
Suspected infective endocarditis
Suspected aortic arch dissection
Recent intracranial or intraspinal surgery (within 3 months)
Intracranial intraaxial neoplasm
Gastrointestinal malignancy or gastrointestinal bleeding within previous 21 days

Active internal bleeding
Systolic blood pressure (BP) >185 mm Hg or diastolic BP >110 mm Hg that cannot be lowered safely
Bleeding diathesis
International normalized ratio (INR) >1.7
Heparin within 48 hours with abnormal activated partial thromboplastin time
Low-molecular-weight heparin full treatment dose within previous 24 hours
Platelets <100,000/mm^3
Current use of direct thrombin inhibitor or factor Xa inhibitor with abnormal coagulation tests[f]
CT showing acute hemorrhage
CT showing extensive hypodensity (eg, >1/3 of the cerebral hemisphere)

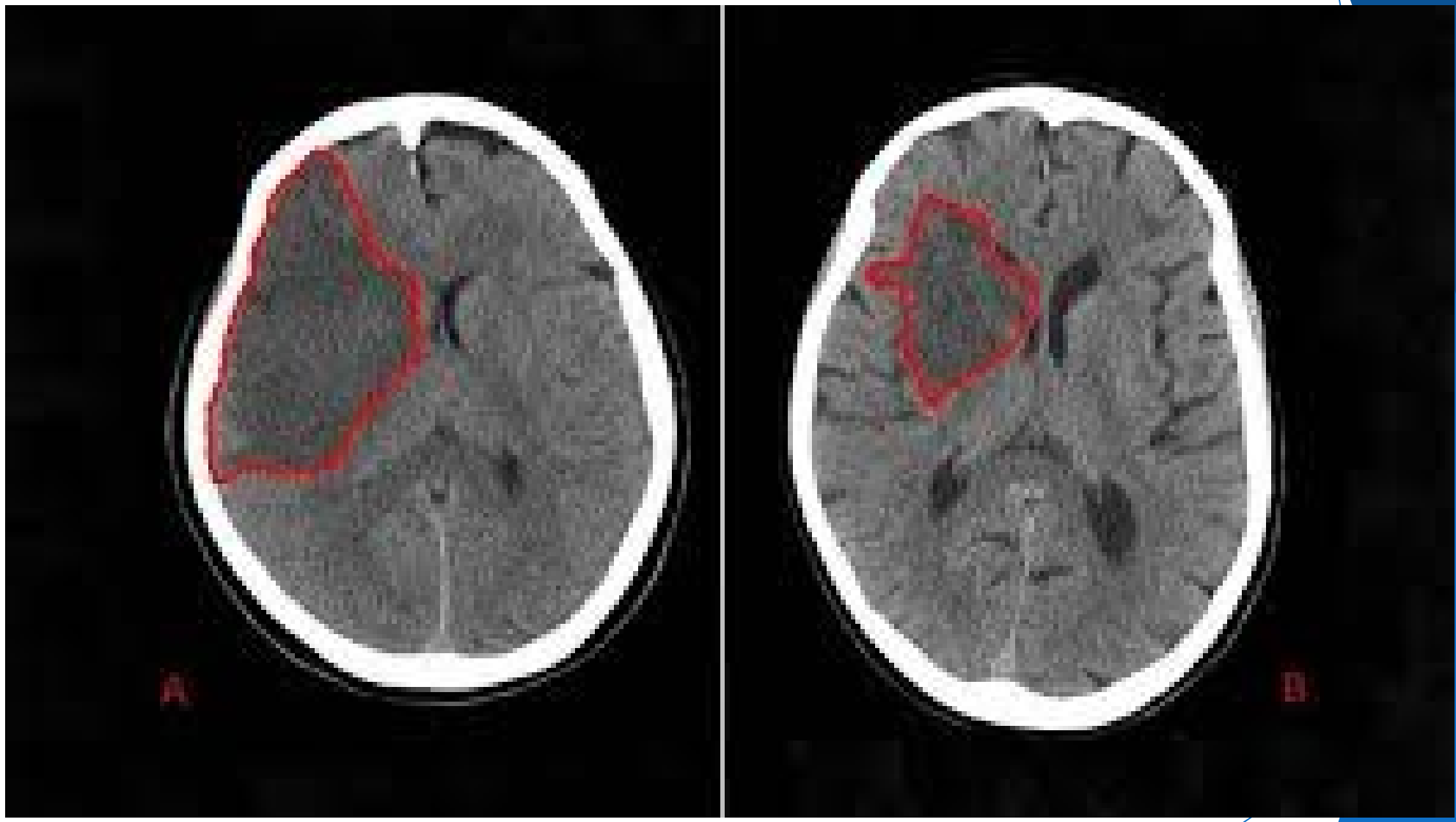
1. Bp>= 185/110 resistant to treatment (2 dose labetalol or hydralazine 10-20mg)
2. PTT>40 >1.5 NL
3. PT>15
4. INR>1.7
5. PLT<100000
6. BS<50 , BS>400 اگه متعاقبا اصلاح بشه و نقص عصبی باقی بماند باید تزریق شود
7. Completed infarct signs involving >1/3 of the MCA territory

1. Last known well time >4.5 hours
2. Therapeutic doses of LMWH received within 24 hours (eg, to treat VTE and ACS); this exclusion does not apply to prophylactic doses (eg, to prevent VTE). There is no need to do a coagulation test.
3. Heparin within 48 hours with abnormal PTT
4. Current use of direct thrombin inhibitors(dabigatron) or direct factor Xa inhibitors (apixaban rivaroxaban) with elevated sensitive laboratory tests (such as PTT, INR, platelet count, and ecarin clotting time [ECT]; thrombin time; or appropriate factor Xa activity assays) or **[last dose within 48 hours in a patient with normal renal function]**
5. Arterial puncture at a noncompressible site within preceding 7 d. It is still unclear.
6. Lumbar puncture within preceding 7 d (IV alteplase may be considered for patients who present with AIS, even in instances when they may have undergone a lumbar dural puncture in the preceding 7 d)
7. Major surgery or serious trauma(not involving the head) within preceding 14 d
8. Gastrointestinal, urinary tract, or other significant bleeding within preceding 21 d
9. Significant MI within past 4 wk
10. Prior Stroke within preceding 3 mo
11. Prior serious(severe) head trauma within preceding 3 mo
12. Intracranial/intraspinal surgery within 3 months

- Heart Rate Atrial fibrillation (AF) with rapid ventricular response, the most common significant arrhythmia in patients with acute stroke, or other tachyarrhythmias can occur on presentation and may necessitate stabilization prior to obtaining CT.
  - Diltiazem 10 mg IV or metoprolol 5 mg IV are commonly used initial therapies for AF with rapid ventricular response in this setting.
- A cardiac monitor should be placed if there is any concern about heart rate or if the patient reports chest pain or palpitations.
- Routine electrocardiography should be obtained in acute stroke patients but is only required prior to CT if there is significant dysrhythmia or if an acute coronary syndrome is suspected.
- Patients with severe dyspnea or significantly impaired level of consciousness (stupor or coma) should be intubated prior to CT scan because failure to control the airway can lead to respiratory arrest or severe aspiration.

Noncontrast Head CT

- The main differential diagnosis in acute stroke is infarction versus hemorrhage.
- Infarction does not cause consistent changes on CT within 6 hours of stroke onset.
- All further management decisions will depend on making this distinction.
- To minimize delays in the diagnosis and treatment of LVO, many stroke systems are combining NCHCT with CTA as the initial imaging protocol for all stroke codes.
- CT perfusion is also often performed to assess tissue viability and potential candidacy for thrombectomy when an LVO is identified 6 to 24 hours from last known well.


A
B

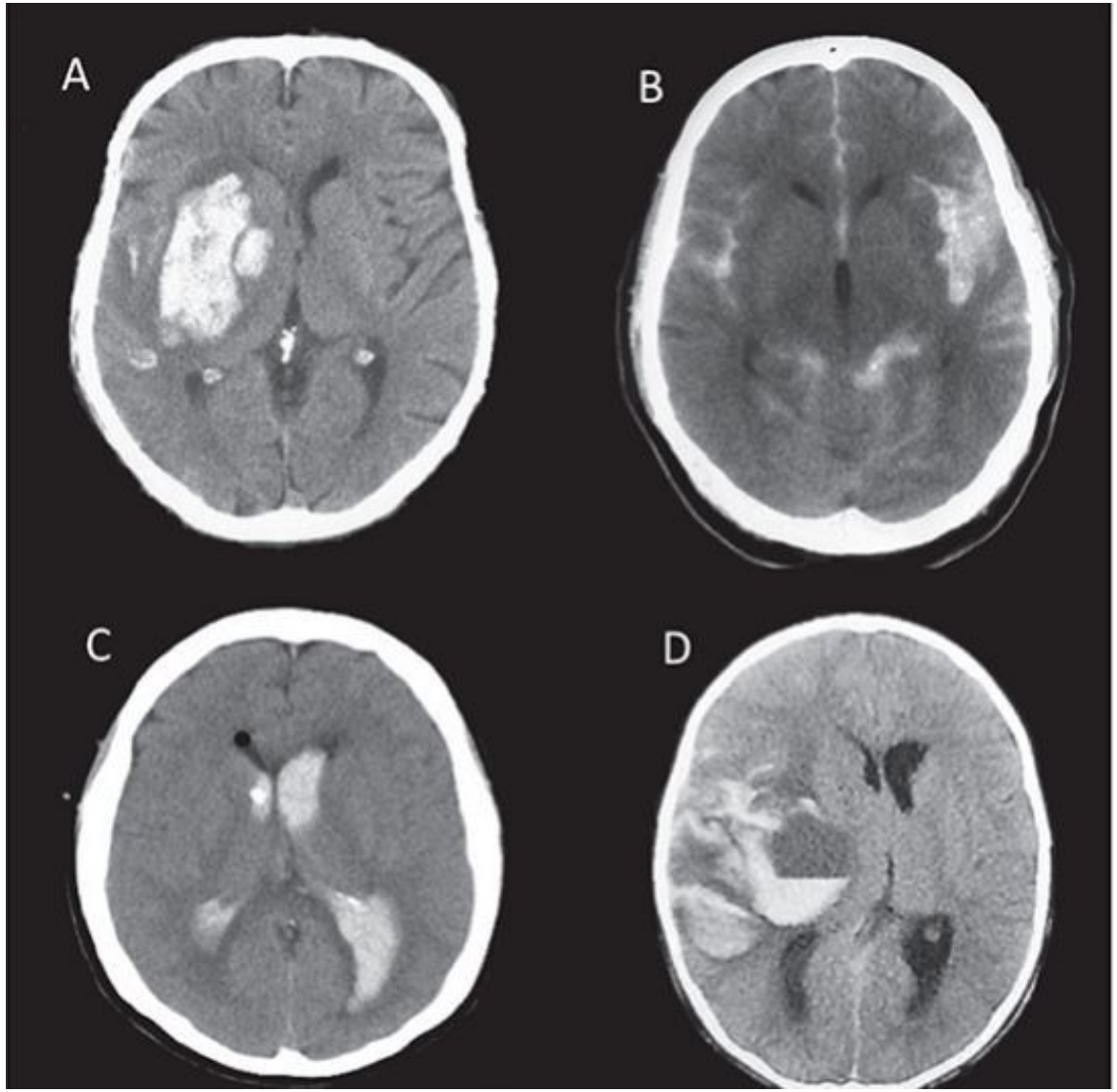

A
B
C
D

TABLE 36.6 Stroke Unit Checklist

□ BP goal <180/105 mm Hg for 24 h if IV tPA was given
□ BP goal <220/120 mm Hg if no IV tPA was used
□ Serial monitoring of vital signs
□ Serial monitoring of neurologic deficits
□ Dysphagia screen
□ Aspirin (by mouth or rectal)[a]
□ Enoxaparin 40 mg SC daily (heparin 5,000 units 3 times a day if renal dysfunction)[a]
□ Place sequential compression device.
□ High-dose statin
□ Neurovascular work-up: carotid and intracranial Doppler ultrasounds, CTA or MRA
□ Cardiac workup: ECG, serial troponins, telemetry, echocardiogram
□ Screen: hemoglobin A_{1c}, lipid panel, toxicology, urinalysis
□ Remove Foley.

Abbreviations: BP, blood pressure; CTA, computed tomography angiography; ECG, electrocardiogram; IV tPA, intravenous tissue plasminogen activator; MRA, magnetic resonance angiography; SC, subcutaneous.

[a]Contraindicated in the first 24 hours after thrombolysis.

- Provide supplemental O_2 if SpO_2 <94%
- Treat hypo/hyperglycemia promptly
- Avoid fluid overload
- Maintain proper hydration
- Early mobilization if allowed
- Compression devices or anticoagulant prophylaxis
- Regular repositioning

Complication	Strategy
DVT	Anticoagulants post-24h
Aspiration	NPO, head up
Ulcers	q2h turns

- **Emotional Support & Counseling**
  - Anxiety, fear, confusion management
  - Include family in care decisions

Case 1: Thrombolysis – Table & Timeline

Table: Key Nursing Actions & Timeline

Nurse Role / Monitoring	Action	Time
—	Symptom onset (LKW)	08:00
FAST assessment, vitals, IV access, labs	ED arrival	08:45
Notify stroke team, prepare patient for imaging	Code 724 activation	08:50
Ensure NPO, remove metal, continuous neuro monitoring	CT scan	08:55
Verify eligibility for thrombolysis	Labs result	09:10
Administer IV, BP monitoring every 15 min, neuro checks	Alteplase start	09:20
Continue vitals, neuro checks, detect complications	Post-infusion monitoring	11:20
NIHSS: 10 → 5, patient stable	Outcome assessment	hrs 24

Mechanical Thrombectomy

- IV tPA fails to recanalize the occluded vessel in 40% of cases.
- In order to effectively select patients for endovascular therapy, acute vessel imaging is required, usually done with CTA
- This allows the team to proceed directly with a CT angiogram without delaying tPA administration.
- some hospitals and health care systems have adopted a "CTA-for-All" policy,
- The rationale for this is to expedite the diagnosis of LVO in all potentially treatable patients, including those with wake-up strokes or late presentation.
- In these protocols, routine documentation of a normal serum creatinine level is waived owing to the urgency of the situation and the low risk of serious contrast-induced nephropathy

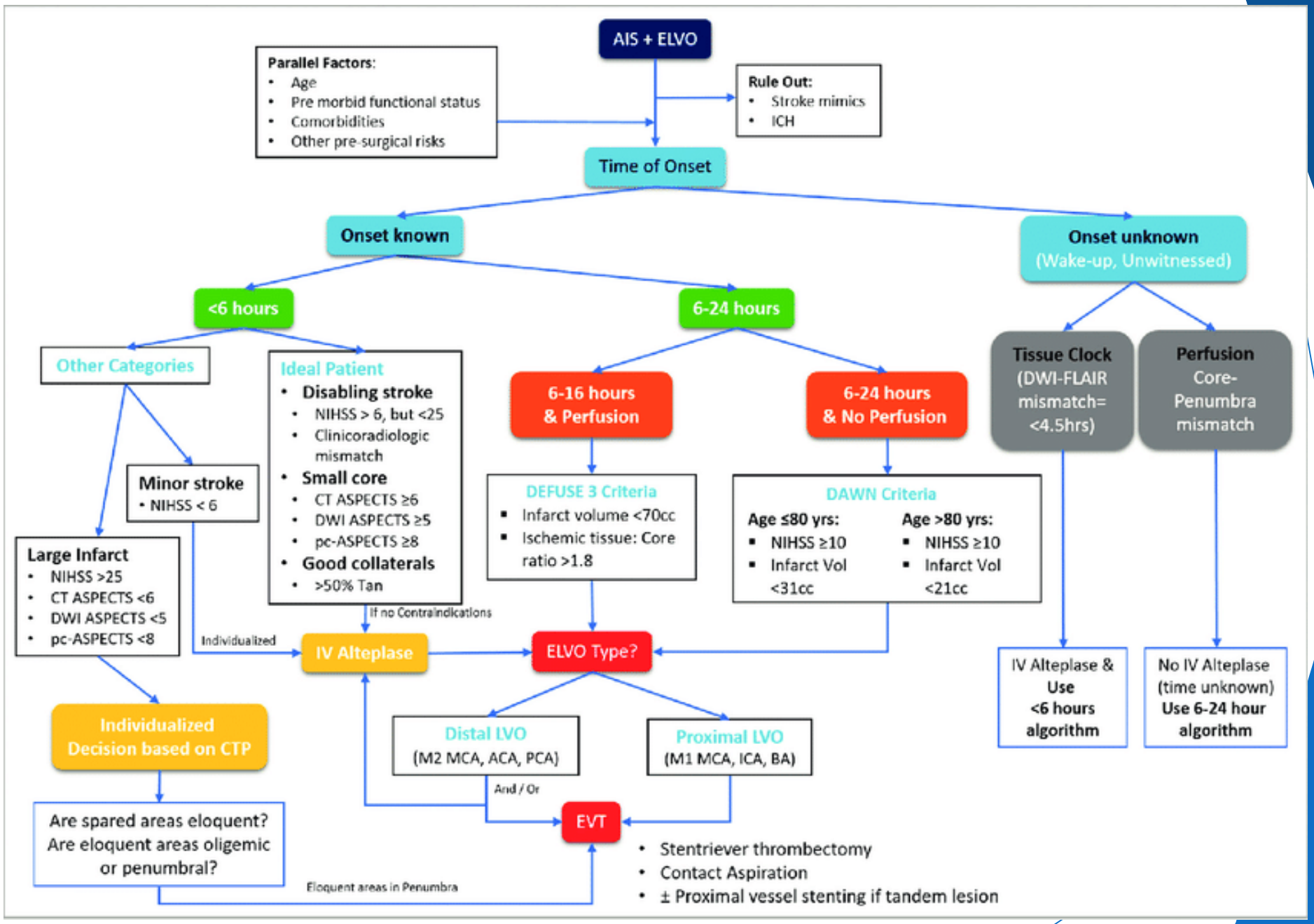
معیار اثر بخشی	ترومبولیتیک IV (Alteplase / Tenecteplase)	ترومبکتومی مکانیکی (MT)	ترکیب IVT + MT (Bridging Therapy)
بازگشت کامل جریان (TICI 3)	≈10–30%	≈50–70%	≈60–80%
بازگشت جریان قابل توجه (TICI ≥2b)	≈20–40%	≈70–90%	≈75–90%
بهبود عملکردی (mRS 0–2 در 90 روز)	≈30–40%	≈45–55%	≈50–60% (بستگی به زمان شروع درمان)
مرگ و میر 90 روز	≈15%	≈10–15%	≈10–15%
خونریزی مغزی شدید (sICH)	≈6%	≈5–7%	≈5–8%
نکته کلیدی	سریع، در همه مراکز قابل انجام، اثربخشی محدود در LVO	بسیار مؤثر در LVO، نیاز به مرکز مجهز و اپراتور ماهر	مزیت در بازگشت جریان و بهبود عملکردی اگر زمان درمان کوتاه باشد؛ شواهد ترکیبی کمی متناقض است

3️⃣ جمع‌بندی مقایسه NNT

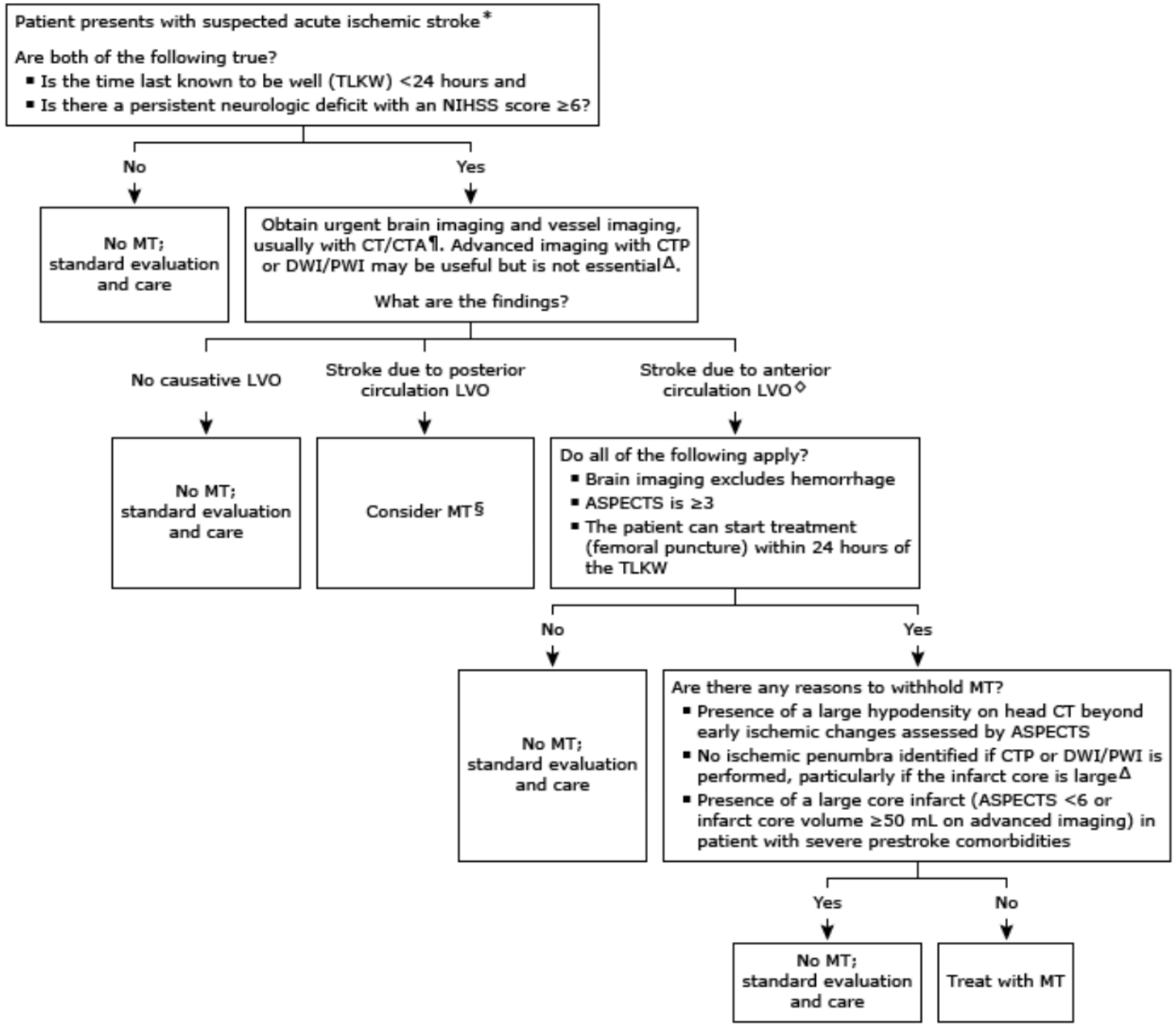
درمان	NNT (بهبود عملکردی)	نکته
IV tPA / TNK	10–8	درمان اولیه، گستره وسیع بیماران
Thrombectomy (LVO)	4–2	در بیماران منتخب با انسداد عروقی بزرگ
Thrombectomy + tPA	3–2	سود حداکثری، استاندارد برای LVO

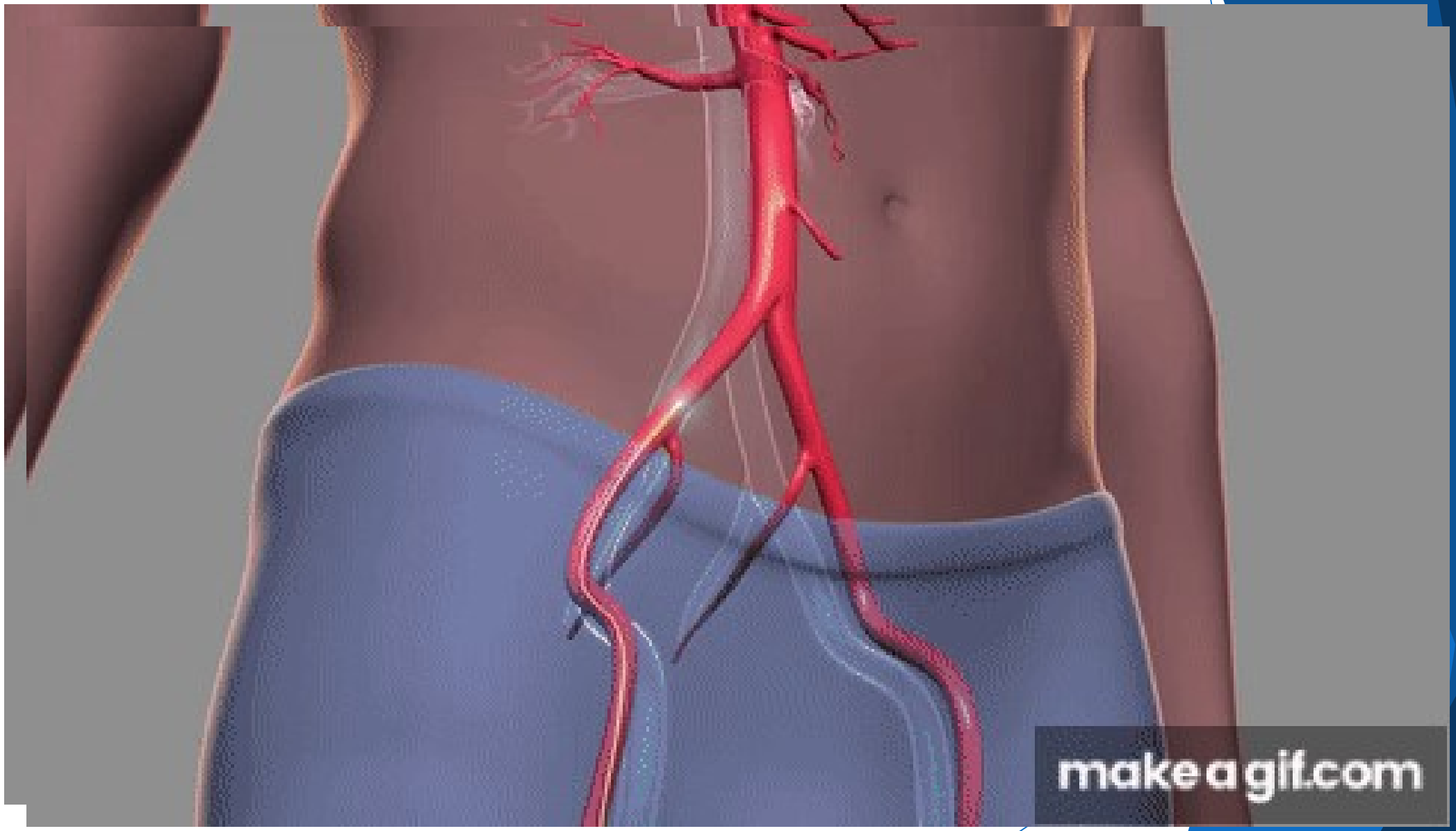
> نتیجه: **ترومبکتومی در بیماران با انسداد عروقی بزرگ به مراتب NNT بهتری دارد**، اما IV tPA هنوز درمان استاندارد برای همه بیماران غیر-LVO و دسترسی سریع است.

- Best practice:
  - IV tPA can be administered within 20 minutes after ED arrival
  - endovascular thrombectomy can be initiated within 60 minutes.


AIS + ELVO
Parallel Factors:
Age
Pre morbid functional status
Comorbidities
Other pre-surgical risks
Rule Out:
Stroke mimics
ICH
Time of Onset
Onset known
Onset unknown
(Wake-up, Unwitnessed)
<6 hours
6-24 hours
Other Categories
Ideal Patient
Disabling stroke
NIHSS > 6, but <25
Clinicoradiologic mismatch
Small core
CT ASPECTS ≥6
DWI ASPECTS ≥5
pc-ASPECTS ≥8
Good collaterals
>50% Tan
6-16 hours & Perfusion
6-24 hours & No Perfusion
Tissue Clock
(DWI-FLAIR mismatch= <4.5hrs)
Perfusion
Core-Penumbra mismatch
Minor stroke
NIHSS < 6
Large Infarct
NIHSS >25
CT ASPECTS <6
DWI ASPECTS <5
pc-ASPECTS <8
DEFUSE 3 Criteria
Infarct volume <70cc
Ischemic tissue: Core ratio >1.8
DAWN Criteria
Age ≤80 yrs:
NIHSS ≥10
Infarct Vol <31cc
Age >80 yrs:
NIHSS ≥10
Infarct Vol <21cc
If no Contraindications
Individualized
IV Alteplase
ELVO Type?
IV Alteplase & Use <6 hours algorithm
No IV Alteplase (time unknown) Use 6-24 hour algorithm
Individualized Decision based on CTP
Distal LVO
(M2 MCA, ACA, PCA)
Proximal LVO
(M1 MCA, ICA, BA)
And / Or
EVT
Are spared areas eloquent? Are eloquent areas oligemic or penumbral?
Eloquent areas in Penumbra
Stentriever thrombectomy
Contact Aspiration
± Proximal vessel stenting if tandem lesion

- CTP Criteria:
  - with a core infarct volume less than 70 mL,
  - a ratio of penumbral tissue to core infarct volume of 1.8 or more
  - and an absolute volume of penumbra of 15 mL or more .


Patient presents with suspected acute ischemic stroke*
Are both of the following true?
Is the time last known to be well (TLKW) <24 hours and
Is there a persistent neurologic deficit with an NIHSS score ≥6?
No
Yes
No MT; standard evaluation and care
Obtain urgent brain imaging and vessel imaging, usually with CT/CTA¶. Advanced imaging with CTP or DWI/PWI may be useful but is not essentialΔ.
What are the findings?
No causative LVO
Stroke due to posterior circulation LVO
Stroke due to anterior circulation LVO◊
No MT; standard evaluation and care
Consider MT§
Do all of the following apply?
Brain imaging excludes hemorrhage
ASPECTS is ≥3
The patient can start treatment (femoral puncture) within 24 hours of the TLKW
No
Yes
No MT; standard evaluation and care
Are there any reasons to withhold MT?
Presence of a large hypodensity on head CT beyond early ischemic changes assessed by ASPECTS
No ischemic penumbra identified if CTP or DWI/PWI is performed, particularly if the infarct core is largeΔ
Presence of a large core infarct (ASPECTS <6 or infarct core volume ≥50 mL on advanced imaging) in patient with severe prestroke comorbidities
Yes
No
No MT; standard evaluation and care
Treat with MT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🧩 جدول ۱. مرحله قبل از ترومبکتومی (Pre-procedure)

مرحله	اقدامات کلیدی
۱. فعال‌سازی سریع کد استروک	تماس فوری تیم استروک و نوروانترونشن، هدف: Door-to-device ≤ ۹۰ دقیقه.
۲. ارزیابی بالینی	NIHSS ≥ ۶ و mRS قبل از سکته ≥ ۲ (بیمار مستقل قبل از سکته).
۳. تصویربرداری	- **CT بدون کنتراست:**排除 خونریزی. - **CTA:** شناسایی انسداد LVO (ICA, M1, M2, basilar). - در موارد تأخیری: **CTP/MRI perfusion** جهت بررسی core–penumbra mismatch.
۴. زمان‌بندی درمان	- ۰ تا ۶ ساعت: واجد شرایط در صورت LVO + ASPECTS ≥ ۶. - ۶ تا ۲۴ ساعت: فقط در صورت mismatch تصویربرداری (مطالعات DAWN/DEFUSE-3).
۵. ترومبولیز وریدی	اگر ≤ ۴.۵ ساعت از شروع علائم و بدون منع: تزریق آلتپلاز یا تنکتپلاز (bridging therapy).
۶. آماده‌سازی قبل از آنژیو	کنترل فشارخون (SBP <185/DBP <110)، دو خط وریدی، بررسی قند، INR و پلاکت، آماده‌سازی اتاق DSA.

⚙️ جدول ۲. مرحله حین ترومبکتومی (Intra-procedure)

مرحله	اقدامات کلیدی
۱. بیهوشی	بیشتر بیماران با **sedation خفیف تا متوسط**؛ در موارد بی‌قراری یا افت هوشیاری: **بیهوشی عمومی**.
۲. دسترسی عروقی	معمولاً از **شریان فمورال راست** (sheath 8Fr) و استفاده از balloon guide catheter.
۳. تکنیک‌ها	- **Stent retriever (Solitaire, Trevo)** - **Aspiration (ADAPT)** - **Solumbra (ترکیبی)** برای افزایش موفقیت در اولین پاس.
۴. تعریف پاس (Pass)	هر تلاش کامل برای خارج کردن لخته. حداکثر ۳ تا ۵ پاس توصیه می‌شود.
۵. هدف بازگشایی (Reperfusion)	دستیابی به **mTICI 2b–3** (جریان ≤۵۰٪ یا کامل).
۶. کنترل همودینامیک	حفظ SBP بین ۱۴۰ تا ۱۸۰ mmHg برای پرفیوژن مناسب ناحیه penumbra.

🏥 جدول ۳. مرحله پس از ترومبکتومی (Post-procedure)

مرحله	اقدامات کلیدی
۱. مراقبت در Stroke ICU	پایش دقیق سطح هوشیاری، فشارخون و علائم عصبی.
۲. کنترل فشارخون	اگر بازگشایی موفق (mTICI ≥2b): هدف SBP <160 mmHg؛ در صورت بازگشایی ناقص: ≥180 mmHg.
۳. تصویربرداری پیگیری	**CT یا MRI مغز** طی ۶–۲۴ ساعت جهت排除 خونریزی.
۴. درمان دارویی پس از پروسیجر	در صورت عدم خونریزی: شروع **ASA 160–325 mg/day**. در سکته کاردیواکمبولیک: شروع ضدانعقاد ۳–۱۴ روز بعد بسته به وسعت انفارکت.
۵. پایش عوارض	خونریزی داخل جمجمه‌ای، انسداد مجدد، ایمبولی دیستال، وازواسپاسم.
۶. توانبخشی و پیگیری عملکردی	ارزیابی NIHSS و mRS، شروع توانبخشی زودهنگام.

جدول 1: TICI / mTICI (modified Thrombolysis In Cerebral Infarction)

درجه mTICI	توضیح فارسی	نکته بالینی
0	بدون پر شدن عروقی	جریان بازنگشته
1	جریان اندک	جریان حداقلی در عروق
2a	بازگشت جریان در <50% منطقه درگیر	جزئی از منطقه احیا شده
2b	بازگشت جریان در ≥50%	بیش از نصف منطقه احیا شده
2c	تقریباً کامل به جز چند شاخهٔ دوردست	تقریباً بازگشت کامل، تفکیک از 2b توصیه می‌شود
3	بازگشت کامل جریان	reperfusion کامل
نکته	هرچه mTICI بالاتر باشد، احتمال بهبودی عملکردی بهتر است	گزارش تفکیکی 2c از 2b امروزه توصیه می‌شود

Case 2: Thrombectomy – Table & Timeline

Table: Key Nursing Actions & Timeline

Nurse Role / Monitoring	Action	Time
—	Symptom onset (LKW)	06:30
FAST, vitals, IV access, labs, NIHSS	ED arrival	08:00
Notify stroke team, prep for imaging	Code 724 activation	08:05
NPO confirmed, oxygen, neuro baseline	CT + CTA	08:15
Large vessel occlusion detected	Eligibility confirmed	08:30
IV lines, sedation, emergency equipment, consent	Pre-procedure prep	08:40
Continuous monitoring, assist IR team	Thrombectomy start	09:00
Vitals every 15 min, access site monitoring, neuro checks	Post-procedure care	10:00
NIHSS: 16 → 8, patient stable	Outcome assessment	hrs 24

Acute Stroke (Code 724) – Nursing Checklist

- **1️⃣ Activation & Initial Assessment**
  - ▫ Recognize stroke symptoms (FAST: Face, Arm, Speech, Time)
  - ▫ Activate **Code 724** immediately
  - ▫ Obtain brief patient history: last known well (LKW), medications, allergies
  - ▫ Vital signs: BP, HR, RR, Temp, O_2 saturation, blood glucose
  - ▫ Rapid neurological assessment (NIHSS if trained)
- **2️⃣ Pre-Imaging Preparation**
  - ▫ Establish IV access (2 large-bore lines)
  - ▫ Ensure NPO (nothing by mouth) status
  - ▫ Prepare patient for rapid brain imaging (CT/MRI)
  - ▫ Gather labs: CBC, electrolytes, coagulation profile

- **3️⃣ Thrombolysis (IV Alteplase / Tenecteplase)**
  - ▫ Confirm eligibility criteria: onset <4.5 hrs (alteplase) / <24 hrs (tenecteplase in selected cases)
  - ▫ Check contraindications (bleeding, recent surgery, uncontrolled BP)
  - ▫ Prepare and administer medication per protocol
  - ▫ Start timer: **door-to-needle goal <60 min**
  - ▫ Continuous monitoring during infusion: BP, heart rate, neurological status
  - ▫ Prepare for emergency interventions if intracranial hemorrhage occurs
- **4️⃣ Mechanical Thrombectomy Support**
  - ▫ Identify candidates (large vessel occlusion, NIHSS ≥6)
  - ▫ Assist in patient transfer to angio suite
  - ▫ Ensure IV lines and monitoring equipment ready
  - ▫ Post-procedure monitoring: vitals, neurological checks, access site assessment

- 5️⃣ **Ongoing Acute Care & Monitoring**
  - ▫ Monitor vital signs frequently (per protocol)
  - ▫ Neurological checks: changes in consciousness, speech, movement
  - ▫ Manage blood pressure, oxygen, blood glucose
  - ▫ Maintain IV fluids and electrolyte balance
  - ▫ Prevent complications: DVT prophylaxis, aspiration precautions, skin care
- 6️⃣ **Patient & Family Education**
  - ▫ Explain stroke, acute treatment, and expected recovery
  - ▫ Warn about warning signs of deterioration (bleeding, worsening weakness, headache)
  - ▫ Provide emotional support

- 7️⃣ **Documentation**
  - ▫ Record all times: symptom onset, code activation, imaging, medication administration
  - ▫ Document neurological status before, during, and after treatment
  - ▫ Note any adverse events or interventions
- ▫ **Key Reminders for Nurses**
  - “Time is brain” – every minute counts
  - Safety checks before thrombolysis or thrombectomy are critical
  - Continuous monitoring can prevent life-threatening complications
  - Clear communication with stroke team is essential

Thank you for your attention