MEVO AND LARGE CORE ACUTE STROKE TREATMENT

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Dr. Robin Novakovic-White Disclosures

	No, nothing to disclose
x	Yes, please specify:

Company Name	*Honoraria / Expenses*	*Consulting/ Advisory Board*	*Funded Research*	*Royalties/ Patent*	*Stock Options*	*Ownership/ Equity Position*	*Employee*	*Other (please specify)*
AHA - S:VIN Journal								Commission Editor
Aidoc		X			X			
SVIN								President-Elect

Stroke Agenda

- **Objectives:**
  - **Stroke reality and treatment options for ischemic stroke**
  - Once upon a thrombectomy…… a long, long, time ago!
    - ✓ Indication for thrombectomy in anterior circulation LVO
  - Could there be a worse fate? Basilar artery occlusion
    - ✓ Indication for thrombectomy in BAO
  - When is enough enough? Large core infarcts in anterior LVO
    - ✓ Indication for thrombectomy large core anterior LVO
  - How far can we go? MeVO and DMVO
    - ✓ Indication for thrombectomy in MeVO??? Wait is there any?

US Incidence of Stroke

Circulation
Volume 151, Issue 8, 25 February 2025; Pages e41-e660
https://doi.org/10.1161/CIR.0000000000001303

AHA STATISTICAL UPDATE

2025 Heart Disease and Stroke Statistics: A Report of US and Global Data From the American Heart Association

In the US, stroke:

- **Is a leading cause of disability**
  - 795,000 strokes occur annually
  - 7% US adults ≥60 yo living with brain injury from stroke

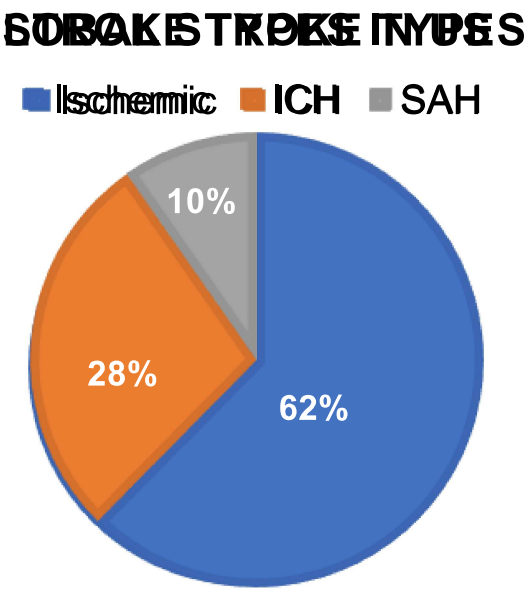
Every 40 seconds someone in the US has a stroke

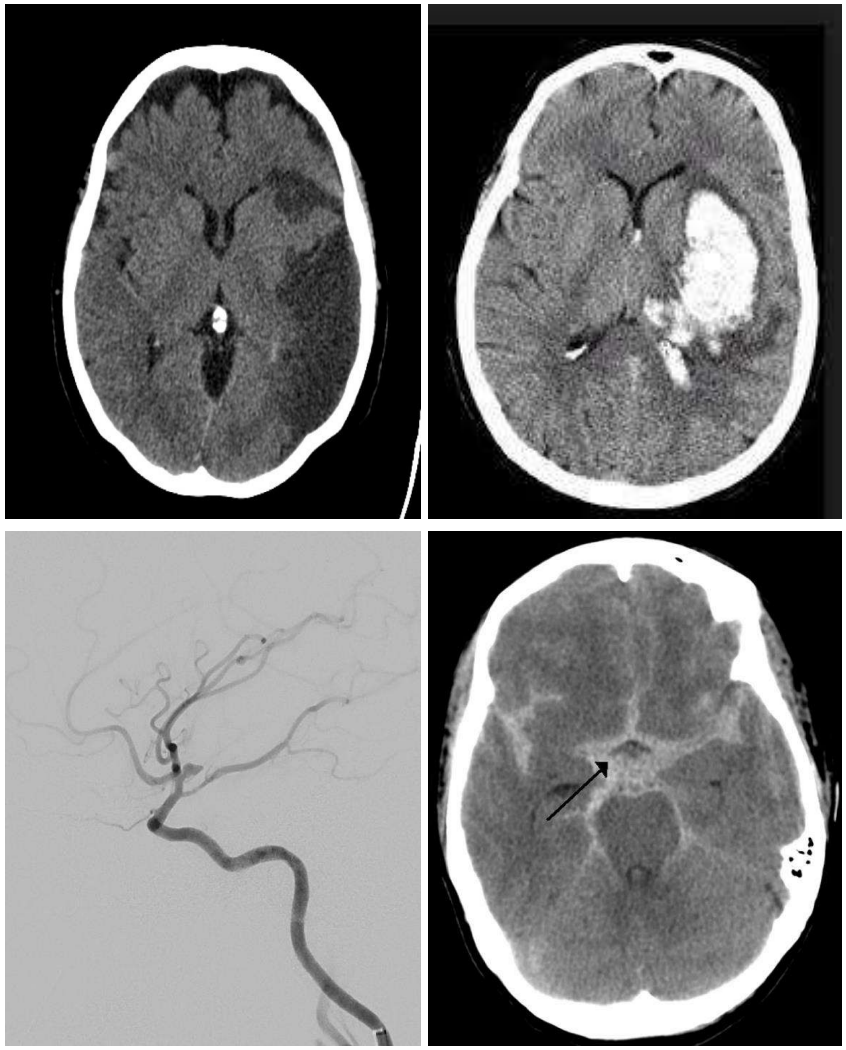
- **Fifth leading cause of death**
  - Deaths from stroke: 165,393 (2022) and 162,639 (2023)

Every 3 minutes and 14 seconds someone in the US dies from a stroke

- SS Martin, et al. 2025 Heart Disease and Stroke Statistics: A Report of US and Global Data From the American Heart Association (*Circulation* 2025).
- Centers for Disease Control and Prevention. National Center for Health Statistics. Mortality data on CDC WONDER. https://wonder.cdc.gov/mcd.html (accessed 01/23/2025).
- W Andres, et al. Trends in the prevalence of stroke among community-dwelling individuals in the US 1999-2018 (*JAMA Neurol*. 2023).

Stroke Incidence

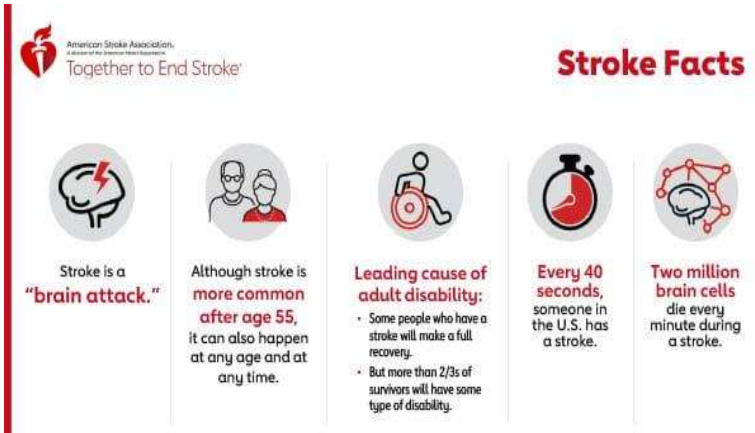




- SS Martin, et al. 2025 Heart Disease and Stroke Statistics: A Report of US and Global Data From the American Heart Association (*Circulation* 2025).
- GBD 2019 Stroke Collaborators. Global, regional, and national burden of stroke and its risk factors, 1990-2019: a systematic analysis for the Global Burden of Disease Study 2019 (*Lancet Neurol*. 2021).

Stroke All Subtype Outcomes

- In a meta-analysis of 55 studies:
  - 56.7% (95% CI, 48.3%–65.1%) of people returned to work after stroke at 1 year
  - 66.7% (95% CI, 60.2%–73.2%) at 2 years
- Functional and cognitive impairment, and dementia are common after stroke.



https://www.stroke.org/en/help-and-support/resource-library/prevention-toolkit/preventing-stroke-presentation

- P Duong, et al. Operational definitions and estimates of return to work poststroke: a systematic review and meta-analysis (*Arch Phys Med Rehabil* 2019).
- S Koton, et al. Association of ischemic stroke incidence, severity, and recurrence with dementia in the Atherosclerosis Risk in Communities Cohort Study (*JAMA Neurol* 2022).

National Impact of Stroke

- **Direct** healthcare cost **$36.7 billion** (2020)
- **Direct and indirect** (unemployment, missed work-days, and premature mortality) **$56.8 billion** (2020)
- Projected 2035 (in 2015 dollars) **direct** costs **$94.3** billion, and **total cost** of stroke:
  - $81.1 billion for non-Hispanic White people
  - $32.2 billion for non-Hispanic Black people
  - $16.0 billion for Hispanic people

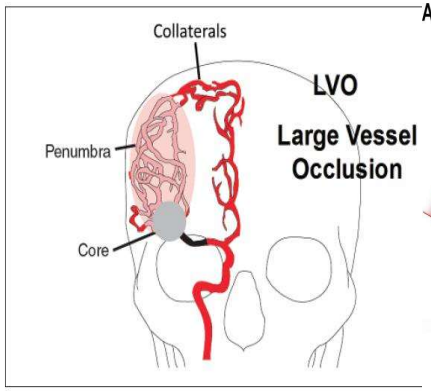
- T Girotra, et al. A contemporary and comprehensive analysis of the costs of stroke in the US (Journal of the Neurological Sciences 2020).
- SS Martin, et al. 2025 Heart Disease and Stroke Statistics: A Report of US and Global Data From the American Heart Association (*Circulation* 2025).
- Agency for Healthcare Research and Quality. Medical Expenditure Panel Survey (MEPS): household component summary tables: medical conditions, United States. Accessed April 2, 2023. https://meps.ahrq.gov/ mepsweb/
- RTI International. Projections of cardiovascular disease prevalence and costs: 2015–2035: technical report [report prepared for the American Heart Association]. RTI International; 2016. RTI project No. 021480.003.001.001.

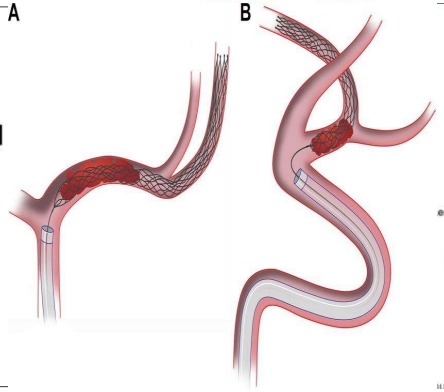
Treatment Options

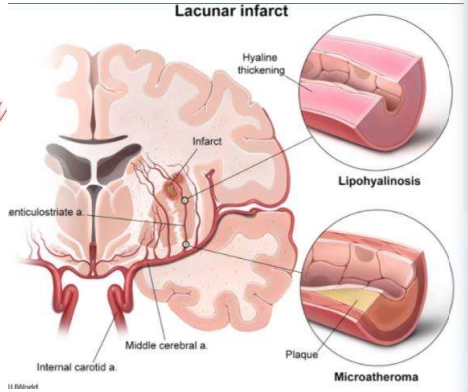
- Most effective treatment for AIS is early reperfusion therapy (**opening the artery**).
- Earlier treatment is associated with **better recovery and outcomes**.
- Factors that can delay treatment and contribute to **poor outcome**:
  - Limited resources
  - Pre-hospital failure to recognize stroke
  - Geographic barriers
  - Lack of expertise

- Saver, J L, et al. *Dis. J. Am. Med. Assoc. Netw*. 2016:13647.
- Kim, JT, et al. *Circulation*. 2017:135, 128–139.
- Agarwal, S, et al. *Neurology. 2018:* 90, e316–e322.
- *Brain Attack Coalition Symposium: Inequities in Access and Delivery of Acute Stroke Care*. Available online at: https://www.ninds.nih.gov/news-events/events/brain-attack-coalition-symposium-inequities-access-and-delivery-acute-stroke-care (accessed April 24, 2025).
- Chari, SV, et al. *Am. J. Emerg. Med*. 2023:63, 120–126.
- Oostema, JA, et al. *J. Am. Heart Assoc*. 2023:12:e026834.

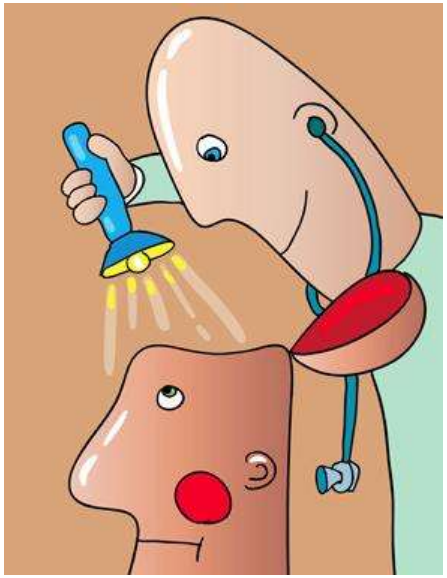
Are All Strokes Created Equal?





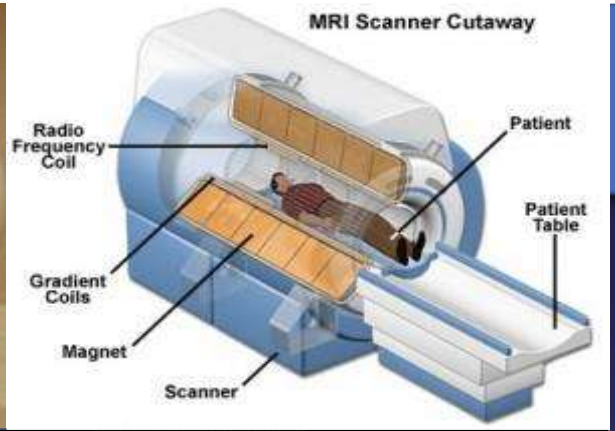


Overview Cerebrovascular Imaging

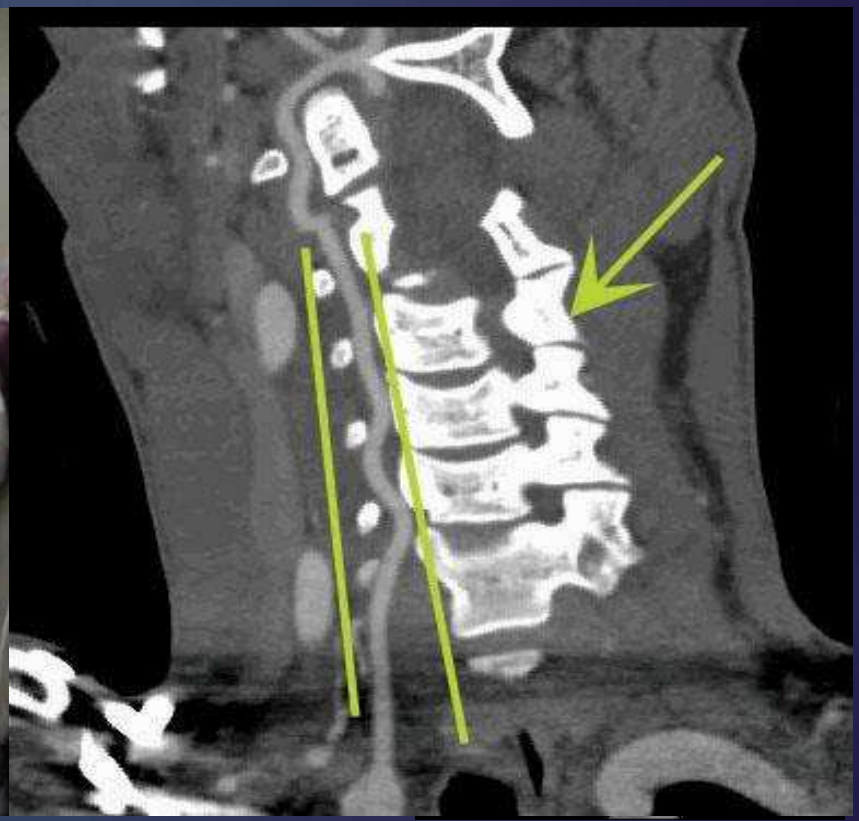


How do We Look at the Cerebrovascular anatomy?

MRI/MRA Scan

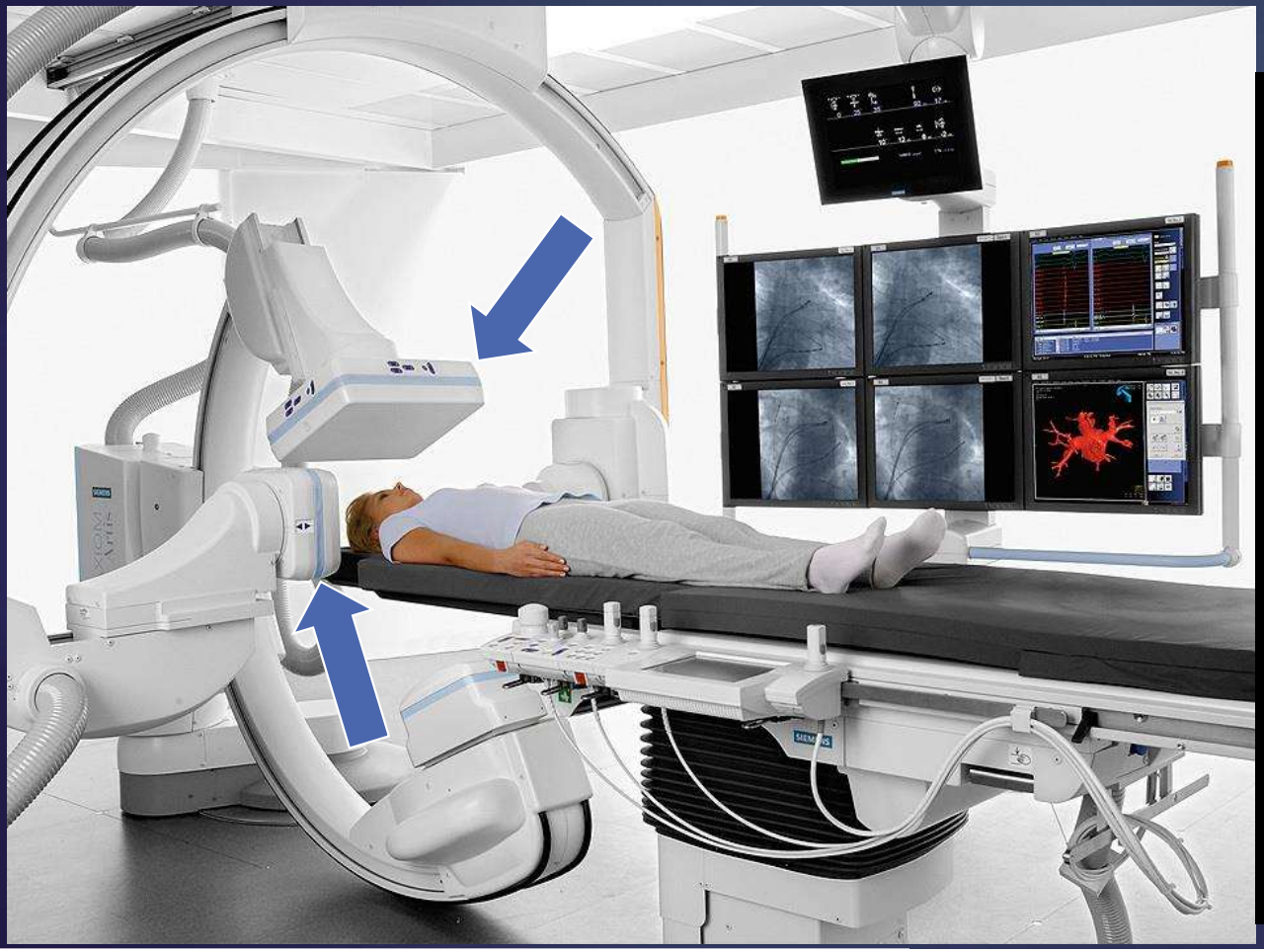

MRI Scanner Cutaway
Radio Frequency Coil
Patient
Patient Table
Gradient Coils
Magnet
Scanner

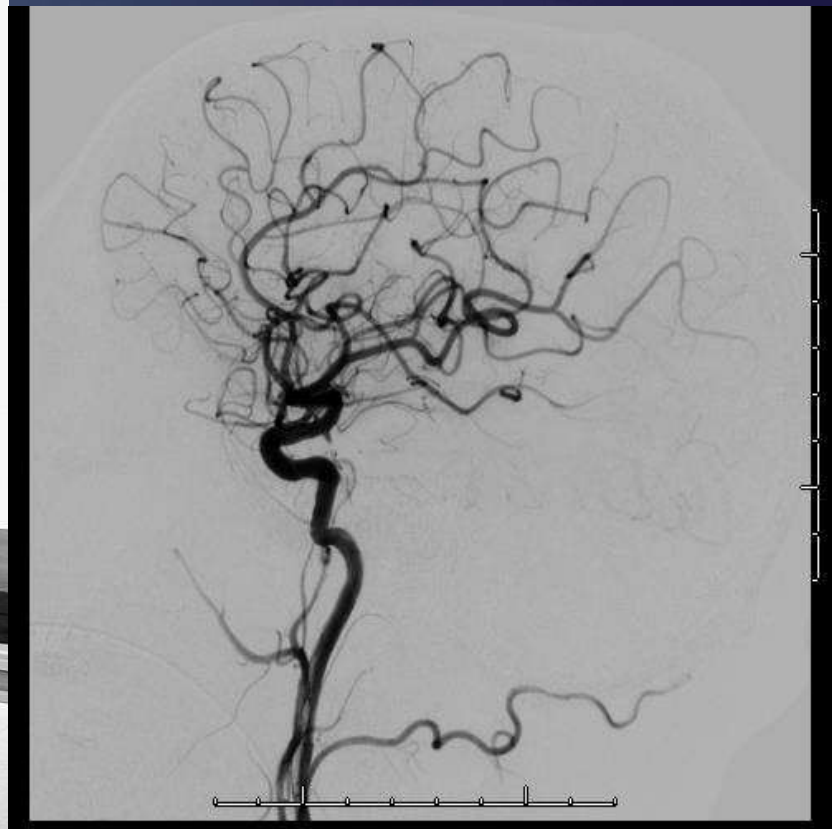
CT Scanner/ CT Angiogram



Biplane Angiography

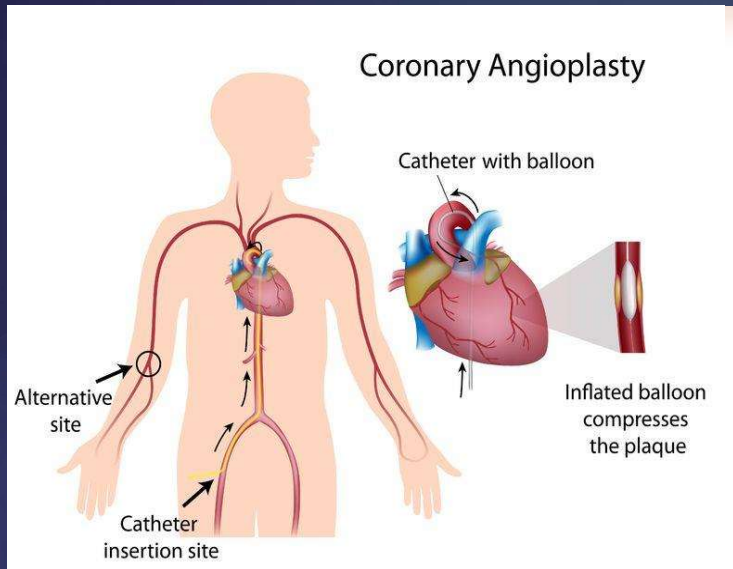
How it Works

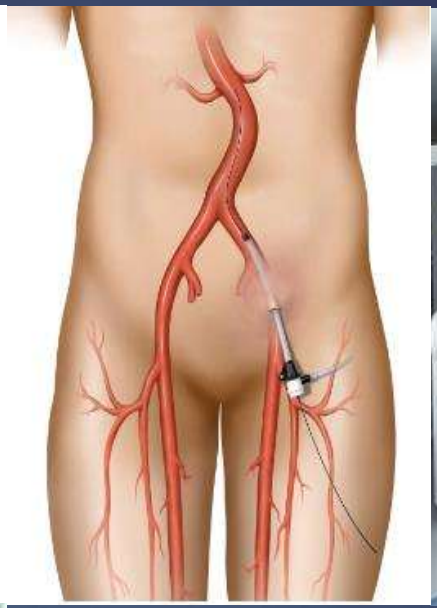


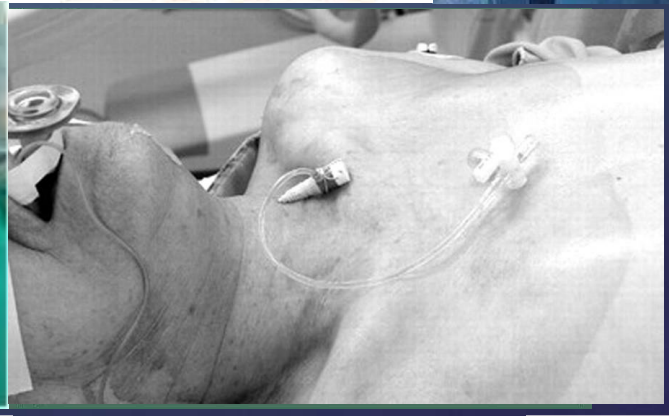


Rotational Angiography

Performing an Arteriogram







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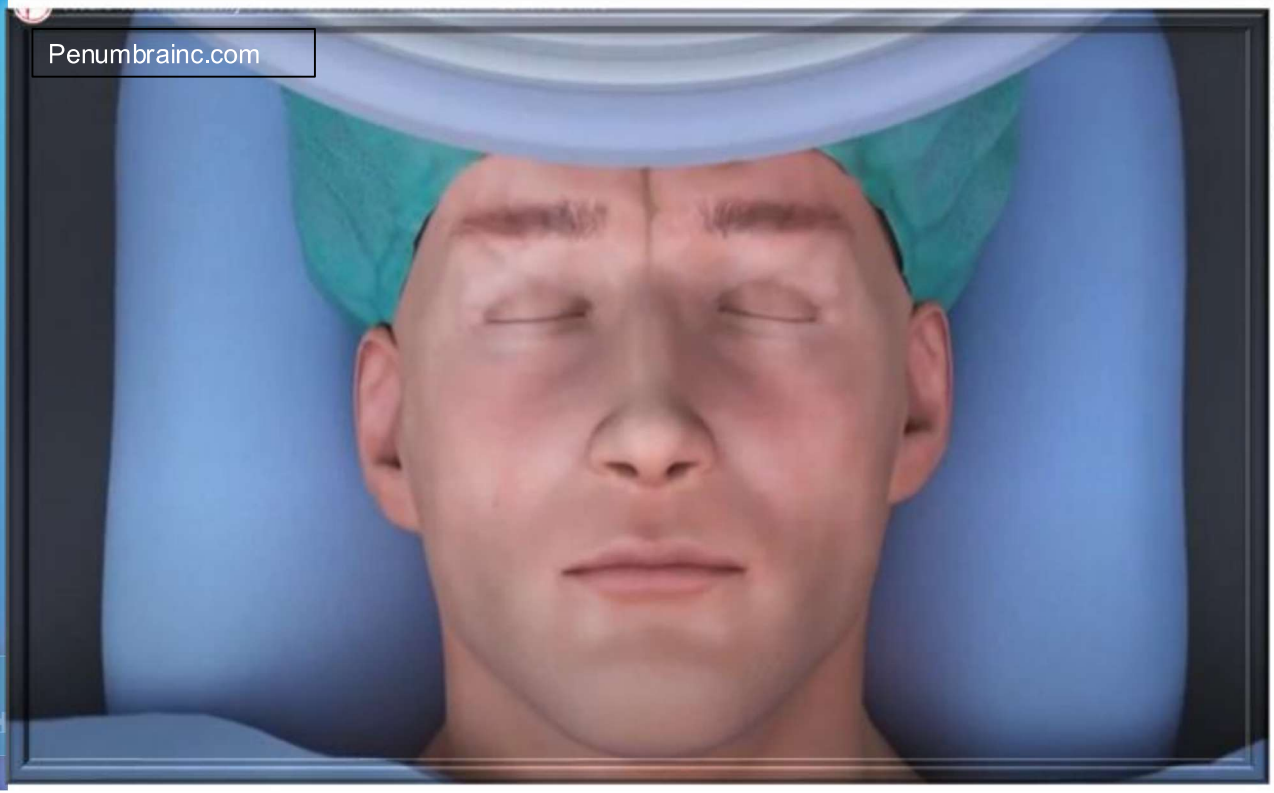
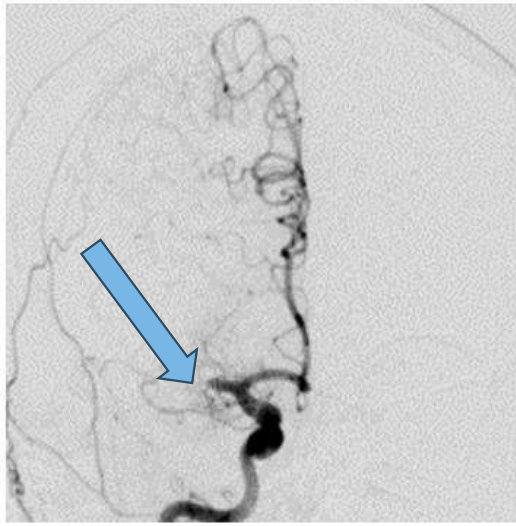
Landmark EVT Trials – Timeline

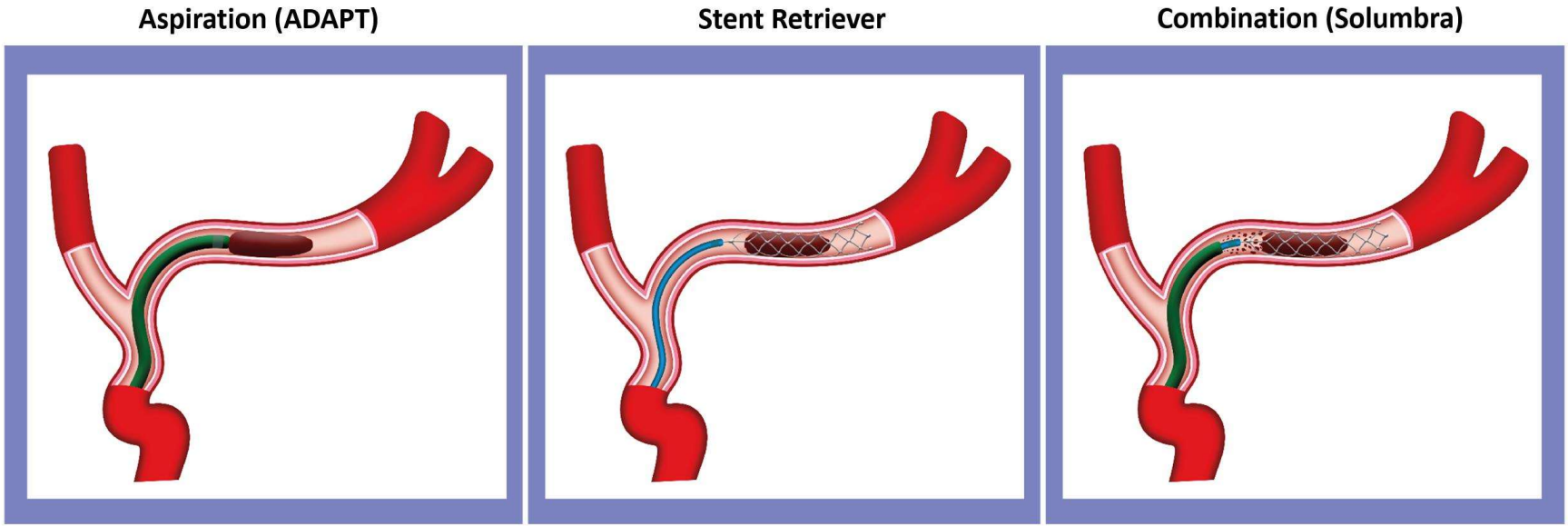
2004	2013	2015
MERCI	SYNTHESIS	MR CLEAN
	MR RESCUE	EXTEND IA
	IMS III	ESCAPE
		REVASCAT
		SWIFT PRIME

Thrombectomy Basics – LVO



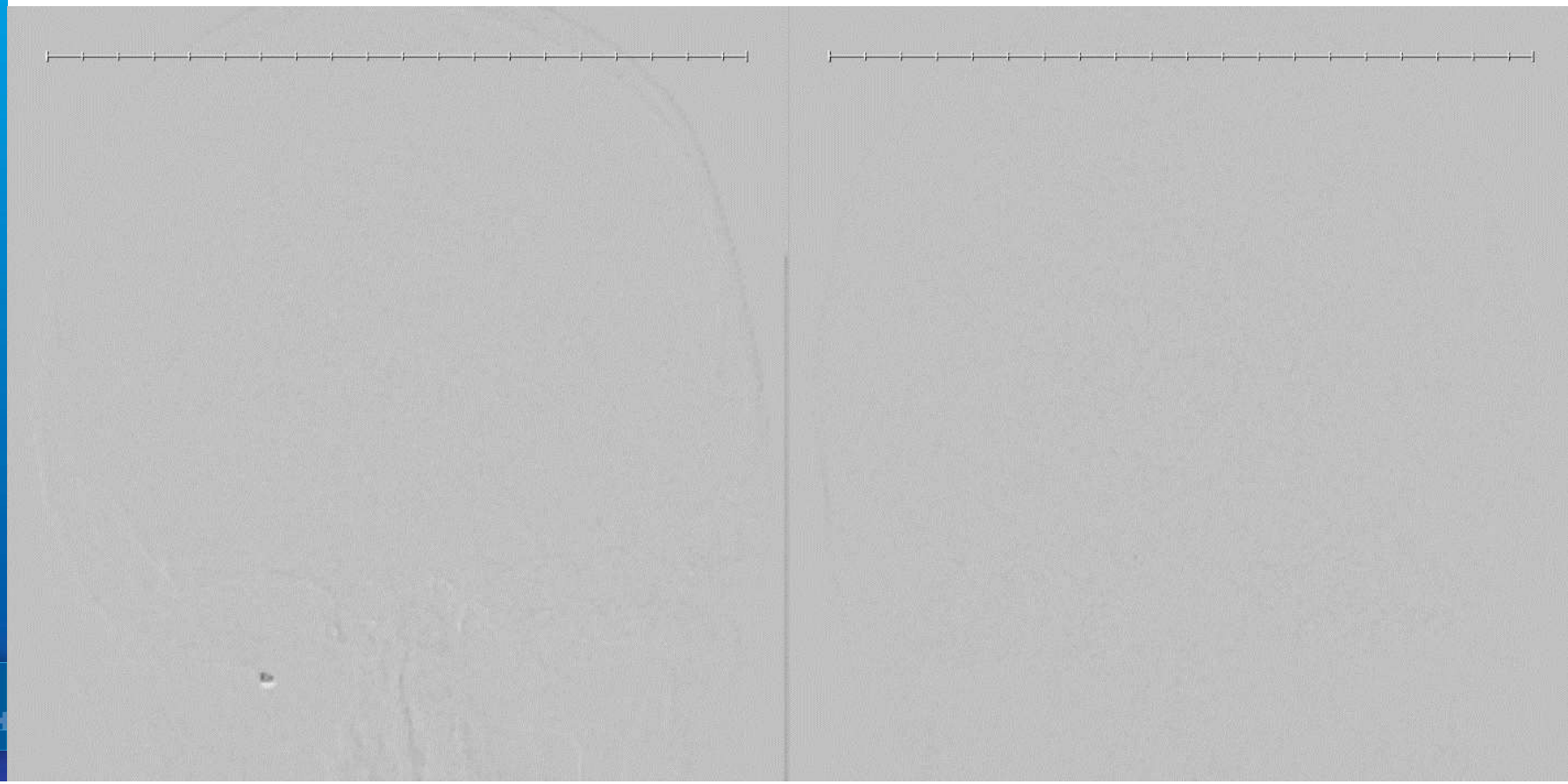


Thrombectomy Basics – LVO



J Am Coll Cardiol Intv. 2020 Jul, 13 (14) 1683–1696.

Endovascular Revascularization Treatment (EVT)



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2015 – The Selection Era

Longest window (12 hours)

First to use CTP with RAPID

Discrepancies with ASPECTS scoring noted

Design of the Five Recent Randomized Controlle… Therap… ke

	MR CLEAN	ESCAPE	EXTEND IA	SWIFT PRIME	RECAVSCAT
Design	Best medical care vs. Best medical care + EVT	Best medical care vs. Best medical care + EVT	IV rtPA vs. IV rtPA + EVT	IV rtPA vs. IV rtPA + EVT	Best medical care vs. Best medical care + EVT
Phase	Phase 3	Phase 3	Phase 2	Phase 3	Phase 3
Time	<6 hr, expected puncture tim	<12 hr, randomization	<6 hr, expected puncture time	<6 hr, expected puncture time	<8 hr, expected puncture time
EVT modality	Discretion of investigator	Recommended stent retriever	Exclusively Solitaire FR	Exclusively Solitaire FR	Exclusively Solitaire FR
Primary outcome	90 days mRS	90 days mRS	· Median percentage reperfusion at 24 h · NIHSS reduction >8 points or reaching 0-1 at 3 days	90 days mRS	90 days mRS
Pretreatment Image	NCCT with CTA	NCCT with mCTA	NCCT with CTA and CTP	NCCT with CTA and CTP (or DWI with MRA and MRP) → NCCT with CTA (or DWI with MRA)	NCCT with CTA
Image selection criteria	Absent	Exclusion of large core (ASPECTS <6) & Exclusion of poor collateral[a]	Target mismatch[b]	Target mismatch[c] → Exclusion of large core (CT or DWI ASPECTS <6)	Exclusion of large core (CT ASPECTS <7, DWI ASPECTS <6)
Premorbid condition	None	Barthel index >90	mRS1<1	mRS1≤1	mRS1≤1
Age	≥18	>18	≥18	18-80	18-80
NIHSS	≥2	≥6	None	8-29	≥6
Occlusive lesion	distal ICA, M1, M2, A1	distal ICA, M1, M1 equivalent	ICA, M1, M2	ICA, M1	ICA, M1

Abbreviations: IV r… linogen … therapy …; NIHSS, Nat… ke Scale; NCCT… angiography; mCTA… perfusio… , diffusio… MR angiograp… Program Early … id artery; M1 , first seg… ry; M2, … rebral ar… [a]Definition of poor … aterals i… of the M… with pial fillin… multiphasic CT… [b]Definition of targe… ssue / C… tissue - Core >10 ml and Core <70 ml; Core (rCBF … (Tmax > 6s) [c]Definition of targe… ssue / C… tissue - Core ≥ 15 ml and Core <50 ml and Severely … ; Core (DWI les… fused tissue (Tmax >6 s); Severely hypoperfused tissue (Tmax >10 s)

Waited for tPA response before going to ERT

Shortest time to reperfusion

Highest % of mRS 0-2 at 90 days

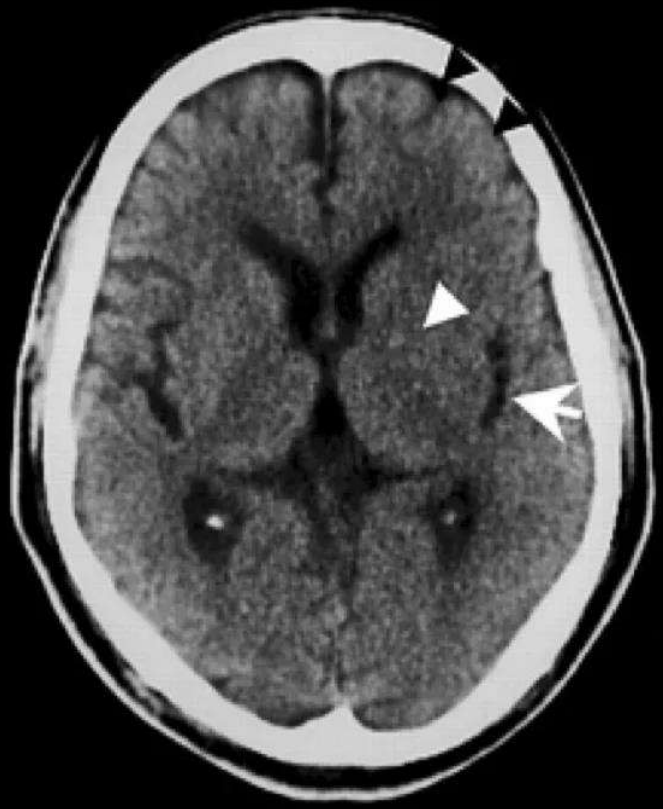
Initially used on CTP and then switched to ASPECTS

EVT in patients who did not respond to tPA

D Song, et al. Previous and recent evidence of endovascular therapy in acute ischemic stroke (*Neurointervention* 2015).

ASPECT

Early Ischemic Changes



- Loss of insular ribbon (←)
- Loss of gray-white interface (◂)
- Loss of sulci (▾)
- Acute hypodensity
- Mass effect
- Dense MCA sign

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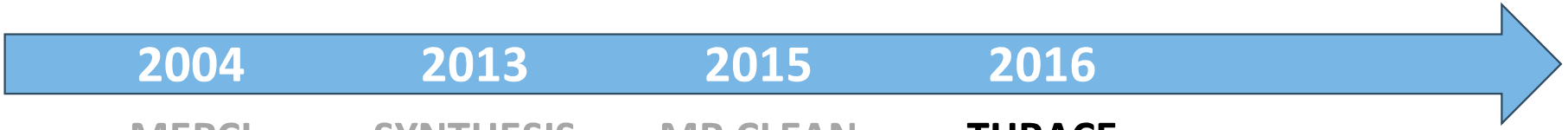
Nina T. Gentile, MD, FAAEM

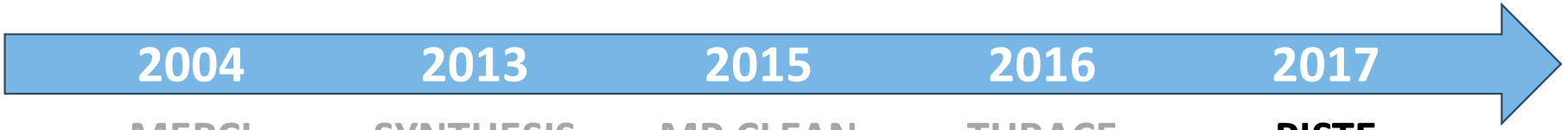
FERNE

Landmark EVT Trials – Timeline



2004	2013	2015	2016
MERCI	SYNTHESIS	MR CLEAN	**THRACE**
	MR RESCUE	EXTEND IA	**THERAPY**
	IMS III	ESCAPE	
		REVASCAT	
		SWIFT PRIME	

Landmark EVT Trials – Timeline



2004	2013	2015	2016	2017
MERCI	SYNTHESIS	MR CLEAN	THRACE	**PISTE**
	MR RESCUE	EXTEND IA	THERAPY	**EASI**
	IMS III	ESCAPE		
		REVASCAT		
		SWIFT PRIME		

What Does the Evidence Show Us?

- What were the important lessons learned from multiple randomized clinical trials that showed thrombectomy was better than IV tPA in LVO cases…

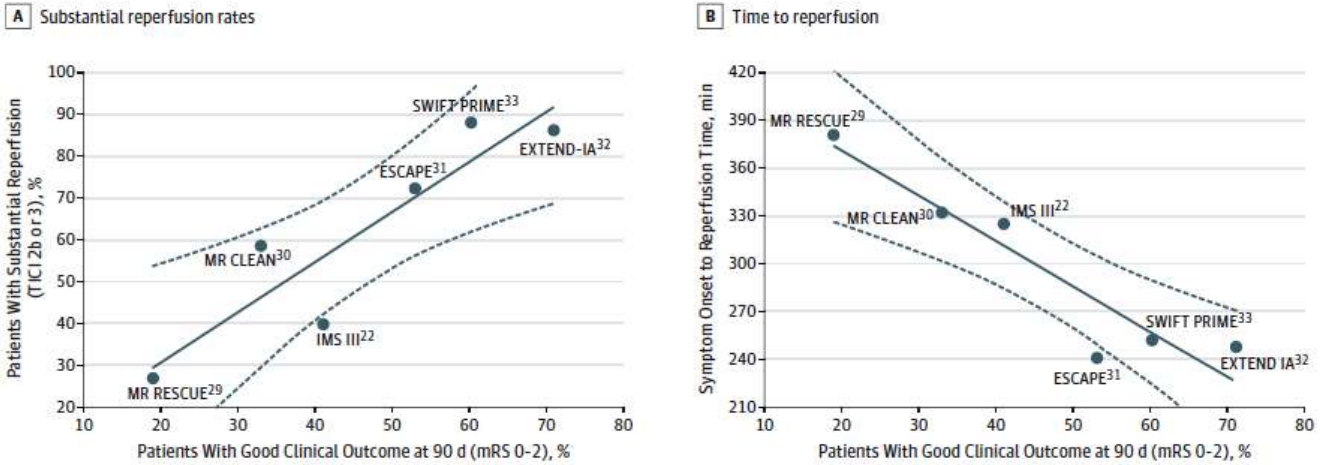
Review

Acute Stroke Intervention
A Systematic Review

JAMA. 2015;313(14):1451-1462. doi:10.1001/jama.2015.3058

Shyam Prabhakaran, MD, MS; Ilana Ruff, MD; Richard A. Bernstein, MD, PhD

Figure 3. Rate of Reperfusion and Time to Reperfusion Compared With Percentage of Good Outcomes in the 6 Trials Comparing Endovascular Treatment to Medical Treatment Alone



mRS indicates modified Rankin Scale; TICI, thrombolysis in cerebral infarction. The dotted lines indicate 95% CIs.

ASA Guidelines 2015 - Endovascular Interventions

Recommendations

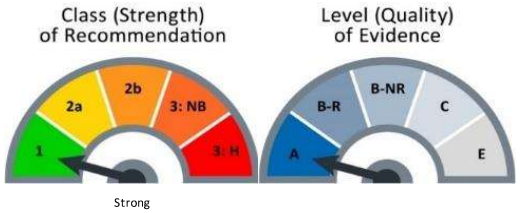
Patients should receive endovascular therapy ***with a stent retriever*** if they meet all the following criteria:

- pre-stroke modified Rankin score (mRS) 0-1
- acute ischemic stroke receiving IV rtPA within 4.5 hours of onset according to guidelines from professional medical societies,
- causative occlusion of the internal carotid artery or proximal middle cerebral artery (M1),
- age 18 years and over,
- National Institutes of Health Stroke Scale (NIHSS) score of 6 or greater,
- Alberta Stroke Program Early Computed Tomography Score (ASPECTS) of 6 or greater, and
- treatment can be initiated (groin puncture) within 6 hours of symptom onset

NV00015889.AA

(Class I; Level of Evidence A).

Powers WJ, Derdeyn CP, et al. Stroke. 2015;46:000-000.



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European Stroke Organisation (ESO) - European Society for Minimally Invasive Neurological Therapy (ESMINT) Guidelines on Mechanical Thrombectomy in Acute Ischemic Stroke

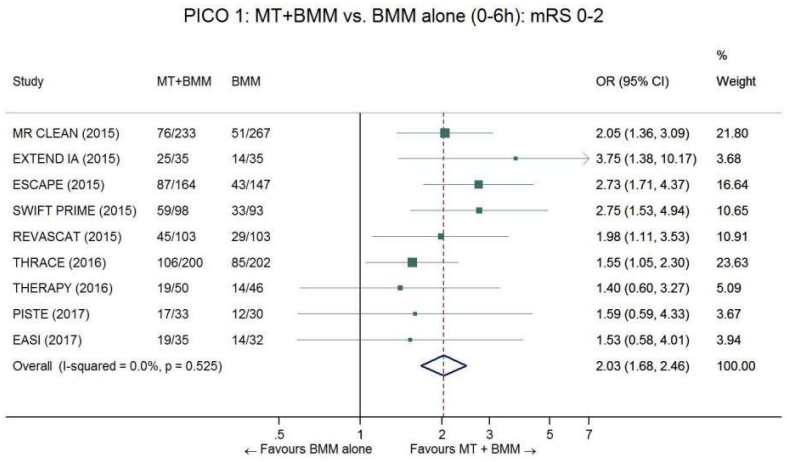

Figure 2 Pooled OR for functional independence in patients treated with MT+BMM versus BMM alone in the 0–6 hour time window. Random-effects meta-analysis. BMM, best medical management; MT, mechanical thrombectomy.

Recommendation

In adults with anterior circulation large vessel occlusion-related acute ischemic stroke presenting within 6 hours after symptom onset, we recommend mechanical thrombectomy plus best medical management—including intravenous thrombolysis whenever indicated—over best medical management alone to improve functional outcome.

Quality of evidence: **High** ⊕⊕⊕⊕; strength of recommendation: **Strong** ↑↑

Recommendations

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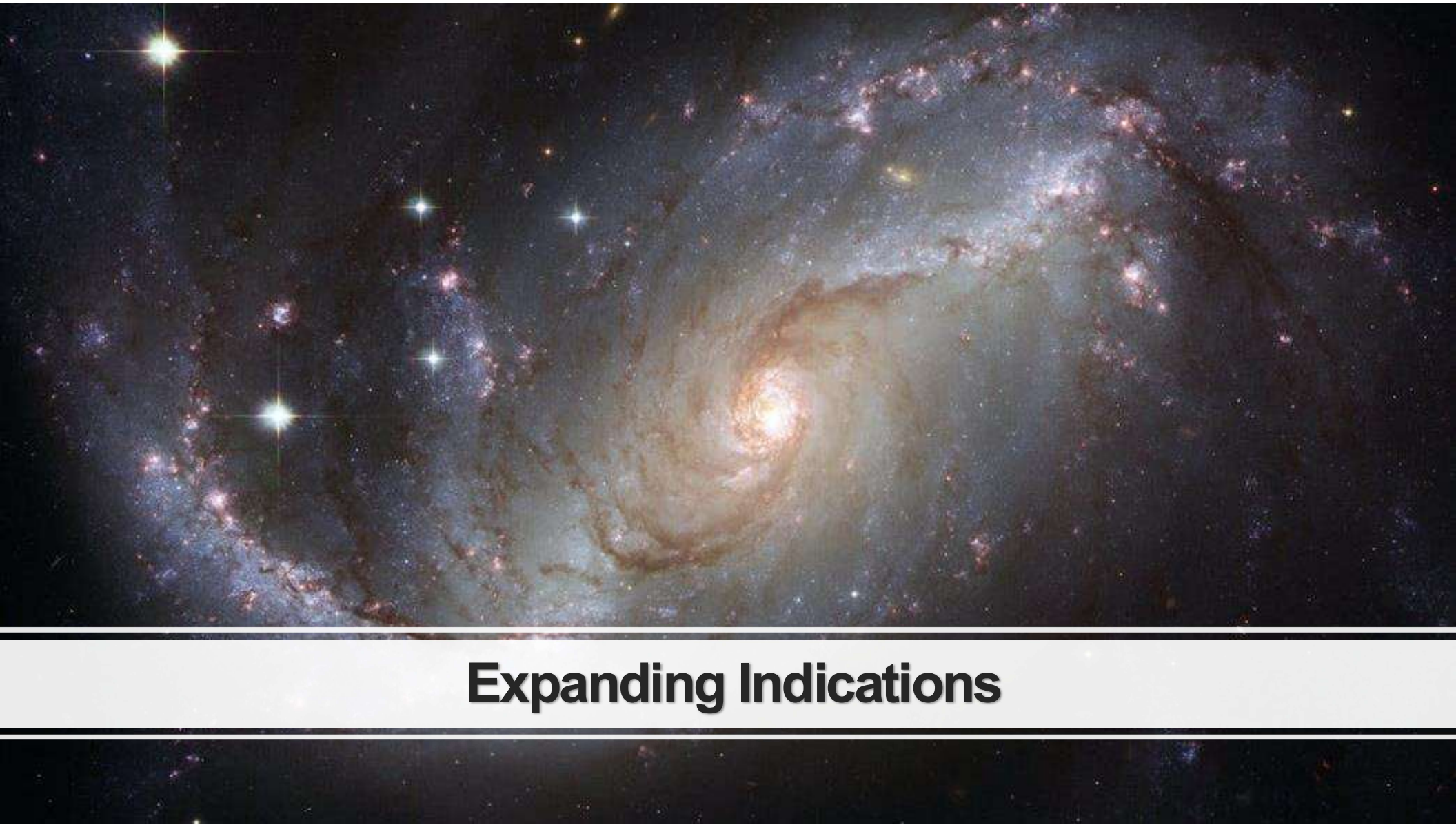
G Turc, et al. European Stroke Organisation–European Society for Minimally Invasive Neurological Therapy expedited recommendation on indication for intravenous thrombolysis before mechanical thrombectomy in patients with acute ischaemic stroke and anterior circulation large vessel occlusion (*European stroke journal* 2022).



Expanding Indications

Landmark EVT Trials – Timeline

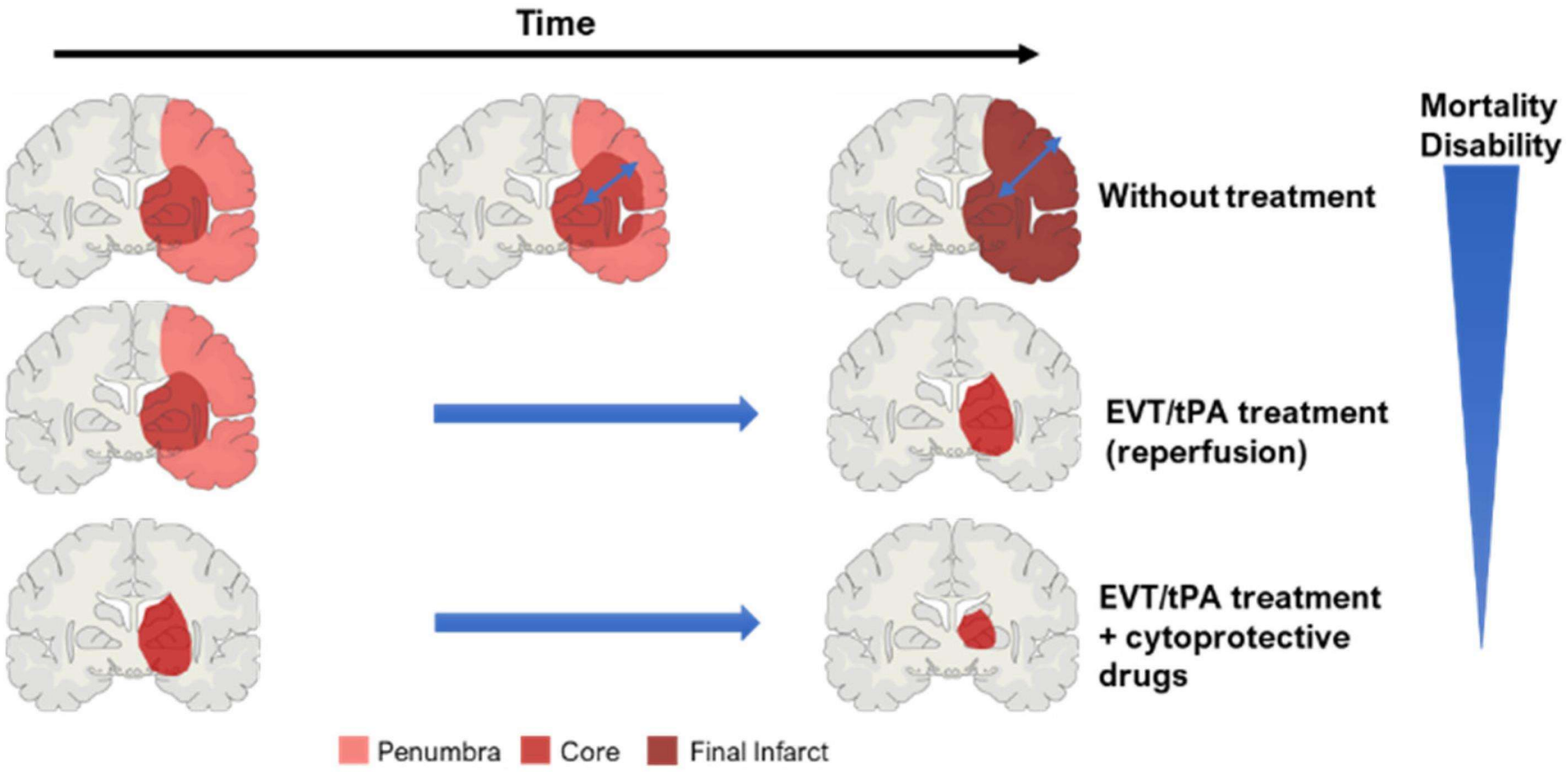
2004	2013	2015	2016	2017	2018
MERCI	SYNTHESIS	MR CLEAN	THRACE	PISTE	**DAWN**
	MR RESCUE	EXTEND IA	THERAPY	EASI	**DEFUSE 3**
	IMS III	ESCAPE			
		REVASCAT			
		SWIFT PRIME			

2018 – The Late Window Era

	DAWN	DEFUSE-3
Eligibility	6-24 hours	6-16 hours
Occlusion location	Intracranial ICA or proximal MCA	Extra- or intra-cranial ICA or proximal MCA
Infarct volume	Age > 80 + NIHSS ≥ 10 → < 21 mL Age < 80 + NIHSS ≥ 10 → 31 mL Age < 80 + NIHSS ≥ 20 → 31-51 mL	< 70 mL Mismatch ratio ≥ 1.8
Imaging selection	CT or MRI RAPID software	CT or MRI RAPID software
Thrombectomy device	TREVO (Stryker sponsored)	Any FDA approved device

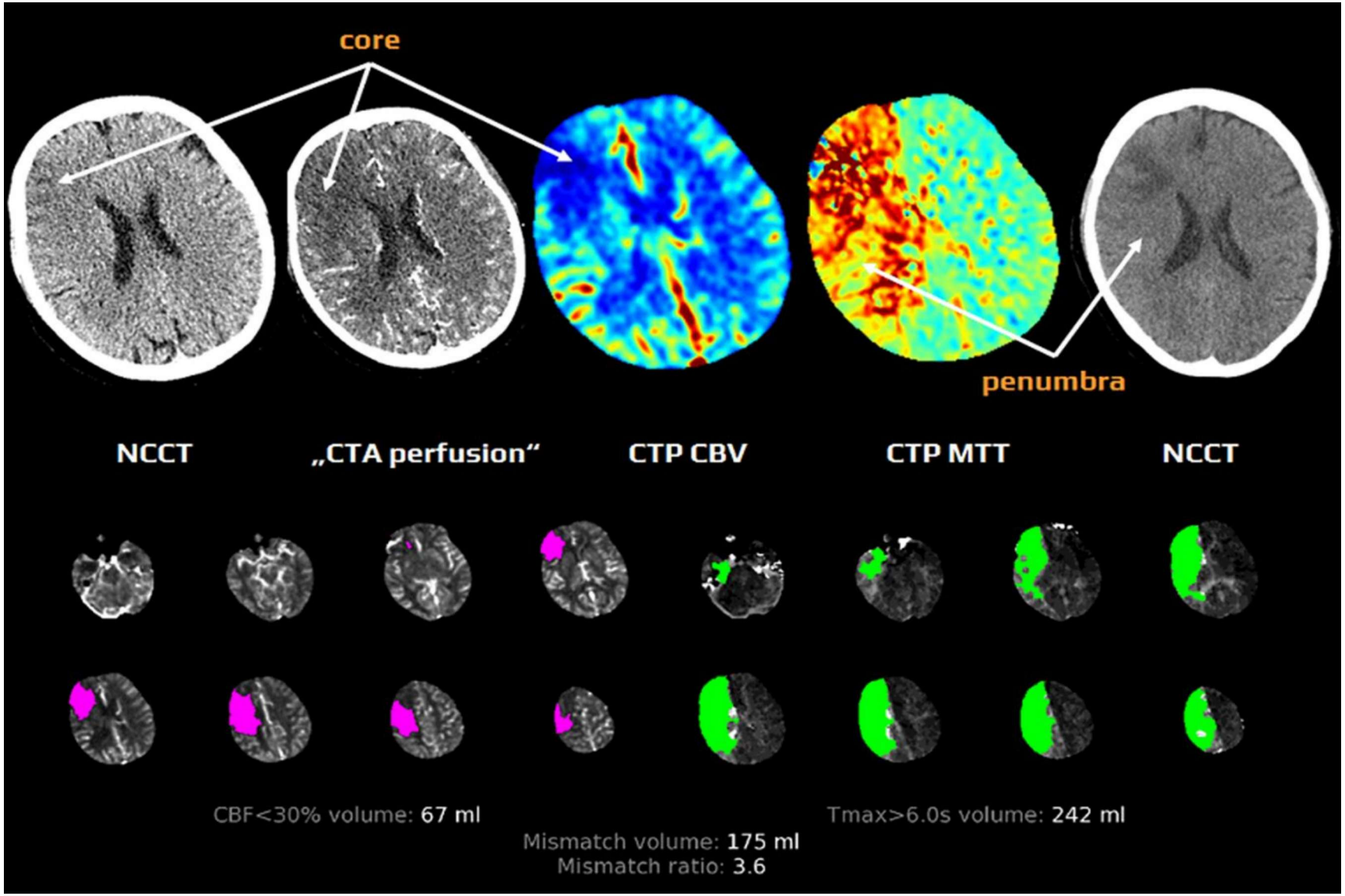
Nogueria, et al. (2018) N Engl J Med, 378:11-21
Albers, et al. (2018) N Engl J Med, 378:708-718

Stroke Progression



B Amado, et al. Ischemic Stroke, Lessons from the Past Towards Effective Preclinical Models (Biomedicines 2022).

CTP Penumbra Infarct Core



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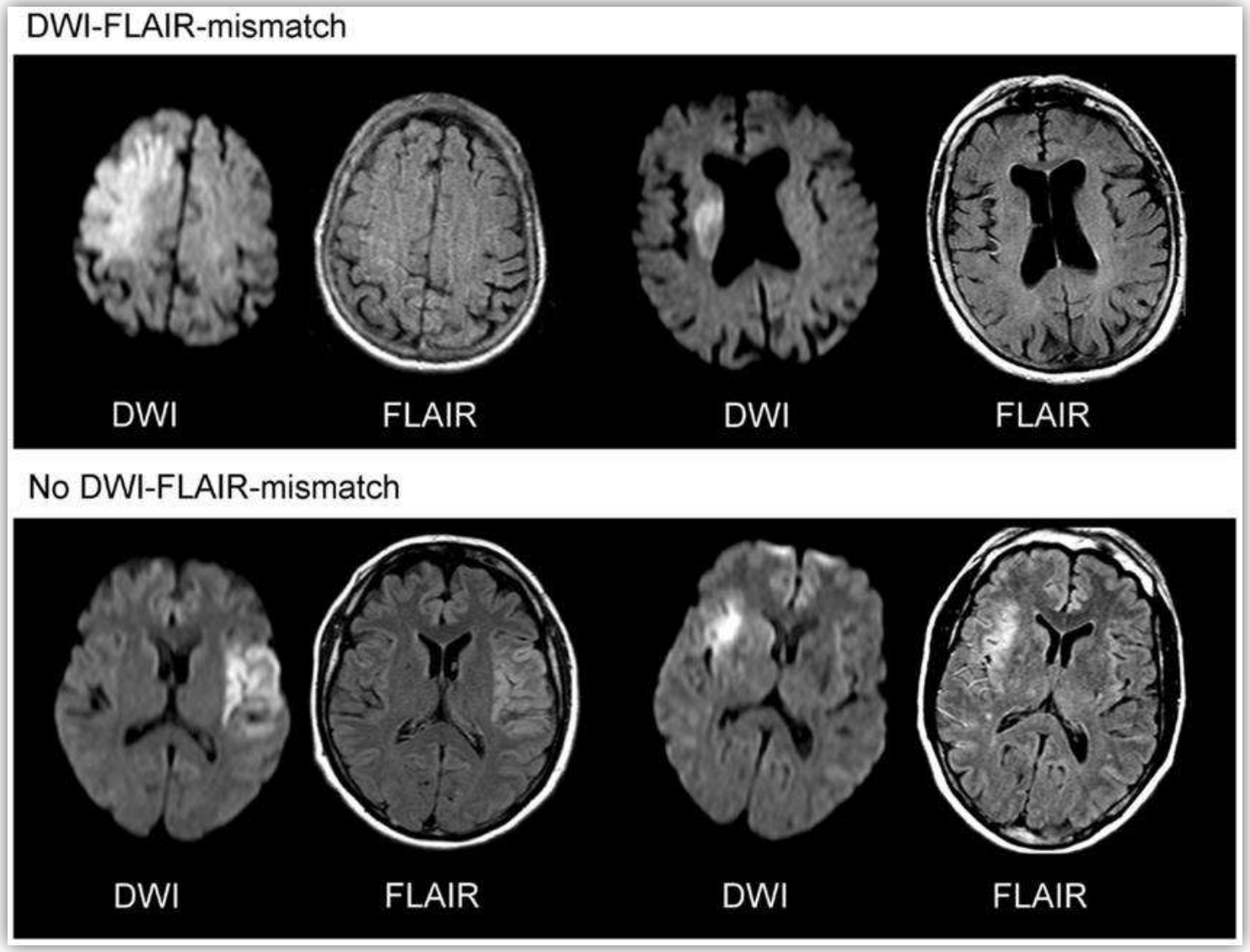
DWI/FLAIR Mismatch



AHA/ASA Guideline

Endovascular Interventions 6-24 hours

3.7 Mechanical Thrombectomy: Over 6 hours

DAWN and DEFUSE 3 Trials

- CT Perfusion, or MRI/MR perfusion to select patients with salvageable brain tissue, despite prolonged time from last normal
- Randomized to thrombectomy vs no-thrombectomy
- Both trials showed ***large*** benefit for thrombectomy
  - DAWN Trial: Good outcome (mRS 0-2) in 49% vs. 13%
  - DEFUSE 3 Trial: Good outcome (mRS 0-2) in 45% vs. 17%

Recommendations

Recommendations	COR	LOE
In selected patients with AIS onset within 6-16 hours, anterior circulation large vessel occlusion, and who meet other DAWN or DEFUSE 3 eligibility criteria, mechanical thrombectomy is recommended.	I	A
In selected patients with AIS within 6 to 24 hours of last known normal who have LVO in the anterior circulation and meet other DAWN eligibility criteria, mechanical thrombectomy is reasonable.	IIa	B-R

Powers JP, Rabinstein AA, et al. Stroke. 2018;49:e46–e99.
Powers JP, Rabinstein AA, et al. Stroke. 2019;50:e344–e418.

European Stroke Organisation (ESO) - European Society for Minimally Invasive Neurological Therapy (ESMINT) Guidelines on Mechanical Thrombectomy in Acute Ischemic Stroke

Recommendation

In adults with anterior circulation large vessel occlusion-related acute ischemic stroke presenting between 6 and 24 hours from time last known well and fulfilling the selection criteria of DEFUSE-3* or DAWN**, we recommend mechanical thrombectomy plus best medical management over best medical management alone to improve functional outcome.

Quality of evidence: **Moderate** ⊕⊕⊕; strength of recommendation: **Strong** ↑↑

(see below and table 3 regarding patient selection)

*6 to 16 hours since time last known well:
**6 to 24 hours since time last known well:

⇒ See table 3 for details.age ≤80 years and NIHSS≥6: infarct core volume <70 mL and penumbra volume >15 mL and penumbra volume/core volume >1.8.

⇒ Age <80 years: infarct core ≤30 mL if NIHSS ≥10; infarct core ≤51 mL if NIHSS ≥20.

⇒ Age≥80 years: infarct core ≤20 mL and NIHSS ≥10.

Table 3 Main inclusion criteria in the DEFUSE-3 and DAWN trials

Inclusion criteria	DEFUSE-3[10]	DAWN[9]
Time window	6–16 hours since time last known well	6–24 hours since time last known well
Age	18–90 years	≥18 years
mRS score before qualifying stroke	≤2; life expectancy ≥6 months	≤1; life expectancy ≥6 months
NIHSS score	≥6	≥10 (see below)
Arterial occlusion	ICA and/or M1*	ICA and/or M1
Mismatch definition	Target mismatch profile on CT or MR perfusion imaging, as determined by an automated image postprocessing system: Infarct core volume <70 mL† AND mismatch volume >15 mL (Tmax>6 s‡) AND mismatch ratio (penumbra/core) >1.8	Clinical-imaging mismatch Age <80 years and NIHSS score ≥10 and infarct core 0–30 mL OR age <80 years and NIHSS score ≥20 and infarct core 31–51 mL OR age ≥80 years and NIHSS score ≥10 and infarct core 0–20 mL

*Carotid occlusions could be cervical or intracranial, with or without tandem MCA lesions in DEFUSE-3.
†Based on CT perfusion or MRI diffusion.
‡The size of the penumbra was estimated from the volume of tissue for which there was delayed arrival of an injected tracer agent (time to maximum of the residue function (Tmax) exceeding 6 s.[148]
ICA, internal cerebral artery; MCA, middle cerebral artery; mRS, modified Rankin Scale; NIHSS, National Institutes of Health Stroke Scale.

G Turc, et al. European Stroke Organisation–European Society for Minimally Invasive Neurological Therapy expedited recommendation on indication for intravenous thrombolysis before mechanical thrombectomy in patients with acute ischaemic stroke and anterior circulation large vessel occlusion (*European stroke journal* 2022).

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Landmark EVT Trials – Timeline

2019

SELECT

SELECT – prospective cohort
ERT vs BMM
105 total, ERT in 62 patients
ASPECTS ≤5 or volume >50 ml

Findings: ERT **may** benefit patients with infarct-core volume of 50- 100 ml in secondary analysis.

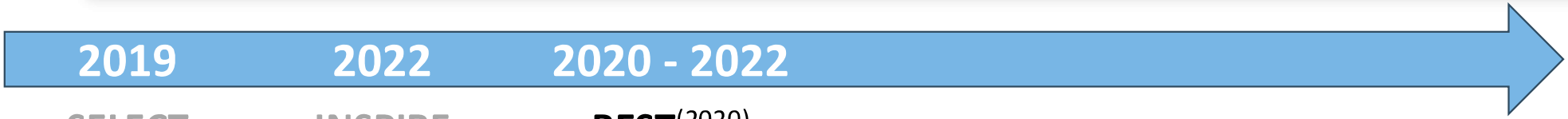
Sarraj A, Hassan AE, et al. JAMA Neurol. 2019;76(10):1147-1156.

Landmark EVT Trials – Timeline

2019 2022

SELECT

Landmark EVT Trials – Timeline



SELECT

INSPIRE

BEST(2020)

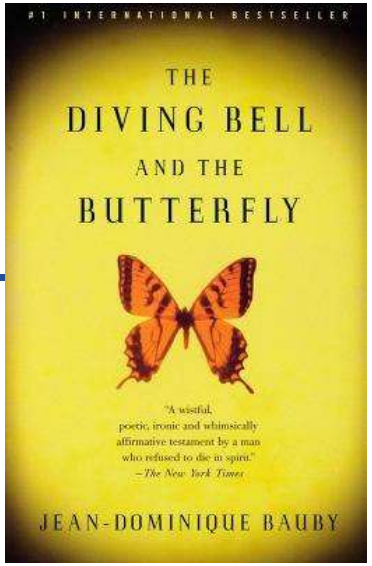
BASICS(2020)

ATTENTION(2021)

BAOCHE(2022)

BEST(2020)

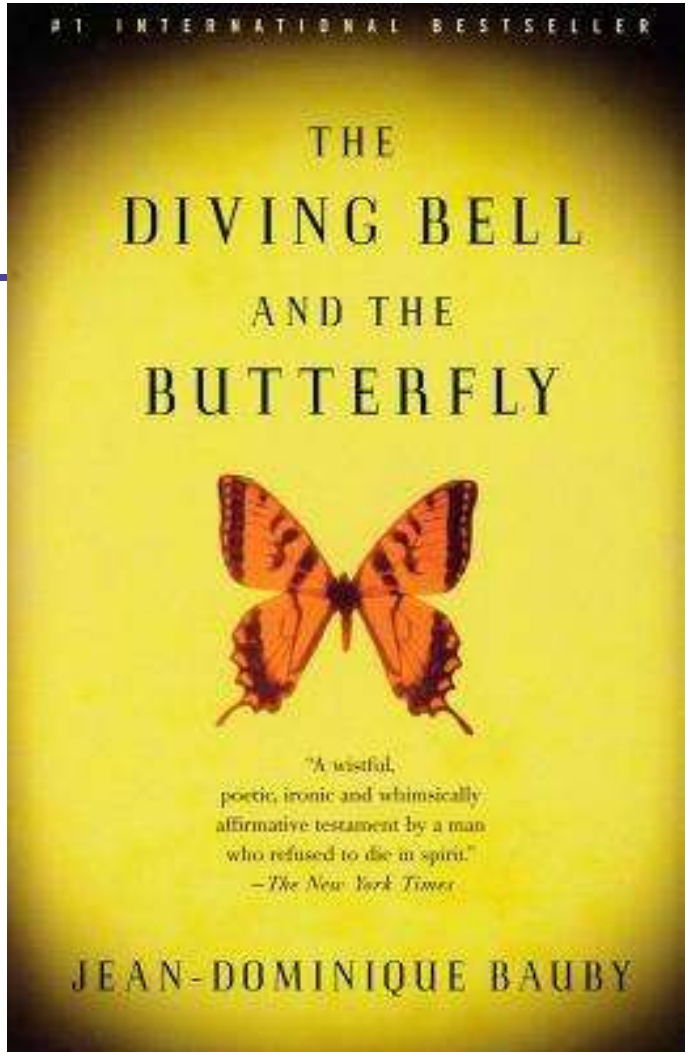
Stroke Agenda



- **Objectives:**
  - Stroke reality and treatment options for ischemic stroke
  - Once upon a thrombectomy…… a long, long, time ago!
    - ✓ Indication for thrombectomy in anterior circulation LVO
  - **Could there be a worse fate? Basilar artery occlusion**
    - ✓ **Indication for thrombectomy in BAO**
  - When is enough enough? Large core infarcts in anterior LVO
    - ✓ Indication for thrombectomy large core anterior LVO
  - How far can we go? MeVO and DMVO
    - ✓ Indication for thrombectomy in MeVO??? Wait is there any?

BAO Outcomes

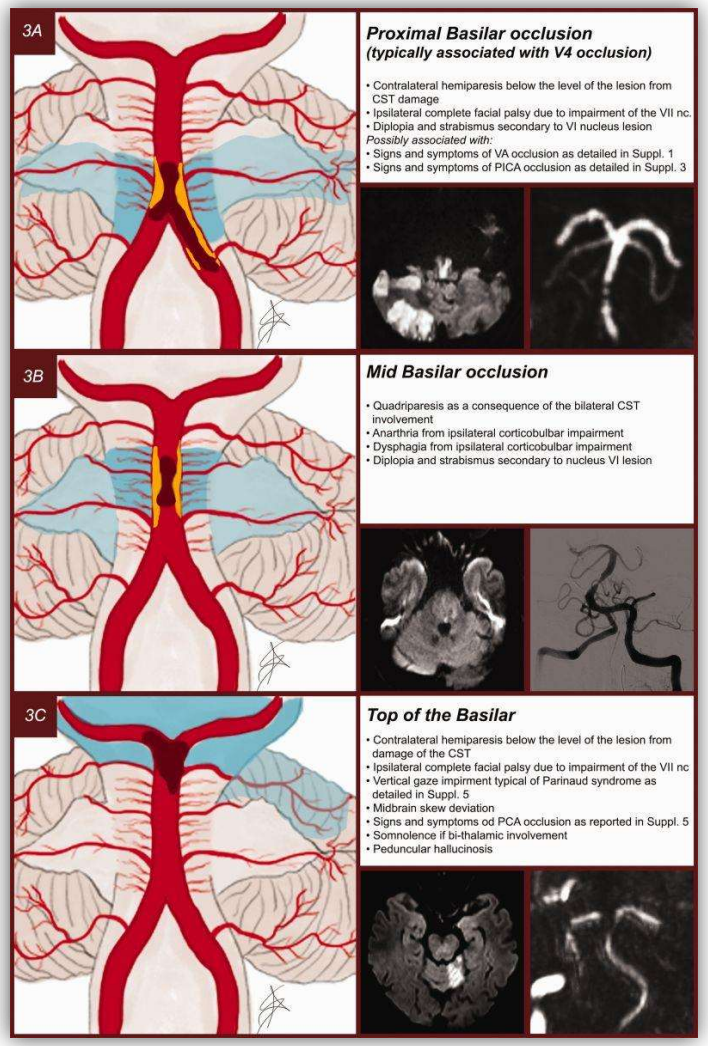
- Basilar artery occlusion (BAO) is a devastating stroke:
  - High mortality (85-95% untreated) and major disability.
  - Often leading to a devastating locked-in syndrome (paralysis with preserved consciousness) in survivors.
- EVT significantly improve chances of favorable outcomes in 24-40% of treated patients, emphasizing rapid treatment for better results.



BAO Treatment

A significant percentage of posterior circulation strokes (PCS) are missed, with studies showing initial misdiagnosis rates from around **20% up to 40% or more**, often due to atypical symptoms like isolated dizziness, nausea, or headache, which are easily mistaken for less serious conditions.

BAO Etiology



- *International Journal of Stroke*. 2021;17(7):714-722.
- neupsykey.com/part-iv-acute-stroke-procedures-5/

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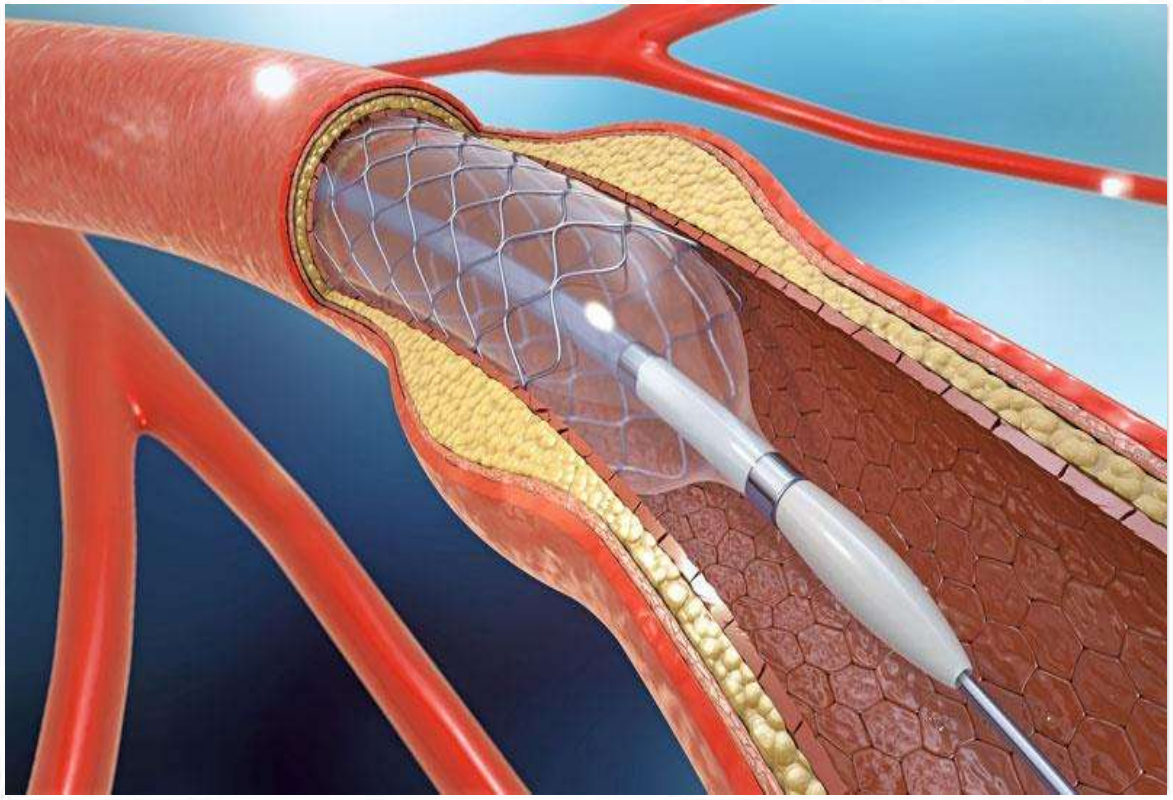
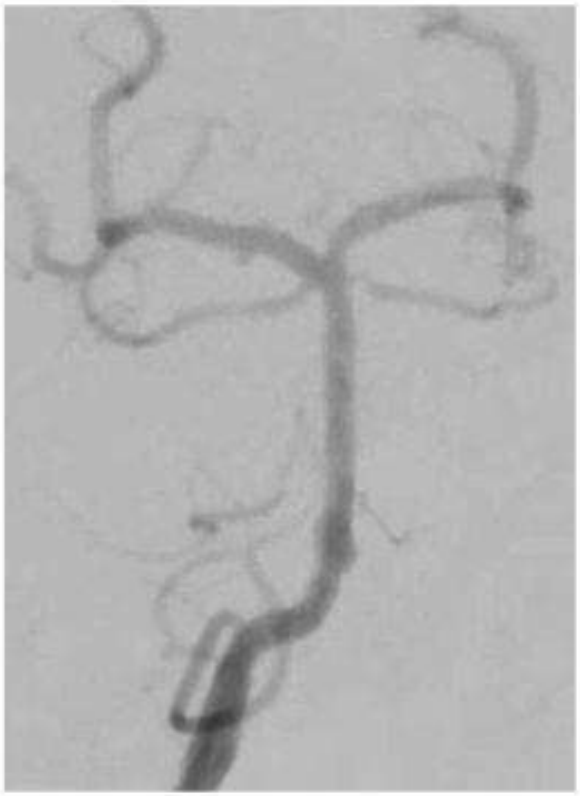
BA Stenosis

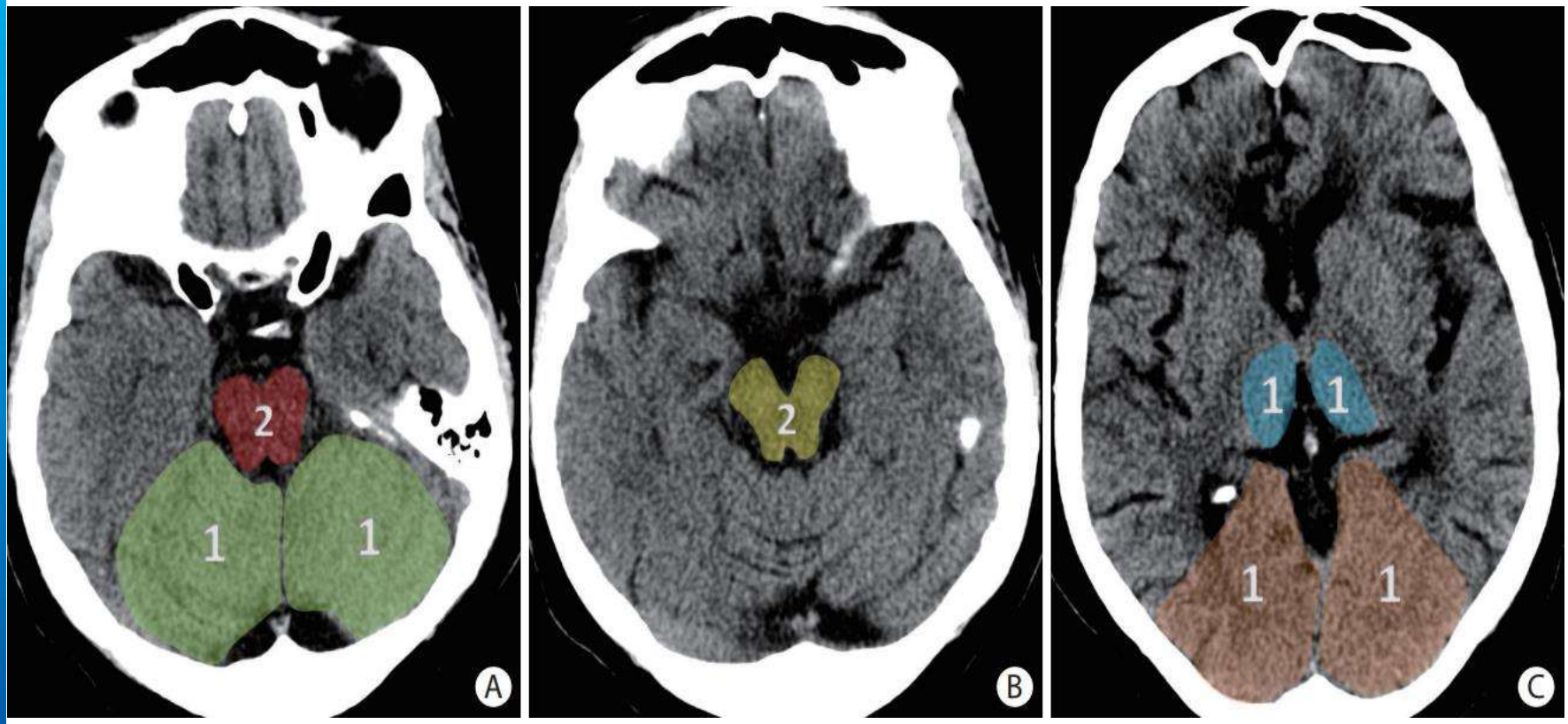




UT Southwestern Medical Center	BEST (2020)	BASICS(2021)	ATTENTION(2021)	BAOCHE(2022)
Region	China	Europe and South America	China	China
Number of Patients (EVT, BMM)	66, 65	154, 146	226, 114	110, 107
Key Inclusion Criteria				
Age (years)	≥18	≥18	≥18	≥18 and ≤80
NIHSS	Not specified	NIHSS score ≥10	≥10	≥6
Premorbid Disability (Baseline mRS)	0-2	0-2	0 for patients ≥80 years old 0-3 for patients <80 years old	≤1

UT Southwestern Medical Center	BEST (2020)	BASICS (2021)	ATTENTION (2021)	BAOCHE (2022)
Occlusion Site	BA or functional V4 VA on CTA/MRA/DSA	BA on CTA/MRA	BA on CTA/MRA/DSA	BA or bilateral VA on CTA/MRA/DSA
Core Infarct Imaging Criteria	None	None	PC-ASPECTS: ≥6 for patients <80 years ≥8 for patients ≥80 years	PC-ASPECTS score: ≥6 Pons-midbrain-index: ≤2
Time Window	8 hrs from the estimated time of occlusion	6 hrs from the estimated time of occlusion	12 hrs from the estimated time of occlusion	6-24 hrs from symptom onset
Crossover Rate	BMM to EVT: 22 % EVT to BMM: 5 %	BMM to EVT: 4.8 % EVT to BMM: 1.9 %	BMM to EVT: 2.6 % EVT to BMM: 1.3 %	BMM to EVT: 3.7% EVT to BMM: 0.9%
Etiology - Large artery atherosclerosis	EVT: 56% BMM: 49%	EVT: 36.3% BMM: 32.6%	EVT: 47.9% BMM: 36.9%	EVT: 68.2% BMM: 64.5%
Occlusion Site	BA or functional V4 VA on CTA/MRA/DSA	BA on CTA/MRA	BA on CTA/MRA/DSA	BA or bilateral VA on CTA/MRA/DSA

pcASPECT



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Journal of Stroke 2023;25(1):55-71.

BAO EVT vs BMM

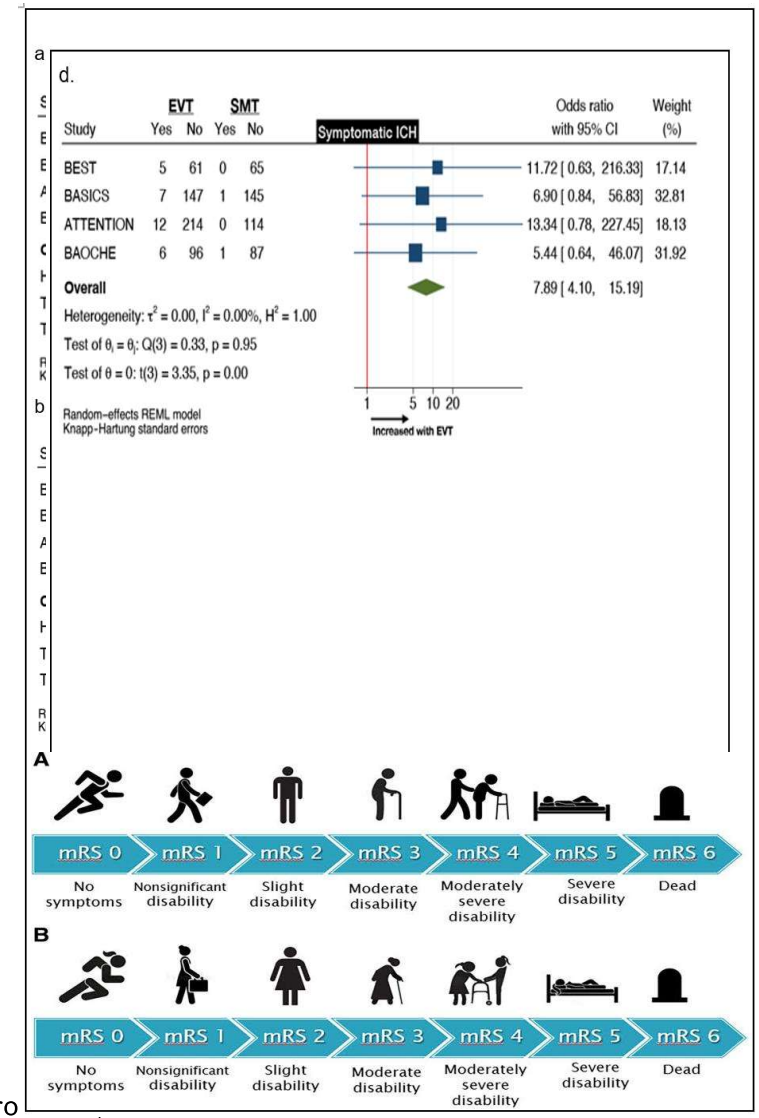
Stroke: Vascular and Interventional Neurology
Volume 3, Issue 6, November 2023
https://doi.org/10.1161/SVIN.123.000885

ORIGINAL RESEARCH

Endovascular Treatment in Acute Basilar Artery Occlusion Stroke: A Brief Practice Update From the Society of Vascular and Interventional Neurology

Kaiz S. Asif, MD, Robin Novakovic, MD, Thanh N. Nguyen, MD, Ossama Mansour, MD, Adam deHavenon, MD, Hesham E. Masoud, MD, Alicia C. Castonguay, PhD, Cynthia Kenmuir, MD, Yazan Ashouri, MD, Vallabh Janardhan, MD, David S. Liebeskind, MD, Ameer E. Hassan, MD, Amer M. Malik, MD, and Osama O. Zaidat, MD, MS for the SVIN GAPS Committee

- **90-day mRS score of ≤3 was** significantly more likely in those **treated with EVT** (pooled OR, 1.99 [95% CI, 1.04–3.8]; *P*=0.042)
- Also, **90-day mRS score of 0 to 2** (pooled OR, 2.26 [95% CI, 0.78–6.57]; *P*=0.094).
- **Mortality** was significantly less likely (pooled OR, 0.64 [95% CI, 0.42–0.99]; *P*=0.048).
- **sICH** was significantly more likely with EVT (pooled OR, 7.89 [95% CI, 4.1–15.19]; *P*=0.002)



K Asif, R Novakovic, et al. Stroke Vasc Interv Neuro

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BAO RCTs Results

- BAO RCTs demonstrated **EVT significantly improved functional outcomes and reduced mortality** compared to BMM when performed within 24 hours of stroke onset.
- While early trials like **BEST and BASICS** showed inconclusive results, more recent trials (**ATTENTION, BAOCHE**) in Chinese populations confirmed EVT's effectiveness, showing much higher rates of good functional recovery and sustained long-term benefits (e.g., 46% vs. 23% good outcomes at 90 days in **ATTENTION**).

K Asif, R Novakovic, et al. Stroke Vasc Interv Neurol. 2023;3:e000885.

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Summary of Recommendations Based on Clinical Questions

1. Should EVT be performed in patients presenting with BAO within 12 hours of symptom onset?
   EVT is moderately recommended in patients presenting with BAO within 12 hours from symptom onset and meeting the following criteria: age 18 to 80 years, prestroke mRS score of 0 to 2, NIHSS score ≥10, and pc-ASPECTS ≥8 (COR 2a, LOE B-R, revised RoB analysis domain 6: high risk, EO for COR: EO-C).

Recommendation	COR	LOE	Expert opinion consensus on COR
EVT is moderately recommended in patients presenting with BAO within 12 hours from onset and meeting the following criteria: age 18 to 80 years, prestroke mRS score of 0 to 2, NIHSS score ≥10, and pc-ASPECTS ≥8.	2a	B-R	EO-C

2. Should EVT be performed in patients presenting with BAO between 12 and 24 hours of symptom onset?
   EVT is moderately recommended in patients presenting with BAO between 12 and 24 hours from symptom onset and meeting the following criteria: age 18 to 80 years, prestroke mRS score of 0 to 1, NIHSS score ≥10, and pc-ASPECTS ≥8 (COR 2a, LOE B-R, revised RoB analysis domain 6: high risk, EO for COR: EO-C).

Recommendation	COR	LOE	Expert opinion consensus on COR
EVT is moderately recommended in patients presenting with BAO between 12 and 24 hours from onset and meeting the following criteria: age 18 to 80 years, prestroke mRS score 0 to 1, NIHSS score ≥10, and pc-ASPECTS ≥8.	2a	B-R	EO-C

3. Should EVT be performed in patients presenting with BAO attributable to large-artery atherosclerosis?
   EVT is moderately recommended in patients presenting with BAO attributable to large-artery atherosclerosis presenting within 24 hours from symptom onset and meeting the following criteria: age 18 to 80 years, prestroke mRS score of 0 to 1, NIHSS score ≥10, and pc-ASPECTS ≥8 (COR 2a, LOE B-R, revised RoB analysis domain 6: high risk, EO for COR: EO-C).

Recommendation	COR	LOE	Expert opinion consensus on COR
EVT is moderately recommended in patients presenting with BAO attributable to large-artery atherosclerosis presenting within 24 hours from onset and meeting the following criteria: age 18 to 80 years, prestroke mRS score of 0 to 1 NIHSS score ≥10, and pc-ASPECTS ≥8.	2a	B-R	EO-C

Stroke: Vascular and Interventional Neurology
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American Heart Association.

ORIGINAL RESEARCH

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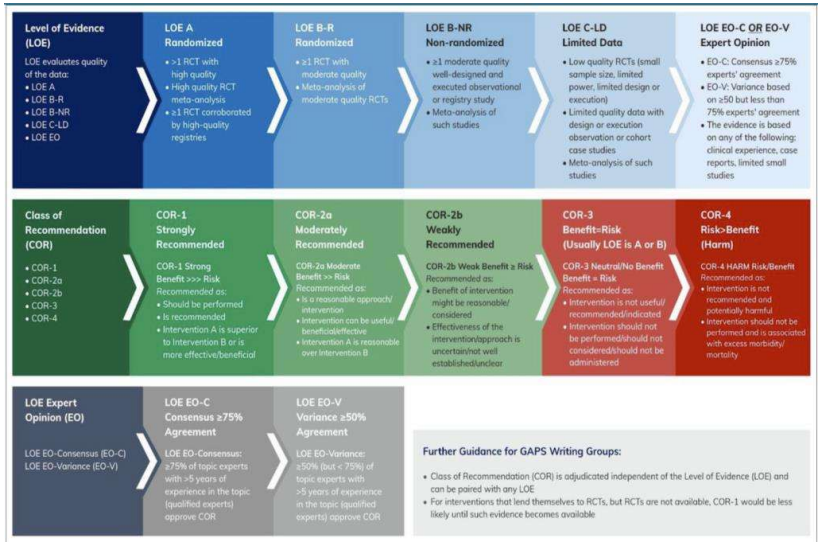
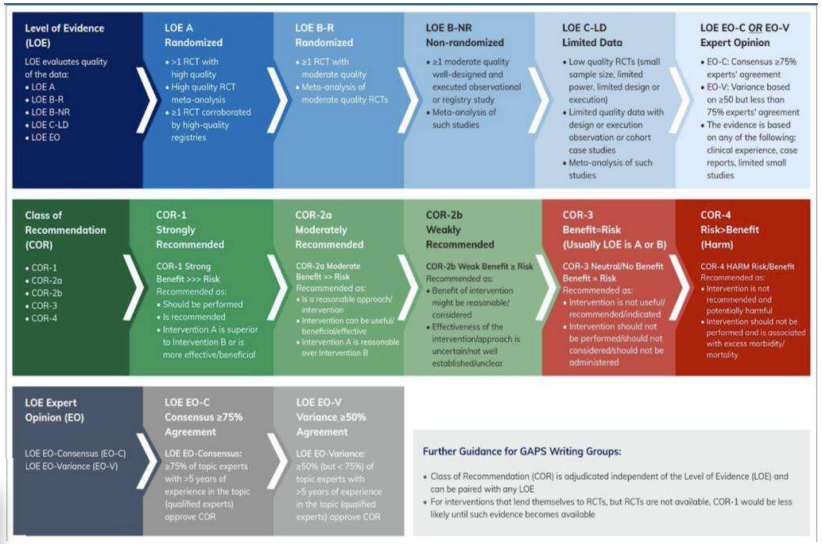


K Asif, R Novakovic, et al. Stroke Vasc Interv Neurol. 2023;3:e000885.



4. Should EVT be performed in basilar artery occlusion with pc-ASPECTS score 6 to 7?
EVT may be considered in patients with a pc-ASPECTS score of 6 to 7 presenting with BAO and meeting the following criteria: symptom onset within 24 hours, age <80 years, prestroke mRS score of 0 to 1, and NIHSS score ≥10 (COR 2b, LOE C-LD, revised RoB analysis domain 6: high risk, EO for COR: EO-C).

Recommendation	COR	LOE	Expert opinion consensus on COR
EVT may be considered in patients with a pc-ASPECTS of 6 to 7 presenting with BAO and meeting the following criteria: onset within 24 hours, age <80 years, prestroke mRS score of 0 to 1, and NIHSS score ≥10.	2b	C-LD	EO-C

5. Should EVT be performed in basilar artery occlusion with patients aged >80 years?
EVT may be considered in patients aged >80 years presenting with BAO and meeting the following criteria: onset within 12 hours, prestroke mRS score of 0, pc-ASPECTS ≥8, and NIHSS score ≥10 (COR 2b, LOE C-LD, revised RoB analysis domain 6: high risk, EO for COR: EO-C).

Recommendation	COR	LOE	Expert opinion consensus on COR
EVT should be considered in patients aged >80 years presenting with BAO and meeting the following criteria: onset within 12 hours, prestroke mRS score of 0, pc-ASPECTS ≥8, and NIHSS score ≥10.	2b	C-LD	EO-C

Stroke: Vascular and Interventional Neurology
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- BAO - lower-level recommendation awarded:
  - ❑>80 years
    - ✓Within 12 hours
    - ✓pc-ASPECTS ≥8
    - ✓Prestroke mRS 0
    - ✓NIHSS ≥10

K Asif, R Novakovic, et al. Stroke Vasc Interv Neurol. 2023;3:e000885.

Recommendations

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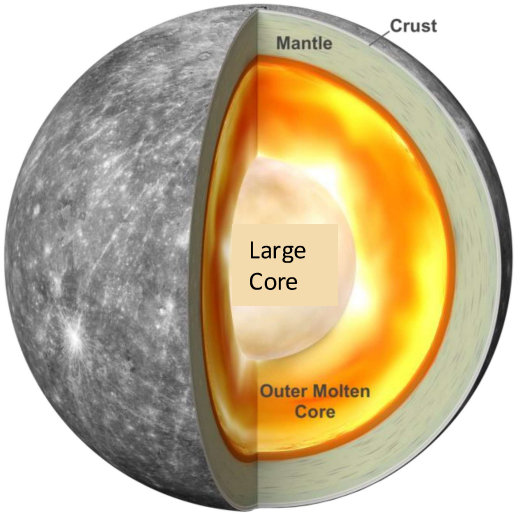
Landmark EVT Trials – Timeline

2019	2022	2023
SELECT	INSPIRE	RESCUE-J LIMIT
	BEST	SELECT2
	BASICS	ANGEL-ASPECT
	ATTENTION	TESLA
	BAOCHE	TENSION
	BEST	LASTE



https://www.nasa.gov/solar-system/a-closer-look-at-mercurys-spin-and-gravity-reveals-the-planets-inner-solid-core/

Stroke Agenda

- **Objectives:**
  - **Stroke reality and treatment options for ischemic stroke**
  - **Once upon a thrombectomy…… a long, long, time ago!**
    - ✓ **Indication for thrombectomy in anterior circulation LVO**
  - **Could there be a worse fate? Basilar artery occlusion**
    - ✓ **Indication for thrombectomy in BAO**
  - **When is enough enough? Large core infarcts in anterior LVO**
    - ✓ **Indication for thrombectomy large core anterior LVO**
  - How far can we go? MeVO and DMVO
    - ✓ Indication for thrombectomy in MeVO??? Wait is there any?

UT Southwestern Medical Center

	RESCUE-JAPAN-LIMIT	ANGEL-ASPECT	SELECT2	TESLA	TENSION	LASTE
	Japan	China	North America, Australia	United States	Europe, Canada	Europe, United States
Inclusion Criteria						
Age (years)	≥18	18-80	18-85	18-85	≥18	≥18
Pre mRS score	0-1	0-1	0-1	0-1	0-2	0-1
LKW/Symptom Onset	<6 hours or 6-24 hours MRI FLAIR negative	<24 hours	<24 hours	<24 hours	<12 hours	<7 hours or MRI FLAIR negative
NIHSS	≥6	6-30	≥6	≥6	<26	>6
Site of Occlusion	ICA or M1	Intracranial ICA or M1	ICA or M1	ICA terminus or M1	Intracranial ICA or M1	Intracranial ICA, M1, M1-M2
ASPECT Score	CT/MRI 3-5	CT 3-5	CT 3-5	CT 2-5	CT/MRI 3-5	CT/MRI 0-5 or ≥ 80 yrs 3 to 5
Additional Criteria		Or core 70-100 mL	Or core ≥50mL			

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	RESCUE-JAPAN-LIMIT		ANGEL-ASPECT		SELECT2		TESLA		TENSION		LASTE	
Comparison Arms	EVT	BMM	EVT	BMM	EVT	BMM	EVT	BMM	EVT	BMM	EVT	BMM
#patients	101	102	230	225	178	174	152	148	125	128	159	165
Median Age			68	67	66	67	66	68	73	74	73	74
Mean Age	76.6	75.7										
Male sex	55	58	135	144	107	100	76	84	59	51		
Median NIHSS	22	22	16	15	19	19	19	18	19	18	21	21
Median ASPECT	3 (3-4)	4 (3-4)	3 (3-4)	3 (3-4)	4 (3-5)	4 (4-5)	4 (3-5)	4 (3-5)	0-2: 12% 3-5: 82% 6-10: 6%	18% 78% 4%	<3: 54% 3-5: 46%	58% 52%
Median Infarct Volume (mL)	94	110	61	63	82	79	166	171	206*	228*	132	137
Median (min) Symptom Onset/LKW to Randomization	229	214	453	463	545	588	653	744	120	126	271	268

EVT: endovascular thrombectomy; BMM: best medical management; ASPECT: Alberta Stroke Program Early Computed Tomographic Score; NIHSS: National Institutes of Health Stroke Scale; * at 24 hours

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	RESCUE-JAPAN-LIMIT		ANGEL-ASPECT		SELECT2		TESLA		TENSION		LASTE	
Comparison Arms	**EVT (N=100)**	**BMM (N=102)**	**EVT (N=230)**	**BMM (N=225)**	**EVT**	**BMM**	**EVT**	**BMM**	**EVT (N=122)**	**BMM (N=123)**	**EVT**	**BMM**
90-Day mRS 0-3	31% (31)	12.7% (13)	47% (108)	33.3% (75)	37.9% (67/177)	18.7% (32/171)	30% (45/151)	20% (29/146)	31.5%	13.1%	33.3% (53/159)	12.7% (21/165)
90-Day Mortality	18% (18)	23.5% (24)	21.7% (50)	20% (45)	38.4% (68/177)	41.5% (71/171)	35.3% (53/150)	33.3% (49/147)	40% (49)	51% (63)	36.1% (57/158)	55.5% (91/164)
24-48 Hrs sICH	9% (9)	4.9% (5)	6.1% (14)	2.7% (6)	0.6% (1/178)	1.1% (2/174)	4% (6/151)	1.3% (2/149)	6% (7)	5% (6)	9.6% (15/157)	5.7% (9/157)

SELECT2 https://clinicaltrials.gov/study/NCT03876457?tab=results
LASTE – Tudor J live presentation SLICE 2023
ANGEL-ASPECT N Engl J Med 2023;388:1272-83.
RESCUE-JAPAN LIMIT N Engl J Med 2022;386:1303-13.
TENSION *Lancet* 2023; 402: 1753–63
TESLA https://ssrn.com/abstract=4587818 – preprint not peer reviewed

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	RESCUE-JAPAN-LIMIT		ANGEL-ASPECT		SELECT2		TESLA		TENSION		LASTE	
Comparison Arms	**EVT (N=100)**	**BMM (N=102)**	**EVT (N=230)**	**BMM (N=225)**	**EVT**	**BMM**	**EVT**	**BMM**	**EVT (N=122)**	**BMM (N=123)**	**EVT**	**BMM**
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Comparison Arms	**EVT (N=100)**	**BMM (N=102)**	**EVT (N=230)**	**BMM (N=225)**	**EVT**	**BMM**	**EVT**	**BMM**	**EVT (N=122)**	**BMM (N=123)**	**EVT**	**BMM**
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Meta-Analysis Large Core RCTs

Systematic review

Endovascular thrombectomy for large ischemic strokes: meta-analysis of six multicenter randomized controlled trials

Huanwen Chen [1,2] Marco Colasurdo [3]

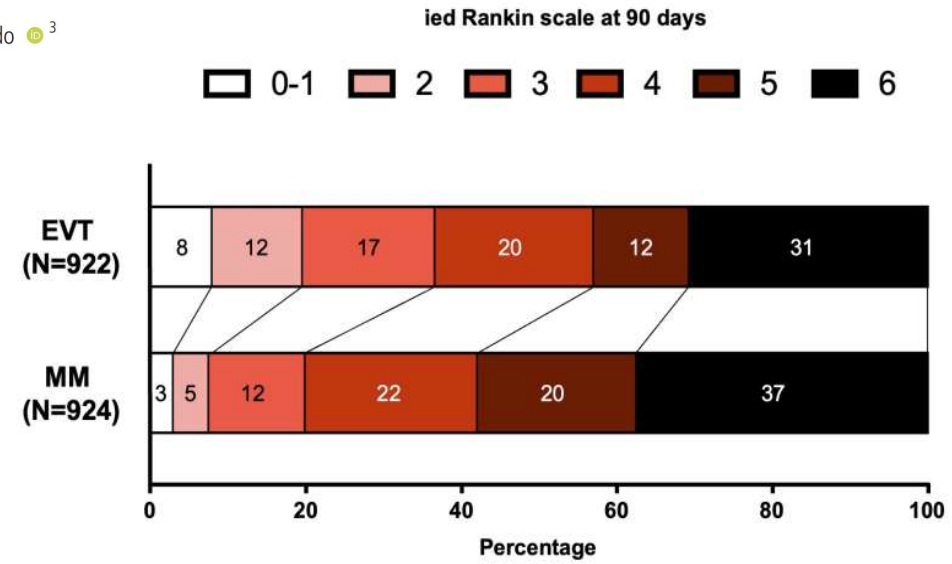

Figure 1 Pooled 90-day modified Rankin Scale outcomes from RESCUE-Japan-LIMIT, ANGEL-ASPECT, SELECT2, TESLA, TENSION, and LASTE. EVT, endovascular thrombectomy; MM, medical management.

H Chen, et al. Endovascular thrombectomy for large ischemic strokes: meta-analysis of six multicenter randomized controlled trials (*Journal of neurointerventional surgery* 2025).

Meta-Analysis Large Core RCTs

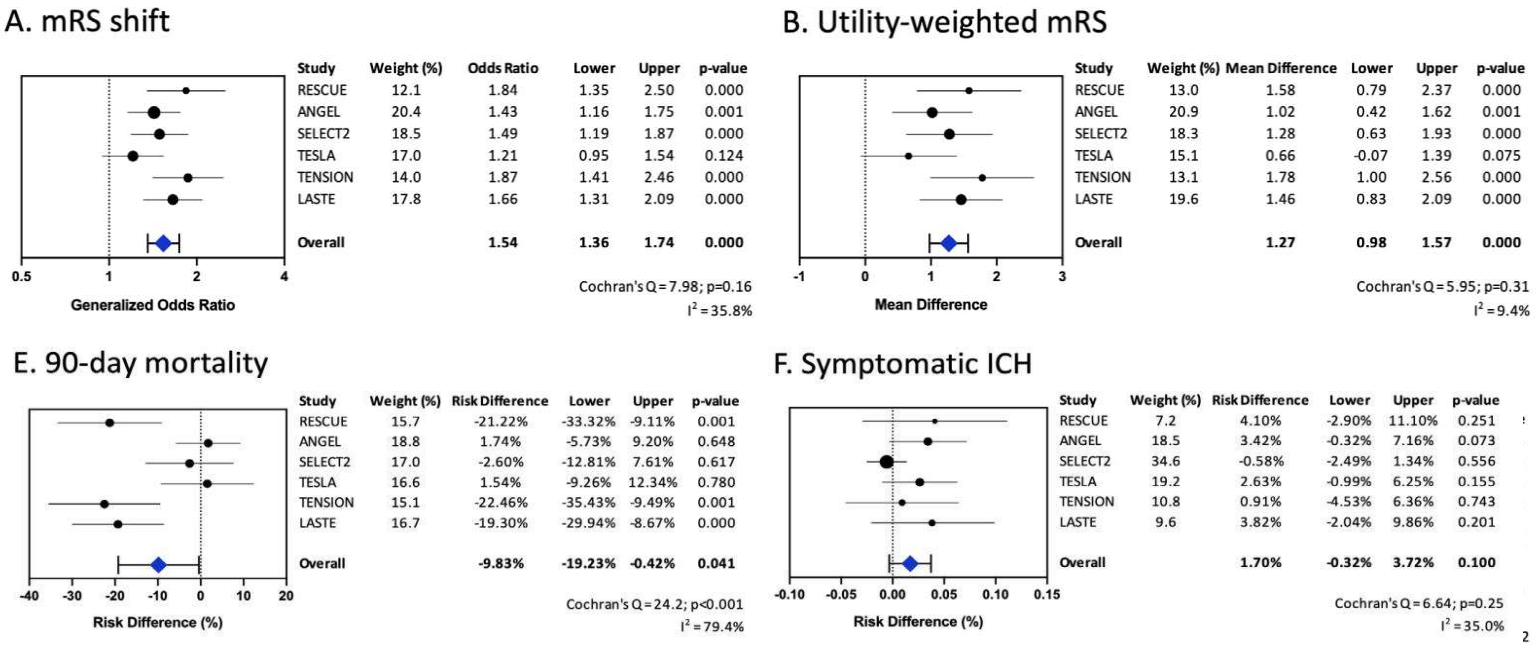

Figure 2 Pooled outcome measures across six randomized controlled trials comparing endovascular thrombectomy with medical management for patients with large ischemic strokes. ICH, intracranial hemorrhage; mRS, modified Rankin Scale.

H Chen, et al. Endovascular thrombectomy for large ischemic strokes: meta-analysis of six multicenter randomized controlled trials (*Journal of neurointerventional surgery* 2025).

Available Recommendations

Standards

Endovascular therapy for anterior circulation emergent large vessel occlusion stroke in patients with large ischemic cores: a report of the SNIS Standards and Guidelines Committee

Fawaz Al-Mufti ,[1] Franklin A Marden,[2] Jan Karl Burkhardt,[3] Daniel Raper,[4] Clemens M Schirmer ,[5] Amanda Baker ,[6] Peng Roc Chen ,[7] Ketan R Bulsara,[8] Kazim H Narsinh ,[9] Matthew Robert Amans ,[6] Jared Cooper,[10] Shadi Yaghi,[11,12] Mais Al-Kawaz ,[13,14] Steven W Hetts ,[15] SNIS Standards and Guidelines Committee, SNIS Board of Directors

Recommendation 1: In patients with anterior circulation ELVO who present within 24 hours of last known normal (LKN) with large infarct core (70–149 mL or ASPECTS 3–5) and meet other criteria of RESCUE-Japan LIMIT, SELECT2, ANGEL-ASPECT, TESLA, TENSION, or LASTE trials, thrombectomy is indicated (Class I, Level A)

Recommendation 2: EVT in patients with LCS aged 18–80 years (5 RCT evidence) and 80–85 years of age (4 RCT evidence) is beneficial (Class I, Level A)

Recommendation 3: EVT in patients with LCS >85 years of age (2 RCT) may be beneficial (Class I, Level B-R)

Recommendation 4: Patients with LCS and NIHSS 6–30 (5 RCT evidence) benefit from EVT in LCS (Class I, Level A)

Recommendation 5: Patients with LCS and NIHSS <6 and >30 (2 RCT evidence) may benefit from EVT in LCS (Class IIa, Level A)

Recommendation 6: Patients with LCS and low baseline mRS (0–1) (5 RCT evidence) benefit from EVT (Class I, Level A)

Recommendation 7: Patients with LCS and time of last known well 0–24 hours (<6 hours with 3 RCT evidence and 6–24 hours with 5 RCT evidence) benefit from EVT (Class I, Level A)

Recommendation 8: It is recommended that patients with LCS who also meet the criteria for on-label use of IV tPA receive IV tPA irrespective of whether endovascular treatments are being considered (Class I; Level B-NR)

F Al-Mufti, et al. Endovascular therapy for anterior circulation emergent large vessel occlusion stroke in patients with large ischemic cores: a report of the SNIS Standards and Guidelines Committee (*Journal of neurointerventional surgery* 2024).

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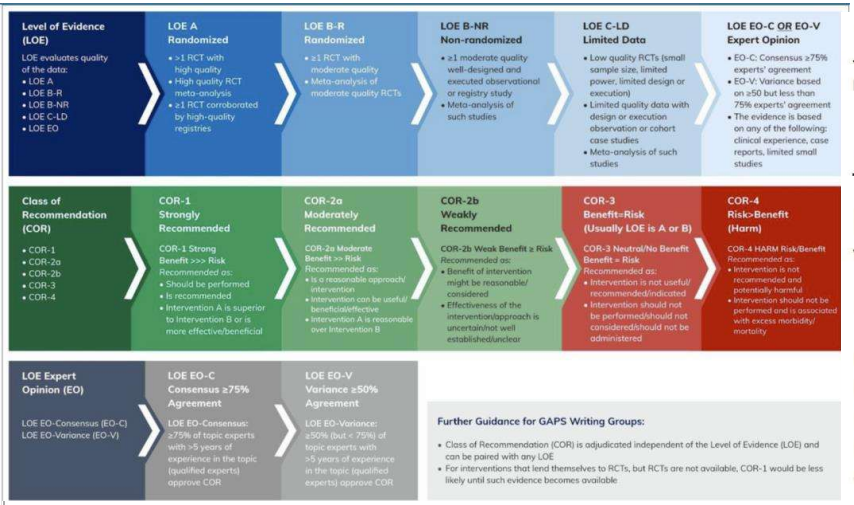

Stroke: Vascular and Interventional Neurology
Volume 5, Issue 2, March 2025
https://doi.org/10.1161/SVIN.124.001581

American Heart Association.

REVIEW ARTICLE

Endovascular Therapy in Patients With Acute Ischemic Stroke With Large Infarct: A Guideline From the Society of Vascular and Interventional Neurology

Maxim Mokin, MD, PhD, Tudor G. Jovin, MD, Sunil A. Sheth, MD, Thanh N. Nguyen, MD, Kaiz S. Asif, MD, Ameer E. Hassan, DO, Ashutosh P. Jadhav, MD, PhD, Cynthia Kenmuir, MD, PhD, David S. Liebeskind, MD, Ossama Mansour, MD, Raul G. Nogueira, MD, Robin Novakovic, MD, Santiago Ortega-Gutierrez, MD, MS, Albert J. Yoo, MD, PhD, Waldo R. Guerrero, MD, and Amer M. Malik, MD for the SVIN GAPS committee

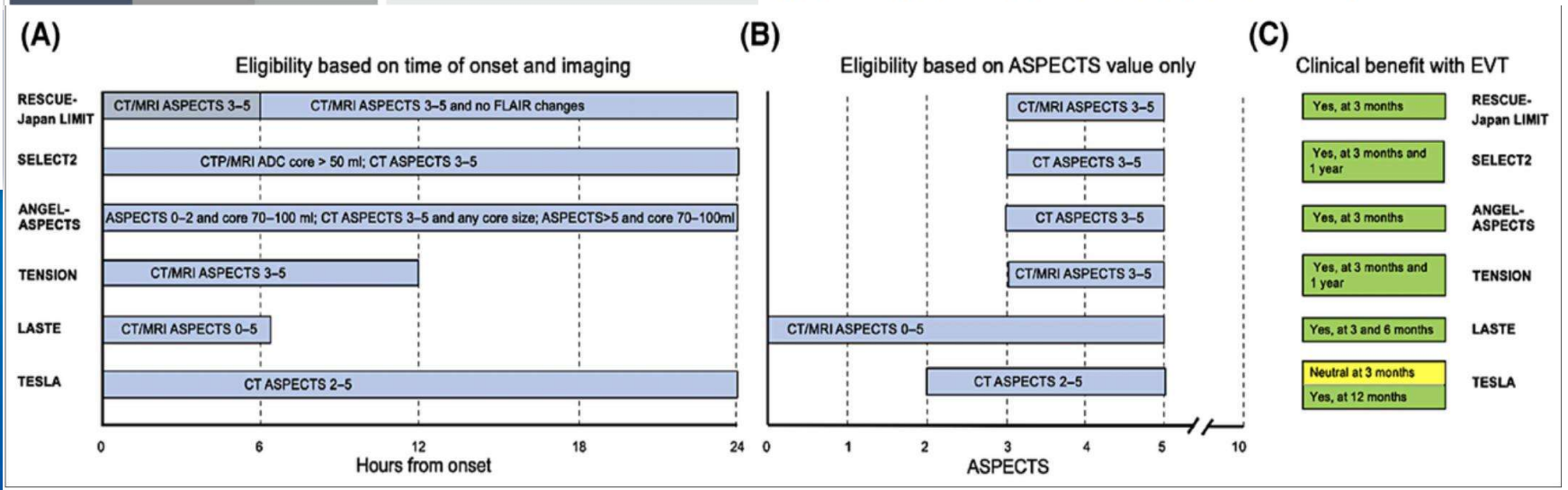

Figure 2. **Key imaging characteristics of 6 large infarct randomized trails**. **A**, The 6 trials evaluated the safety and efficacy of EVT during different time periods from symptom onset to randomization and initiation of EVT. Key imaging metrics for each trial are shown. **B**, ASPECTS were used in all 6 trials. Upper and lower ASPECTS thresholds are shown. **C**, Overall clinical benefit was shown in 5 trials. One trial (TESLA) did not meet its primary end point at 3 months but showed clinical benefit at the 1-year mark. ADC indicates apparent diffusion coefficient; ANGEL-ASPECT, Endovascular Therapy in Acute Anterior Circulation Large Vessel Occlusive Patients With a Large Infarct Core; ASPECTS, Alberta Stroke Program Early CT score; CT, computed tomography; CTP, computed tomography perfusion; EVT, endovascular therapy; FLAIR, fluid-attenuated inversion recovery; LASTE, Large Stroke Therapy Evaluation; MRI, magnetic resonance imaging; RESCUE-Japan LIMIT, Recovery by Endovascular Salvage for Cerebral Ultra-Acute Embolism–Japan Large Ischemic Core Trial; SELECT2, Randomized Controlled Trial to Optimize Patient's Selection for Endovascular Treatment in Acute Ischemic Stroke; TENSION, Efficacy and Safety of Thrombectomy in Stroke With Extended Lesion and Extended Time Window; and TESLA, Thrombectomy for Emergent Salvage of Large Anterior Circulation Ischemic Stroke.

Recommendations

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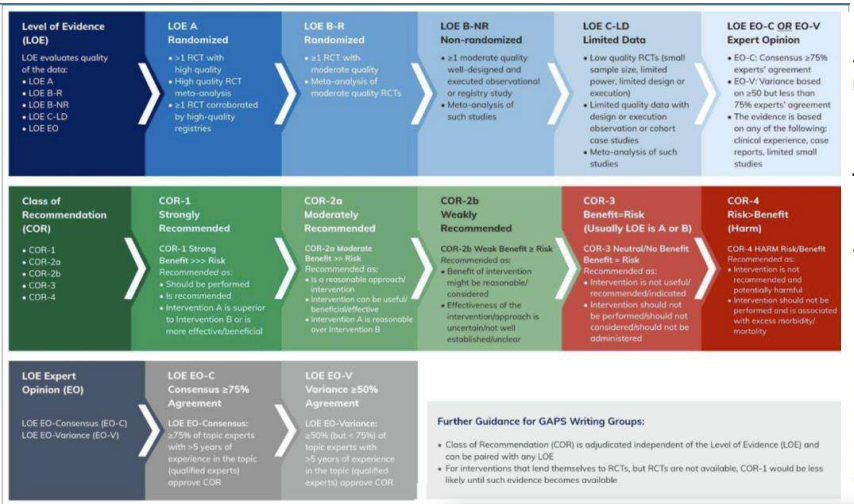

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Recommendations

EVT within 0–6 hours of stroke onset	Class of recommendation	Level of evidence
In patients with anterior circulation stroke presenting within 0–6 h from symptom onset, baseline mRS score 0–1, age 18–80 y old, occlusion of the ICA or MCA M1 segment, and ASPECTS of 0–5 on noncontrast CT or MRI, EVT is recommended. (Evidence: LASTE trial; meta-analyses AlMajali et al, Roman et al, Winkelmeier et al)	**1**	**A**

EVT within 6–24 hours of stroke onset	Class of recommendation	Level of evidence
In patients with anterior circulation LVO presenting within 6–24 h from symptom onset, baseline mRS score 0–1, age 18–80 years old, occlusion of the ICA or MCA M1 segment, and ASPECTS of 3–5 on noncontrast CT or MRI, EVT is recommended. (Evidence: ANGEL-ASPECT, RESCUE-Japan LIMIT; meta-analyses Palaiodimou et al, Wei et al, and Li et al)	**1**	**A**
In patients with anterior circulation LVO presenting within 6–24 h from symptom onset, baseline mRS score 0–1, age 18–80 years old, occlusion of the ICA or MCA M1 segment with CTP imaging according to the SELECT2 and ANGEL-ASPECT eligibility criteria, EVT is recommended. (Evidence: ANGEL-ASPECT, SELECT2)	**1**	**A**
In patients with anterior circulation LVO presenting within 6–24 h from symptom onset, baseline mRS score 0–1, age 18–80 years old, occlusion of the ICA or MCA M1 segment, and ASPECTS of 0–2 on noncontrast CT or MRI, the benefit of EVT is uncertain.	**2b**	**B-R**

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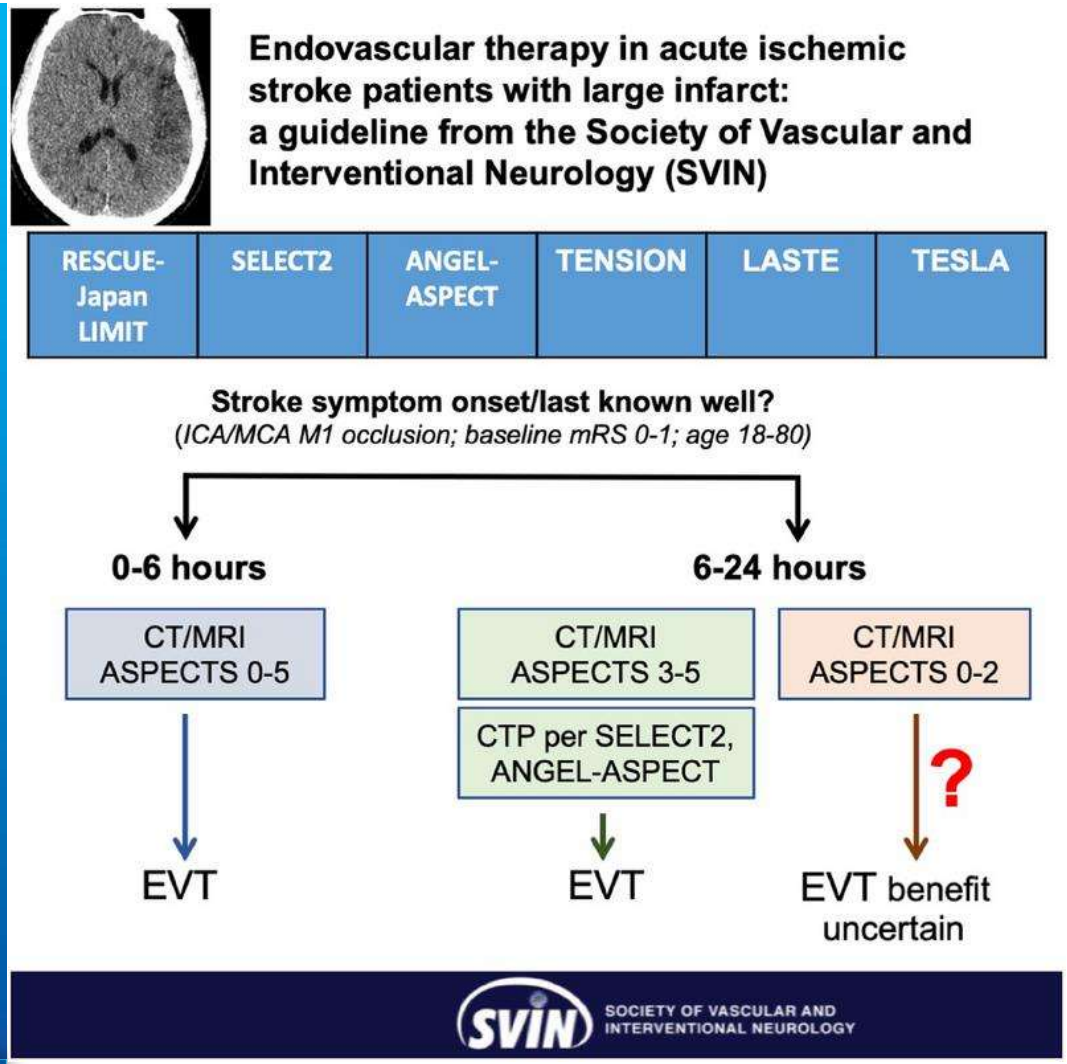

- Despite increased hemorrhage rates
- Benefit of thrombectomy for large core infarcts, up to 24hrs

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M Mokin, et al. Endovascular therapy in patients with acute ischemic stroke with large infarct: A guideline from the Society of vascular and Interventional Neurology (*Stroke: vascular and interventional neurology* 2025).

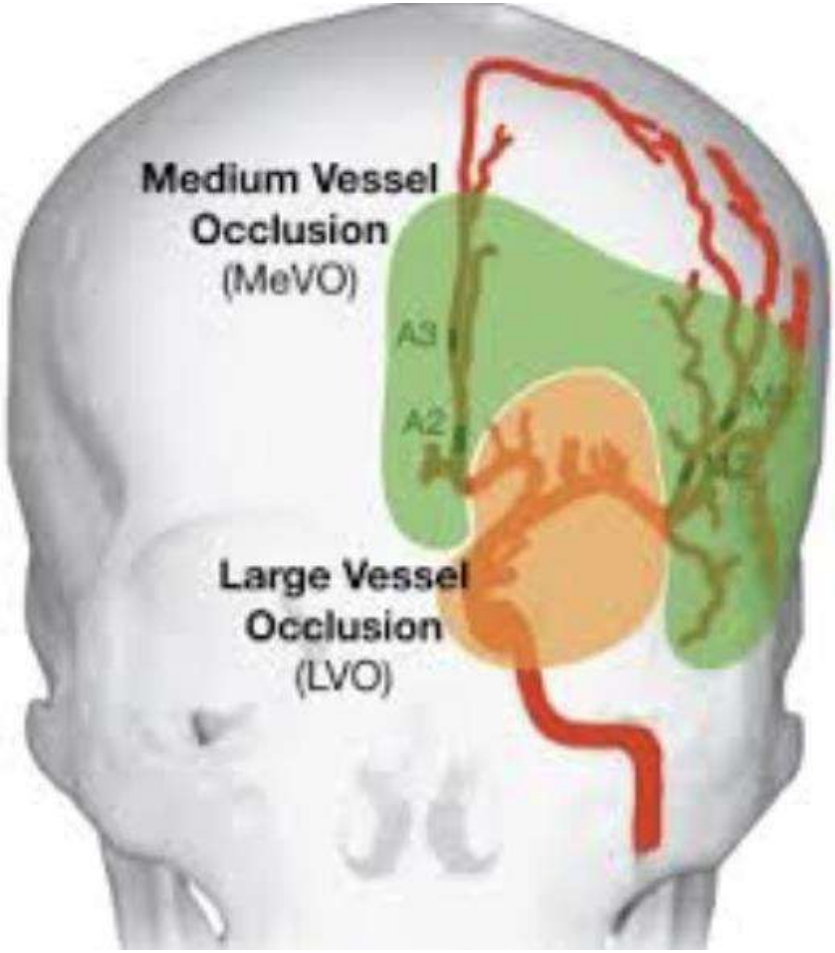
Landmark EVT Trials – Timeline

2019	2022	2023	2024	2025
SELECT	INSPIRE	RESCUE-J LIMIT		
	BEST	SELECT2		
	BASICS	ANGEL-ASPECT		
	ATTENTION	TESLA		
	BAOCHE	TENSION		
	BEST	LASTE		

Stroke Agenda

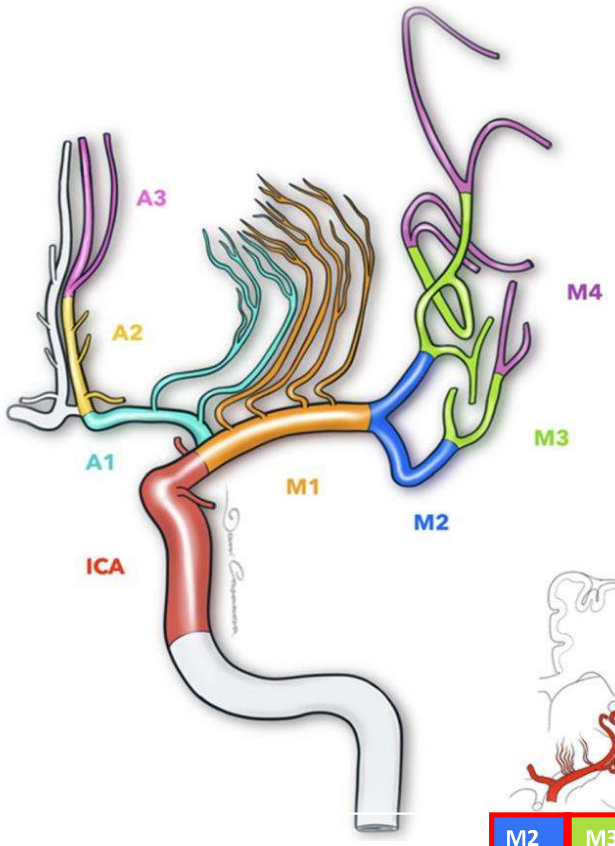
- **Objectives:**
  - Stroke reality and treatment options for ischemic stroke
  - Once upon a thrombectomy…… a long, long, time ago!
    - ✓ Indication for thrombectomy in anterior circulation LVO
  - Could there be a worse fate? Basilar artery occlusion
    - ✓ Indication for thrombectomy in BAO
  - When is enough enough? Large core infarcts in anterior LVO
    - ✓ Indication for thrombectomy large core anterior LVO
  - **How far can we go? MeVO and DMVO**
    - ✓ **Indication for thrombectomy in MeVO??? Wait is there any?**

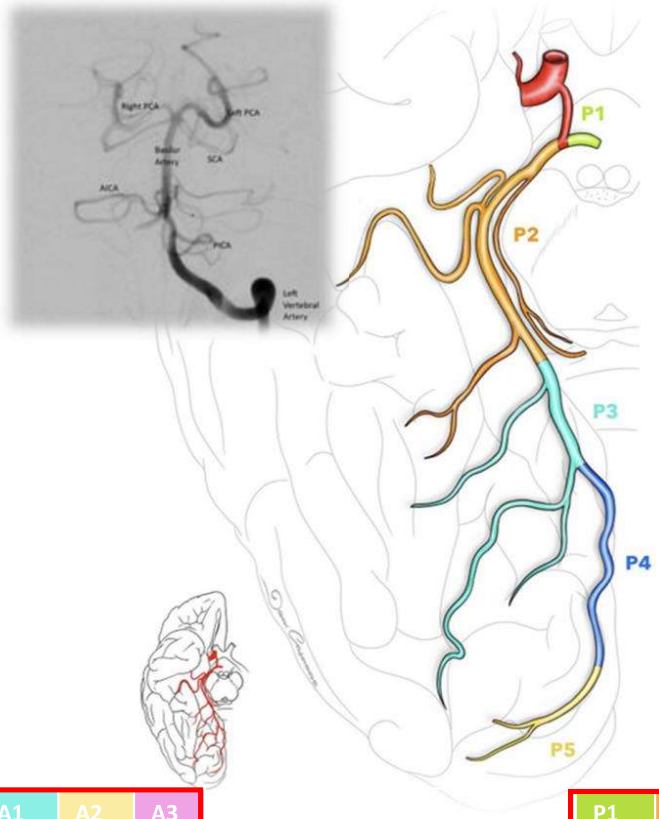
DMVO vs LVO


Medium Vessel
Occlusion
(MeVO)
A3
A2
Large Vessel
Occlusion
(LVO)

Distal Medium vs Medium Vessel DMVO/MeVO

DMVO Clinical Trials





	M2	M3	M4	A1	A2	A3
DISTAL	X	X	X	X	X	X
DISCOUNT	X*	X		X	X	X
ESCAPE-MeVO	X	X			X	X
DISTALS	X	X		X	X	X
DUSK	X	X		X	X	X

	P1	P2	P3
DISTAL	X	X	X
DISCOUNT	X	X	X
ESCAPE-MeVO		X	X
DISTALS	X	X	X
DUSK	X	X	X

A Rodriguez-Calienes, et al. Current challenges in the endovascular treatment of medium vessel occlusions (*Frontiers in Stroke* 2023).

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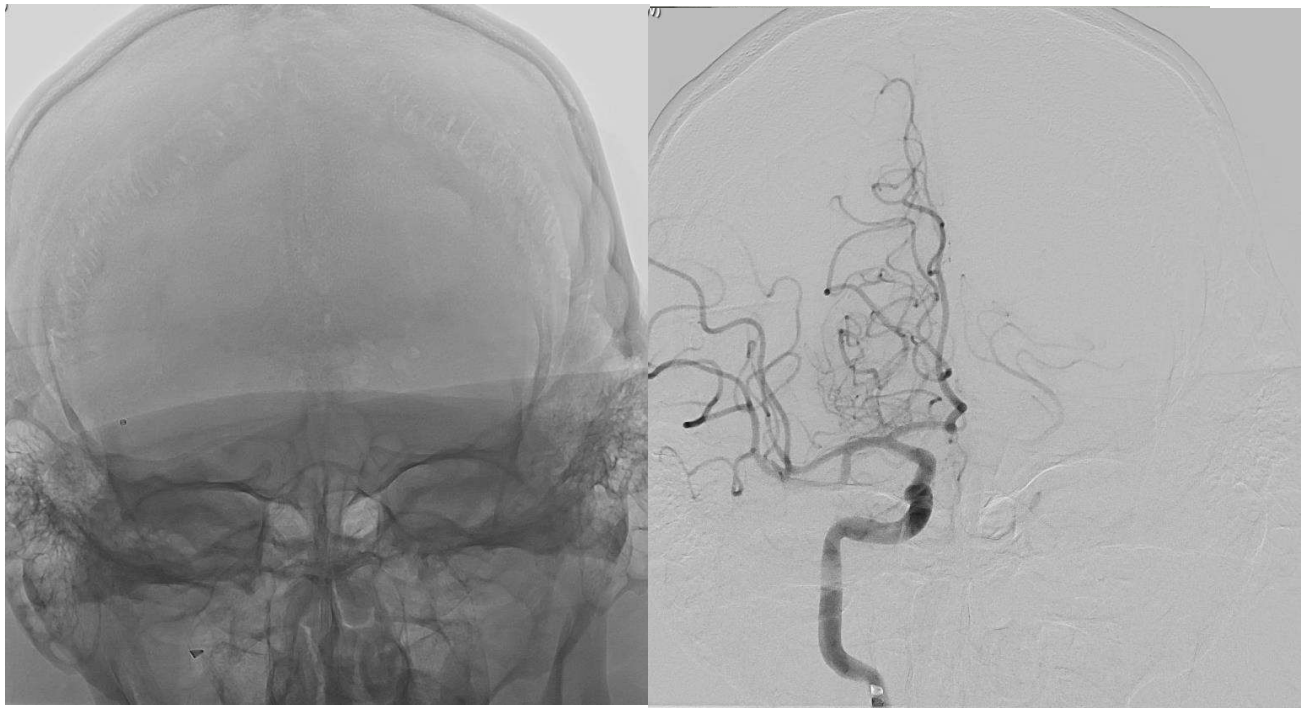
DMVO

- DMVOs account for **25%** to **40%** of all AIS.
- **Less** deficits and disability caused by DMVO(median NIHSS 7) compared to LVO.
- But still, observational studies showed **1/3 do not** achieve functional independence and excellent functional outcome in only **50%** with best medical management.
- Mortality **9%** at 90 days.
- Recanalization rates **<50%** at 2 to 6 hours with IV alteplase.

- Duloquin G, et al. *Stroke*. 2020;51:2122–2130.
- Saver JL, et al; *Stroke*. 2020;51:2872–2884.
- Ospel JM, et al. *Stroke*. 2020;51:3232–3240.

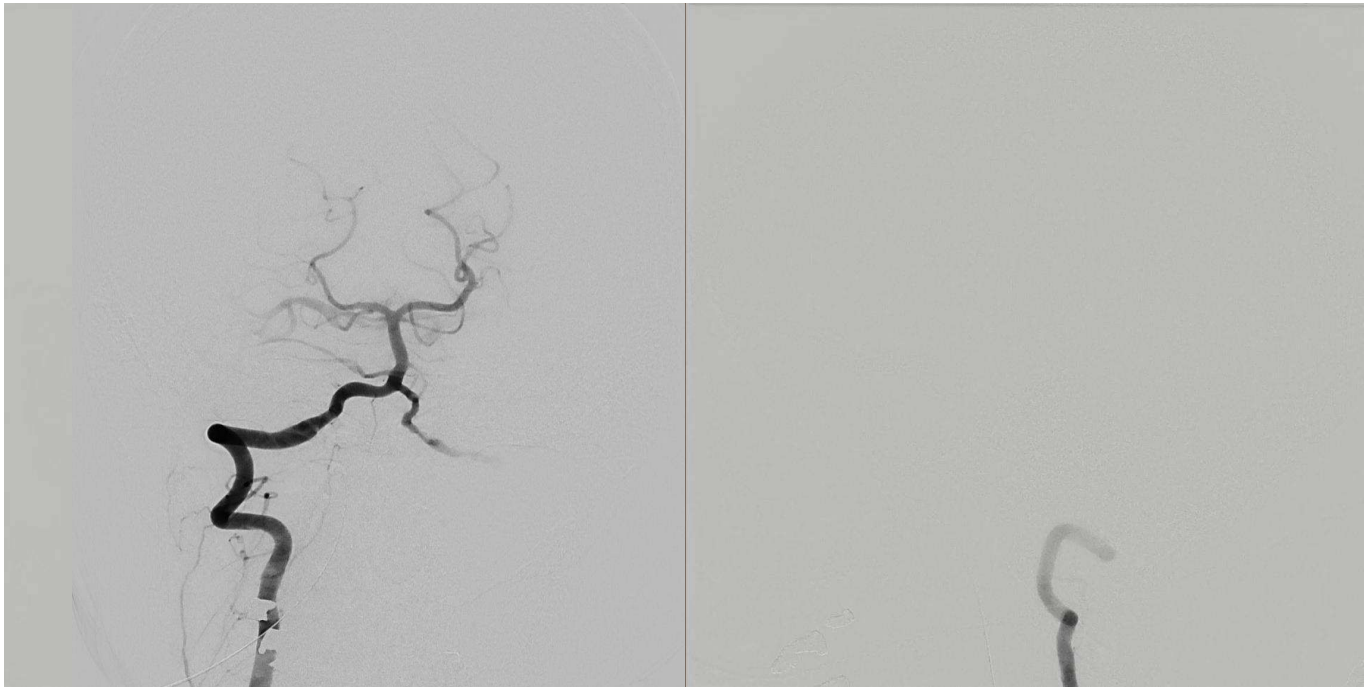
Clinical Presentation

- **MCA territory DMVOs most common (70%–85%).**
  - Clinical manifestations highly variable, from clinically silent, to fleeting symptoms, to severely disabling or even fatal stroke.



Clinical Presentation

- **PCA second most common site (~10% to 20%).**
  - Contralateral homonymous hemianopia or (usually superior) quadrantanopia most common symptoms.
  - Less often visual agnosias, alexia, achromatopsia.



Clinical Presentation

- **ACA third most common site (~5%).**
  - Contralateral leg weakness and sensory loss most common.
  - Frontal lobe infarcts present with behavioral syndrome like abulia.

- JM Ospel, et al. Stroke. 2020;51:3232–3240.
- M Goyal et al. ESCAPE-MeVO investigators. N Engl J Med. 2025;392:1385–1395.
- M Psychogios, et al; DISTAL Investigators. N Engl J Med. 2025;392:1374–1384.
- WK Diprose, et al. *Stroke*. 2026;57:00–00. DOI: 10.1161/STROKEAHA.125.05040

3 RCTs Criteria

Table 1. Trial Protocols

Trial Name	DISCOUNT	DISTAL	ESCAPE-MeVO
Primary outcome	90-d mRS score 0–2	90-d mRS score (shift analysis)	90-d mRS score 0–1
Included occlusion locations	Distal M2/M3 MCA, A1/A2/A3 ACA, P1/P2/P3 PCA	Nondominant or codominant M2/M3/M4 MCA, A1/A2/A3 ACA, P1/P2/P3 PCA	M2/M3 MCA, A2/A3 ACA, P2/P3 PCA
Other imaging criteria	Absence of carotid tandem occlusion	0–6 h: No criteria; 6–24 h: Hypoperfusion-hypodensity mismatch or FLAIR-DWI mismatch	Evidence of salvageable tissue required (moderate collaterals, core–penumbra mismatch, or no extensive ischemic changes)
Included NIHSS score range	≥5 or significant aphasia	≥4 or disabling symptoms	>5 or 3–5 with disabling symptoms
Time frame (max from LKW to randomization)	≤8 h	≤24 h	≤12 h
Devices allowed	Trevo, pReset, CatchView Mini, 3MAX, 4MAX, 5MAX, Q3, Q5	Any commercially available device	Solitaire X as first-line device
Exclusion criteria	Large core infarct, spontaneous recanalization, prestroke mRS score >1	Dominant M2 occlusion, nondisabling deficits, evidence of large infarcts, poor life expectancy	ASPECTS ≤ 8, living in nursing home or requiring daily nursing care or assistance with ADLs, or major comorbid illness

ADLs indicates activities of daily living; ASPECTS, Alberta Stroke Program Early Computed Tomography Score; DISCOUNT, Evaluation of Mechanical Thrombectomy in Acute Ischemic Stroke Related to a Distal Arterial Occlusion; DISTAL; Endovascular Therapy Plus Best Medical Treatment [BMT] Versus BMT Alone for Medium Vessel Occlusion Stroke; ESCAPE-MeVO, Endovascular Treatment to Improve Outcomes for Medium Vessel Occlusions; FLAIR DWI, diffusion-weighted imaging–fluid-attenuated inversion recovery; LKW, last known well; MCA, middle cerebral artery; mRS, modified Rankin Scale; and NIHSS, National Institutes of Health Stroke Scale.

D Goldman, et al. Thrombectomy for MeVO and DVO: The End of the Road or Just a Detour? (S:VIN 2025).

3 RCTs

- Studies found that the benefits of thrombectomy may have limits, particularly for medium and distal vessel occlusions.
- 3 trials found no clinical benefit EVT compared to BMM.

Table 3. Trial Outcome Measures

Outcome	DISCOUNT OR (95% CI)	*P* value	DISTAL OR (95% CI)	*P* value	ESCAPE-MeVO OR (95% CI)	*P* value
Primary outcome						
mRS score ≤ 2 at 90 d		0.024	0.90 (0.67–1.22)	—	0.92 (0.79–1.07)	—
mRS score ≤ 1 at 90 d	0.42 (0.2–0.88)					
Per protocol analysis (DISCOUNT)	0.30 (0.12–0.74)	0.009	—	—	—	—
Secondary outcomes						
mRS score 0–1 at 90 d	—	—	0.88 (0.61–1.25)	—	0.97 (0.79–1.18)	—
Death at 90 d	—	—	1.17 (0.71–1.90)	—	1.82 (1.06–3.12)	0.03

CI indicates confidence interval; DISCOUNT, Evaluation of Mechanical Thrombectomy in Acute Ischemic Stroke Related to a Distal Arterial Occlusion; DISTAL; Endovascular Therapy Plus Best Medical Treatment [BMT] Versus BMT Alone for Medium Vessel Occlusion Stroke; ESCAPE-MeVO, Endovascular Treatment to Improve Outcomes for Medium Vessel Occlusions; MeVO, medium vessel occlusions; mRS, modified Rankin Scale; and OR, odds ratio.

D Goldman, et al. Thrombectomy for MeVO and DVO: The End of the Road or Just a Detour? (S:VIN 2025).

3 RCTs

- **ESCAPE-MeVO** - **higher mortality in the EVT group** (13.3%) vs. BMM group (8.4%) (adjusted hazard ratio (adj HR) of 1.82 (95% CI, 1.06–3.12).
- **DISTAL** - **no significant difference** in mortality between groups (15.5% EVT group vs. 14.0% BMT group) (odds ratio [OR] 1.17 [95% CI, 0.71–1.90]).
- **DISCOUNT** - **lower mortality rate in the EVT group** (3%) vs. BMT arm (7%).

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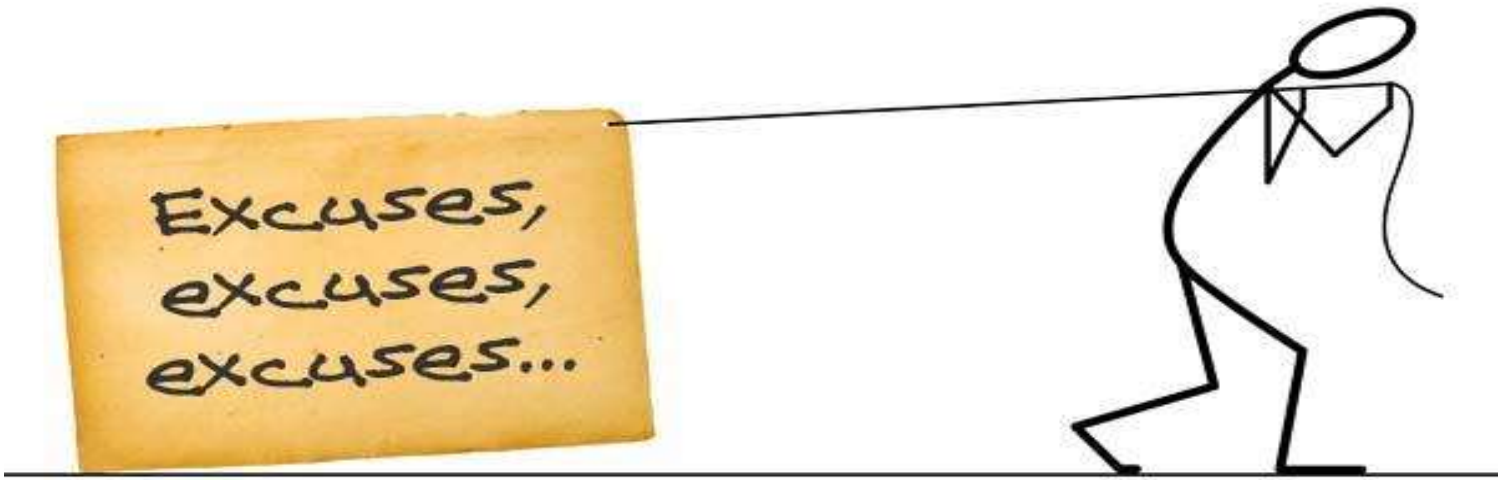
D Goldman, et al. Thrombectomy for MeVO and DVO: The End of the Road or Just a Detour? (S:VIN 2025).

The Defense

- Any time trials fail to show expected benefit or negative you are going to hear why it failed.



D Goldman, et al. Thrombectomy for MeVO and DVO: The End of the Road or Just a Detour? (S:VIN 2025).

Median age significantly older than LVO RCTs (67-71 yo)

Factors that might impact outcomes

Characteristic	DISCOUNT EVT + BMT (N=64)	DISCOUNT BMT alone (N=97)	DISTAL EVT + BMT (N=271)	DISTAL BMT alone (N=272)	ESCAPE-MeVO EVT + usual care (N=257)	ESCAPE-MeVO usual care (N=272)
Age, y (median, IQR)	75 (11)	72 (13)	77 (68–83)	77.5 (68–84)	74 (63–82)	76 (65–83)
Female sex (%)	37 (46%)	38 (48%)	116 (42.8%)	123 (45.2%)	118 (46.3%)	127 (46.4%)
NIHSS (median, IQR)	8 (6–11)	8 (6–12)	6 (5–9)	6 (5–9)	8 (6–11)	7 (5–11)
Intravenous thrombolysis (%)	57 (70%)	57 (71%)	168 (62.0%)	187 (68.8%)	144 (56.5%)	165 (60.2%)
Serious adverse events (%)	25 (39%)	30 (31%)	114 (42.1%)	88 (32.3%)	87 (33.9%)	70 (25.7%)
Symptomatic intracranial hemorrhage (%)	8 (12%)	6 (6%)	16 (5.9%)	7 (2.6%)	14 (5.4%)	6 (2.2%)
Death at 90 days (%)	2 (3%)	7 (7%)	42 (15.5%)	38 (14.0%)	34 (13.3%)	23 (8.4%)
modified Rankin Scale score 0–2 at 90 days (%)	45 (60%)	59 (77%)	153 (56.5%)	145 (54.7%)	138 (54.1%)	161 (58.8%)
modified Rankin Scale score 0–1 at 90 days (%)	-	-	94 (34.7%)	101 (37.5%)	106 (41.6%)	118 (43.1%)
Time from symptom onset to final recanalization (min [IQR])	-	-	-	-	358 (233–530)	-
Time from last known well to puncture (median [IQR])	240 [192-312]	-	292.0 [177.7–640.5)	-	-	-
TICI 2b-3 (%)	49 (77%)	-	194 (71.7%	-	190 (75.1%)	-
Procedural technique		-		-		-
Combined approach			148 (64.6%)			
Aspiration only	22 (34.4%)		36 (15.7%)			
Stent retriever only	39 (61.0%)		36 (15.7%)		257 (100.0%)	
Anesthesia modality	-	-		-		-
General			129 (49.6%)		105 (41.3%)	
Sedation			-		98 (38.6%)	
Local anesthesia			-		51 (20.1%)	
Occlusion site						
MCA: distal M2 or M3	62 (76%)	60 (75%)	-	-	-	-
MCA: proximal M2	-	-	-	-	64 (25.3%)	58 (21.6%)

D Goldman, et al. Thrombectomy for MeVO and DVO: The End of the Road or Just a Detour? (S:VIN 2025).

Higher rates IV thrombolysis than seen in real world registries (40.8 to 44.6%)

IV TNK/tPA

Characteristic	DISCOUNT EVT + BMT (N=64)	DISCOUNT BMT alone (N=97)	DISTAL EVT + BMT (N=271)	DISTAL BMT alone (N=272)	ESCAPE-MeVO EVT + usual care (N=257)	ESCAPE-MeVO usual care (N=272)
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Occlusion site						
MCA: distal M2 or M3	62 (76%)	60 (75%)	-	-	-	-
MCA: proximal M2	-	-	-	-	64 (25.3%)	58 (21.6%)

D Goldman, et al. Thrombectomy for MeVO and DVO: The End of the Road or Just a Detour? (S:VIN 2025).

Higher rates of sICH

sICH

Characteristic	DISCOUNT EVT + BMT (N=64)	DISCOUNT BMT alone (N=97)	DISTAL EVT + BMT (N=271)	DISTAL BMT alone (N=272)	ESCAPE-MeVO EVT + usual care (N=257)	ESCAPE-MeVO usual care (N=272)
Age, y (median, IQR)	75 (11)	72 (13)	77 (68–83)	77.5 (68–84)	74 (63–82)	76 (65–83)
Female sex (%)	37 (46%)	38 (48%)	116 (42.8%)	123 (45.2%)	118 (46.3%)	127 (46.4%)
NIHSS (median, IQR)	8 (6–11)	8 (6–12)	6 (5–9)	6 (5–9)	8 (6–11)	7 (5–11)
Intravenous thrombolysis (%)	57 (70%)	57 (71%)	168 (62.0%)	187 (68.8%)	144 (56.5%)	165 (60.2%)
Serious adverse events (%)	25 (39%)	30 (31%)	114 (42.1%)	88 (32.3%)	87 (33.9%)	70 (25.7%)
Symptomatic intracranial hemorrhage (%)	8 (12%)	6 (6%)	16 (5.9%)	7 (2.6%)	14 (5.4%)	6 (2.2%)
Death at 90 days (%)	2 (3%)	7 (7%)	42 (15.5%)	38 (14.0%)	34 (13.3%)	23 (8.4%)
modified Rankin Scale score 0–2 at 90 days (%)	45 (60%)	59 (77%)	153 (56.5%)	145 (54.7%)	138 (54.1%)	161 (58.8%)
modified Rankin Scale score 0–1 at 90 days (%)	-	-	94 (34.7%)	101 (37.5%)	106 (41.6%)	118 (43.1%)
Time from symptom onset to final recanalization (min [IQR])	-	-	-	-	358 (233–530)	-
Time from last known well to puncture (median [IQR])	240 [192-312]	-	292.0 [177.7–640.5)	-	-	-
TICI 2b-3 (%)	49 (77%)	-	194 (71.7%	-	190 (75.1%)	-
Procedural technique		-		-		-
Combined approach			148 (64.6%)			
Aspiration only	22 (34.4%)		36 (15.7%)			
Stent retriever only	39 (61.0%)		36 (15.7%)		257 (100.0%)	
Anesthesia modality	-	-		-		-
General			129 (49.6%)		105 (41.3%)	
Sedation			-		98 (38.6%)	
Local anesthesia			-		51 (20.1%)	
Occlusion site						
MCA: distal M2 or M3	62 (76%)	60 (75%)	-	-	-	-
MCA: proximal M2	-	-	-	-	64 (25.3%)	58 (21.6%)

D Goldman, et al. Thrombectomy for MeVO and DVO: The End of the Road or Just a Detour? (S:VIN 2025).

Despite this finding overall mortality did not significantly differ

Mortality

Characteristic	DISCOUNT EVT + BMT (N=64)	DISCOUNT BMT alone (N=97)	DISTAL EVT + BMT (N=271)	DISTAL BMT alone (N=272)	ESCAPE-MeVO EVT + usual care (N=257)	ESCAPE-MeVO usual care (N=272)
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TICI 2b-3 (%)	49 (77%)	-	194 (71.7%	-	190 (75.1%)	-
Procedural technique		-		-		-
Combined approach			148 (64.6%)			
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Anesthesia modality	-	-		-		-
General			129 (49.6%)		105 (41.3%)	
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Occlusion site						
MCA: distal M2 or M3	62 (76%)	60 (75%)	-	-	-	-
MCA: proximal M2	-	-	-	-	64 (25.3%)	58 (21.6%)

D Goldman, et al. Thrombectomy for MeVO and DVO: The End of the Road or Just a Detour? (S:VIN 2025).

Suggesting not the sole driver of morbidity and mortality

Mortality

Characteristic	DISCOUNT EVT + BMT (N=64)	DISCOUNT BMT alone (N=97)	DISTAL EVT + BMT (N=271)	DISTAL BMT alone (N=272)	ESCAPE-MeVO EVT + usual care (N=257)	ESCAPE-MeVO usual care (N=272)
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TICI 2b-3 (%)	49 (77%)	-	194 (71.7%	-	190 (75.1%)	-
Procedural technique		-		-		-
Combined approach			148 (64.6%)			
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Anesthesia modality	-	-		-		-
General			129 (49.6%)		105 (41.3%)	
Sedation			-		98 (38.6%)	
Local anesthesia			-		51 (20.1%)	
Occlusion site						
MCA: distal M2 or M3	62 (76%)	60 (75%)	-	-	-	-
MCA: proximal M2	-	-	-	-	64 (25.3%)	58 (21.6%)

D Goldman, et al. Thrombectomy for MeVO and DVO: The End of the Road or Just a Detour? (S:VIN 2025).

Proximal M2

Only ESCAPE-MeVO included proximal M2

Characteristic	DISCOUNT EVT + BMT (N=64)	DISCOUNT BMT alone (N=97)	DISTAL EVT + BMT (N=271)	DISTAL BMT alone (N=272)	ESCAPE-MeVO EVT + usual care (N=257)	ESCAPE-MeVO usual care (N=272)
Age, y (median, IQR)	75 (11)	72 (13)	77 (68–83)	77.5 (68–84)	74 (63–82)	76 (65–83)
Female sex (%)	37 (46%)	38 (48%)	116 (42.8%)	123 (45.2%)	118 (46.3%)	127 (46.4%)
NIHSS (median, IQR)	8 (6–11)	8 (6–12)	6 (5–9)	6 (5–9)	8 (6–11)	7 (5–11)
Intravenous thrombolysis (%)	57 (70%)	57 (71%)	168 (62.0%)	187 (68.8%)	144 (56.5%)	165 (60.2%)
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modified Rankin Scale score 0–2 at 90 days (%)	45 (60%)	59 (77%)	153 (56.5%)	145 (54.7%)	138 (54.1%)	161 (58.8%)
modified Rankin Scale score 0–1 at 90 days (%)	-	-	94 (34.7%)	101 (37.5%)	106 (41.6%)	118 (43.1%)
Time from symptom onset to final recanalization (min [IQR])	-	-	-	-	358 (233–530)	-
Time from last known well to puncture (median [IQR])	240 [192-312]	-	292.0 [177.7–640.5)	-	-	-
TICI 2b-3 (%)	49 (77%)	-	194 (71.7%	-	190 (75.1%)	-
Procedural technique		-		-		-
Combined approach			148 (64.6%)			
Aspiration only	22 (34.4%)		36 (15.7%)			
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Anesthesia modality	-	-		-		-
General			129 (49.6%)		105 (41.3%)	
Sedation			-		98 (38.6%)	
Local anesthesia			-		51 (20.1%)	
Occlusion site						
MCA: distal M2 or M3	62 (76%)	60 (75%)	-	-	-	-
MCA: proximal M2	-	-	-	-	64 (25.3%)	58 (21.6%)

D Goldman, et al. Thrombectomy for MeVO and DVO: The End of the Road or Just a Detour? (S:VIN 2025).

DISTAL only included patients with co-dominant or nondominant M2

DMVO

Table 2. (Continued)

Characteristic	DISCOUNT EVT + BMT (N=64)	DISCOUNT BMT alone (N=97)	DISTAL EVT + BMT (N=271)	DISTAL BMT alone (N=272)	ESCAPE-MeVO EVT + usual care (N=257)	ESCAPE-MeVO usual care (N=272)
MCA: distal M2	-	-	-	-	63 (24.9%)	41 (15.2)
MCA: M2 segment	-	-	129 (47.6%)	110 (40.4%)	-	-
MCA: M3 segment	-	-	62 (22.9%)	84 (30.9%)	90 (35.6%)	126 (46.8%)
MCA: M4 segment	-	-	3 (1.1%)	0 (0.0%)	-	-
PCA: P1, P2, P3	13 (16%)	14 (18%)	-	-	-	-
PCA: P1 segment	-	-	17 (6.3%)	13 (4.8%)	-	-
PCA: P2 segment	-	-	32 (11.8%)	41 (15.1%)	24 (9.5%)	26 (9.7%)
PCA: P3 segment	-	-	6 (2.2%)	11 (4.0%)	0 (0.0%)	6 (2.2%)
ACA: A1, A2, A3	6 (7%)	6 (8%)	-	-	-	-
ACA: A1 segment	-	-	0 (0.0%)	1 (0.4%)	-	-
ACA: A2 segment	-	-	11 (4.1%)	5 (1.8%)	4 (1.6%)	9 (3.3%)
ACA: A3 segment	-	-	9 (3.3%)	5 (1.8%)	8 (3.2%)	3 (1.1%

Values in this table were extracted from published data in *New England Journal of Medicine* articles and presentations from the International Stroke Conference. Missing data were left blank. Where categories did not converge exactly, they were included as individual rows. For instance, when occlusion site definitions differed across studies, the most specific category available was used in separate rows to preserve granularity. For procedural technique, if a combination strategy was not explicitly reported, the first-line device was assumed to be used in isolation. The most commonly reported serious adverse events in ESCAPE-MeVO were pneumonia, recurrent stroke, worsening of index stroke, and symptomatic intracranial hemorrhage. In DISTAL, serious adverse events most commonly included pneumonia, recurrent ischemic stroke, any intracranial hemorrhage, and a broad "other" category. The "other" category encompassed various medical complications largely unrelated to EVT, such as sepsis, endocarditis, post-stroke depression, and gastric ulcer. Detailed characterization of serious adverse events in the DISCOUNT trial has not yet been published.

ACA indicates anterior cerebral artery; BMT, best medical treatment; DISCOUNT, Evaluation of Mechanical Thrombectomy in Acute Ischemic Stroke Related to a Distal Arterial Occlusion; DISTAL; Endovascular Therapy Plus Best Medical Treatment [BMT] Versus BMT Alone for Medium Vessel Occlusion Stroke; ESCAPE-MeVO, Endovascular Treatment to Improve Outcomes for Medium Vessel Occlusions; EVT, endovascular thrombectomy; IQR, interquartile range; MCA, middle cerebral artery; MeVO, medium distal vessel occlusions; NIHSS, National Institutes of Health Stroke Scale; PCA, posterior cerebral artery; and TICI, thrombolysis in cerebral infarction.

D Goldman, et al. Thrombectomy for MeVO and DVO: The End of the Road or Just a Detour? (S:VIN 2025).

Proximal M2

- Although no dedicated RCT confirmed benefit of EVT for proximal or dominant M2, existing data suggest benefit.
- There may have been lack of equipoise during patient selection and patients may have not been enrolled in the trials (suggested by overall low NIHSS in the trials).
- Thus, the **trial results for M2 occlusions should be interpreted with caution.**
- Data from the 3 RCTs may be more relevant to nondominant, codominant, and distal M2 occlusions.

D Goldman, et al. Thrombectomy for MeVO and DVO: The End of the Road or Just a Detour? (S:VIN 2025).

TICI score

Lower rates of successful reperfusion compared to post-hoc analysis of LVO trials

Characteristic	DISCOUNT EVT + BMT (N=64)	DISCOUNT BMT alone (N=97)	DISTAL EVT + BMT (N=271)	DISTAL BMT alone (N=272)	ESCAPE-MeVO EVT + usual care (N=257)	ESCAPE-MeVO usual care (N=272)
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TICI 2b-3 (%)	49 (77%)	-	194 (71.7%	-	190 (75.1%)	-
Procedural technique		-		-		-
Combined approach			148 (64.6%)			
Aspiration only	22 (34.4%)		36 (15.7%)			
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Anesthesia modality	-	-		-		-
General			129 (49.6%)		105 (41.3%)	
Sedation			-		98 (38.6%)	
Local anesthesia			-		51 (20.1%)	
Occlusion site						
MCA: distal M2 or M3	62 (76%)	60 (75%)	-	-	-	-
MCA: proximal M2	-	-	-	-	64 (25.3%)	58 (21.6%)

D Goldman, et al. Thrombectomy for MeVO and DVO: The End of the Road or Just a Detour? (S:VIN 2025).

3 RCTs

Unclear if due to technical limitations of devices, anatomy or operator bias

Characteristic	DISCOUNT EVT + BMT (N=64)	DISCOUNT BMT alone (N=97)	DISTAL EVT + BMT (N=271)	DISTAL BMT alone (N=272)	ESCAPE-MeVO EVT + usual care (N=257)	ESCAPE-MeVO usual care (N=272)
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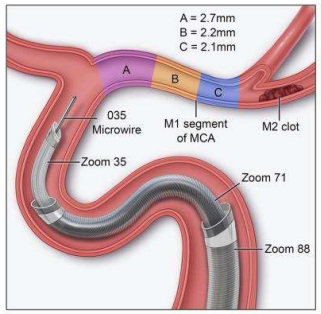
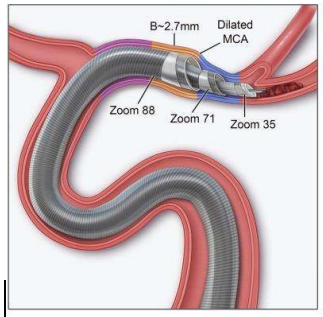
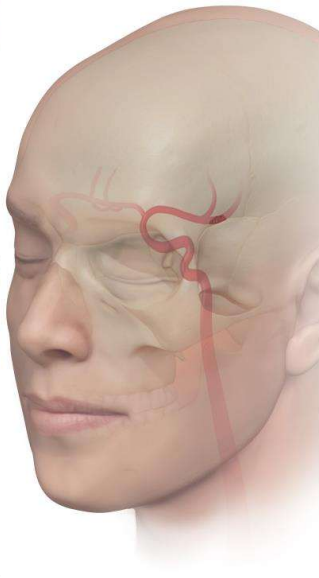
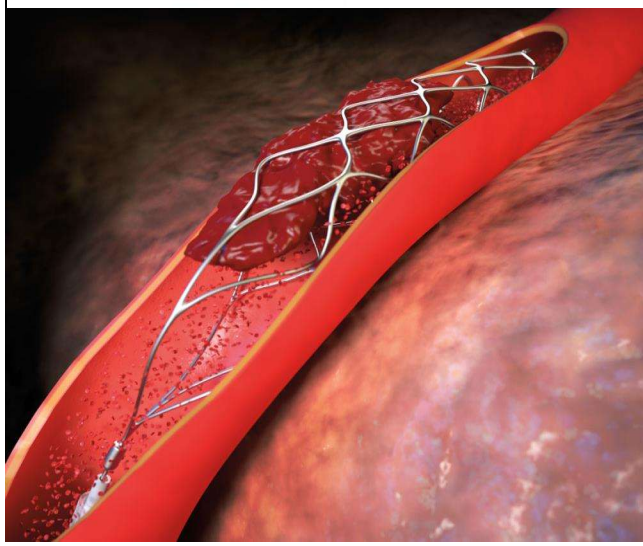
EVT Devices

- **ESCAPE-MeVO** and **DISTAL** trials, stent retrievers were used as the first-line treatment.
- Stents highly effective for LVOs, but may carry increased procedural risks in smaller, more tortuous arteries, such as those involved in DMVOs.
- Direct aspiration as a first-line approach was permitted in **DISTAL** (15.7% of enrolled) and **DISCOUNT** (34% of enrolled) but underrepresented in all 3 RCTs.
- Maybe we need better devices to go distal!!!









UT Southwestern Medical Center

Recommendations Coming

- These trials were subject to selection bias and other methodological limitations, and there remains a suggestion that certain subgroups of patients may still benefit from EVT.
- Until further data emerge, physicians should take pause when considering offering EVT for patients who are older with less severe deficits and higher baseline disability.
- Further research should concentrate on procedural techniques, specific anatomical location of occlusion, rates of thrombolysis, and differences between real-world populations and trial populations, as these factors affect outcomes.

- M Goyal, et al. Endovascular Treatment of Stroke Due to Medium-Vessel Occlusion. *N Engl J Med*. 2025;392:1385-1395.
- M Psychogios, et al. Endovascular Treatment for Stroke Due to Occlusion of Medium or Distal Vessels. *N Engl J Med*. 2025;392:1374-1384.
- F Clarencon, et al. Evaluation of mechanical thrombectomy in acute ischemic stroke related to a distal arterial occlusion: A randomized controlled trial. *Int J Stroke*. 2024;19:367-372.

Future Trials

- Additional RCTs and registries underway on DMVO.
- Including: **DISTALS**, **STEP**, **ORIENTAL MeVO** and **DUSK**.
- Methodologies vary:
  - **DISTALS** - to evaluate the safety and effectiveness of the Tigertriever 13 Revascularization, includes a distinct endpoint of successful reperfusion (assessed on 24-hour imaging) without sICH.
    - Excluded patients who received intravenous thrombolysis and differentiated M2s, only including nondominant or codominant M2 occlusions.
  - **STEP trial**, a randomized, multifactorial, adaptive platform registry-based trial.
    - Includes a unique end point of utility-weighted mRS and neurologic deficit (NIHSS) at 24 hours (±12 hours).

- Distal Ischemic Stroke Treatment With Adjustable Low-profile Stentriever (DISTALS). [cited 2025 February 11]; Available from: https://clinicaltrials. gov/study/NCT05152524
- StrokeNet Thrombectomy Endovascular Platform (STEP). [cited 2025 February 11]; Available from: https://clinicaltrials.gov/study/ NCT06289985
- Evaluation of Endovascular Treatment in Acute Intracranial Distal Medium Vessel Occlusion Stroke. [cited 2025 February 11]; Available from: https: //clinicaltrials.gov/study/NCT06146790
- MH Mohammaden, et al. Endovascular versus medical management in distal medium vessel occlusion stroke: the DUSK Study. Stroke. 2024;55(6):1489– 1497.

Endovascular Interventions MeVo and DMVO

Recommendations

AHA/ASA Guideline

Guidelines for the Early Management of Patients With Acute Ischemic Stroke: 2019 Update to the 2018 Guidelines for the Early Management of Acute Ischemic Stroke

A Guideline for Healthcare Professionals From the American Heart Association/American Stroke Association

3.7.2. 0 to 6 Hours From Onset (Continued)	COR	LOE	New, Revised, or Unchanged
3. Although the benefits are uncertain, the use of mechanical thrombectomy with stent retrievers may be reasonable for carefully selected patients with AIS in whom treatment can be initiated (groin puncture) within 6 hours of symptom onset and who have causative occlusion of the MCA segment 2 (M2) or MCA segment 3 (M3) portion of the MCAs.	**IIb**	**B-R**	Recommendation reworded for clarity from 2015 Endovascular. COR unchanged. LOE revised. See Table XCV in online Data Supplement 1 for original wording.
In pooled patient-level data from 5 trials (HERMES, which included the 5 trials MR CLEAN, ESCAPE, REVASCAT, SWIFT PRIME, and EXTEND-IA), the direction of treatment effect for mechanical thrombectomy over standard care was favorable in M2 occlusions, but the adjusted cOR was not significant (1.28 [95% CI, 0.51–3.21]).[189] In patient-level data pooled from trials in which the Solitaire was the only or the predominant device used, a prespecified meta-analysis (SEER Collaboration: SWIFT PRIME, ESCAPE, EXTEND-IA, and REVASCAT) showed that the direction of treatment effect was favorable for mechanical thrombectomy over standard care in M2 occlusions, but the OR and 95% CI were not significant.[190] In an analysis of pooled data from SWIFT (Solitaire With the Intention for Thrombectomy), STAR (Solitaire Flow Restoration Thrombectomy for Acute Revascularization), DEFUSE 2, and IMS III, among patients with M2 occlusions, reperfusion was associated with excellent functional outcomes (mRS score 0–1; OR, 2.2 [95% CI, 1.0–4.7]).[195] Therefore, the recommendation for mechanical thrombectomy for M2/M3 occlusions does not change substantively from the 2015 AHA/ASA focused update.			See Tables XVII and XLV in online Data Supplement 1.

Powers JP, Rabinstein AA, et al. Stroke. 2019;50:e344–e418.

UT Southwestern Medical Center

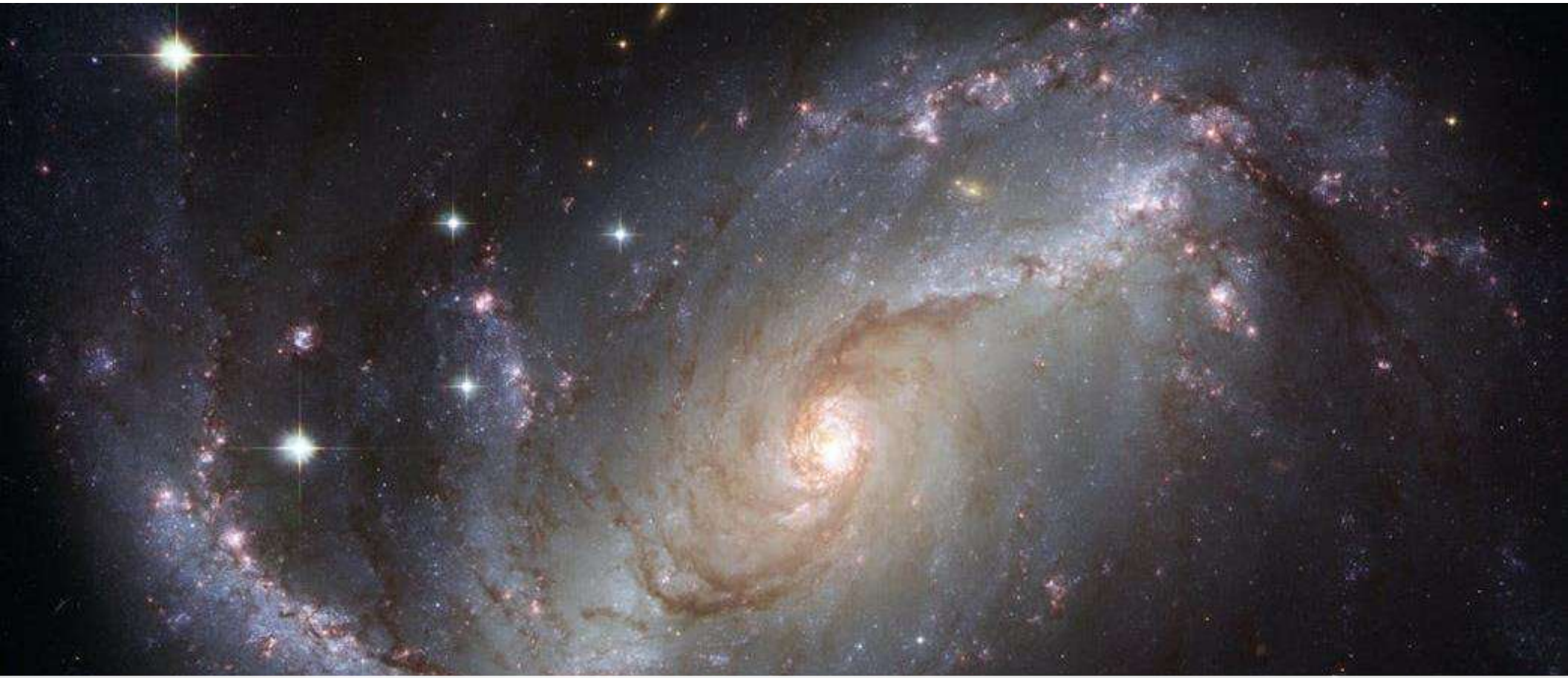
European Stroke Organisation (ESO) - European Society for Minimally Invasive Neurological Therapy (ESMINT) Guidelines on Mechanical Thrombectomy in Acute Ischemic Stroke

Expert opinion on mechanical thrombectomy for M2 occlusion

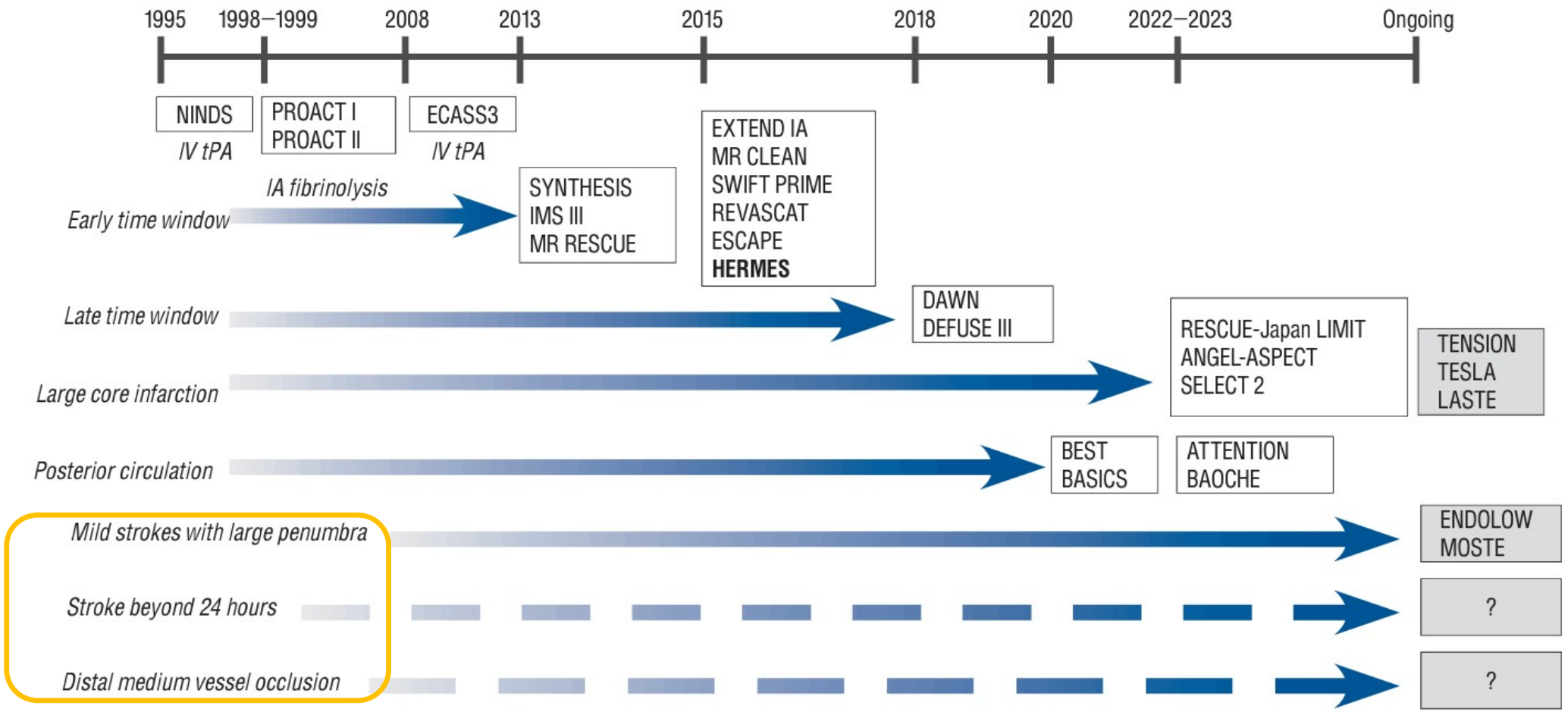
There is a consensus among the guideline group (11/11 votes) that patients with M2 occlusion fulfilled the inclusion criteria in most randomized trials and therefore mechanical thrombectomy is reasonable in this situation.

G Turc, et al. European Stroke Organisation–European Society for Minimally Invasive Neurological Therapy expedited recommendation on indication for intravenous thrombolysis before mechanical thrombectomy in patients with acute ischaemic stroke and anterior circulation large vessel occlusion (*European stroke journal* 2022).

Vascular Territory	Recommendation	COR	LOE
M2 (MCA Division)	**EVT is reasonable for disabling M2 occlusions—especially dominant or proximal branches—with favorable imaging with CT, CTP or MRI**. Routine EVT for nondominant or low-severity M2 occlusions is not recommended. Additional randomized trial data is needed.	**IIa / III (Harm)**	B-NR/A
M3/M4 (Distal MCA)	**Routine EVT with mechanical devices is not recommended for distal M3/M4 occlusions due to lack of benefit and potential harm**. EVT may be considered in patients with severe disabling deficits, favorable imaging, and poor response or contraindication to IV thrombolysis. Additional randomized trial data are needed.	III (no benefit) / IIb (select cases)	B-R / C-LD
ACA (A2/A3)	**Routine EVT is not recommended for isolated distal ACA (A2/A3) occlusions due to lack of demonstrated benefit**. EVT may be considered for patients with disabling deficits (e.g., profound leg weakness, abulia, bilateral involvement), large territory at risk, favorable imaging, and good baseline functional status. Additional randomized trial data is needed.	III (no benefit) / IIb (select cases)	B-NR
PCA (P2/P3)	**Routine EVT for isolated PCA (P1/P2/P3) occlusions is not recommended due to lack of demonstrated clinical benefit and possible increased mortality risk.** EVT may be considered for patients with severe, disabling neurological deficits significantly impacting quality of life or those unable to receive IV thrombolysis. Additional randomized trial data is needed.	III (no benefit) / IIb (select cases)	B-NR



Expanding Access



EUROPEAN STROKE JOURNAL

Tenecteplase in central retinal artery occlusion study (TenCRAOS): protocol for a randomized-controlled trial

Can tenecteplase (TNK) improve outcomes of central retinal artery occlusion (CRAO)?

Study design

Prospective RCT, double-dummy, double-blind phase 3 multi-centre trial of TNK 0.25 mg/kg + placebo vs. ASA + placebo

Population: CRAO within 4.5 hours from onset

Randomization: 2 arms , 1:1 block randomisation

Sample size: 78

Diagnosis of CRAO performed by ophthalmologist
Patient screening by ophthalmologist and stroke specialist

↓

Eligibility criteria checked + informed consent

↓

Randomization (1:1)
TNK 0.25 mg/kg + placebo vs. ASA + placebo
Monitoring in stroke unit >24 hours

↓

Post-treatment visit at 24 (18–36) hours
In the stroke unit

↓

30-day Primary endpoint
90-day follow-up

Primary endpoint

Best-corrected visual acuity ≤ 0.7 logMAR (decimal best-corrected visual acuity ≥ 0.2) at 30-day

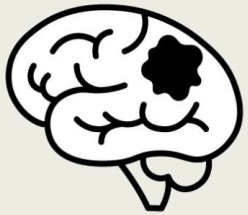
Ryan, S. J., et al. European Stroke Journal, 2025 sterya@ous-hf.no doi.org/10.1177_23969873251344199

JAMA Neurology

RCT: Intra-Arterial Tenecteplase After Successful Reperfusion in Large Vessel Occlusion Stroke

POPULATION

113 Males, 92 Females



Adults with large vessel occlusion stroke and successful reperfusion within 24 h

INTERVENTION

205 Patients randomized and analyzed

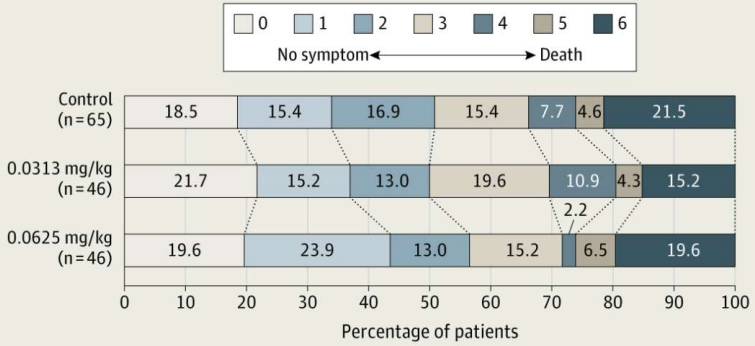
48 Tenecteplase, 0.0313 mg/kg
Intra-arterial tenecteplase at a dose of 0.0313 mg/kg after successful reperfusion

48 Tenecteplase, 0.0625 mg/kg
Intra-arterial tenecteplase at a dose of 0.0625 mg/kg after successful reperfusion

65 Control
Ended the procedure without further intra-arterial thrombolysis

FINDINGS

Adjunctive intra-arterial tenecteplase in doses of 0.0313 mg/kg or 0.0625 mg/kg showed adequate safety to advance to larger trials to determine the potential benefits in patients with large vessel occlusion stroke



Phase 2a, mRS score 0-1

Tenecteplase, 0.0313 mg/kg, group:
Adjusted risk ratio [RR] vs control, 0.85; 95% CI, 0.54-1.35; *P* = .50

Tenecteplase, 0.0625 mg/kg, group:
Adjusted RR vs control, 1.15; 95% CI, 0.73-1.80; *P* = .55

SETTINGS / LOCATIONS

30 Stroke centers in China

PRIMARY OUTCOME

The primary outcome was the proportion of patients with a nondisabled outcome at 90 d (as indicated by modified Rankin Scale [mRS] score 0-1; range, 0 [no symptoms] to 6 [death])

Hou X, Huang J, Wang L, et al. Intra-arterial tenecteplase after successful reperfusion in large vessel occlusion stroke: a randomized clinical trial. *JAMA Neurol*. Published online July 5, 2025. doi: 10.1001/jamaneurol.2025.2036


ANY
QUESTIONS?