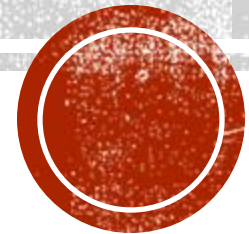


STUCK IN THE MIDDLE- MEVO IN STROKE



Jennifer Dearborn-Tomazos
Assistant Professor of Neurology
BIDMC Medical Center/Harvard Medical School

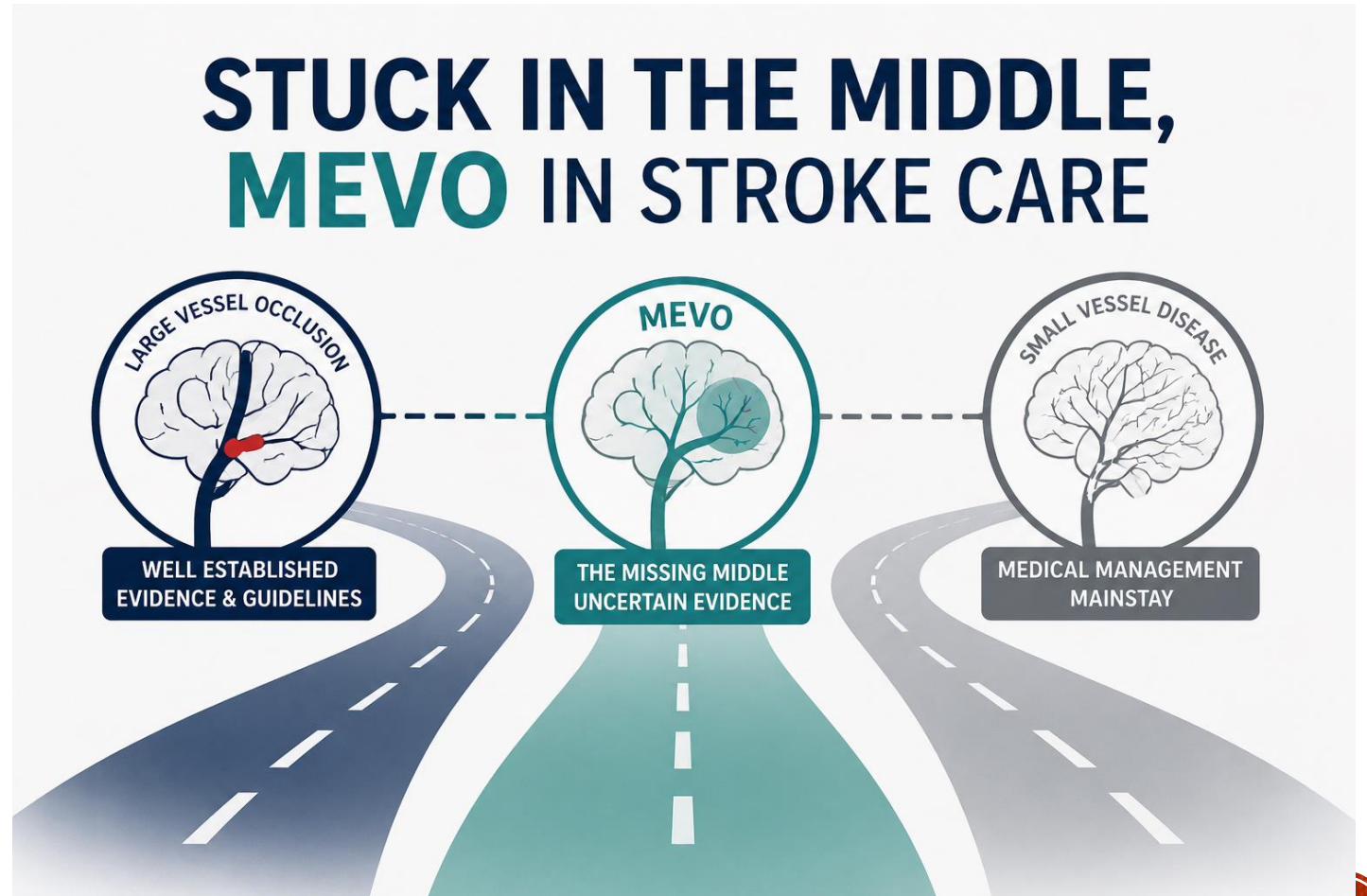
DISCLOSURES

- Receive research funding from Janssen for a study on stroke secondary prevention



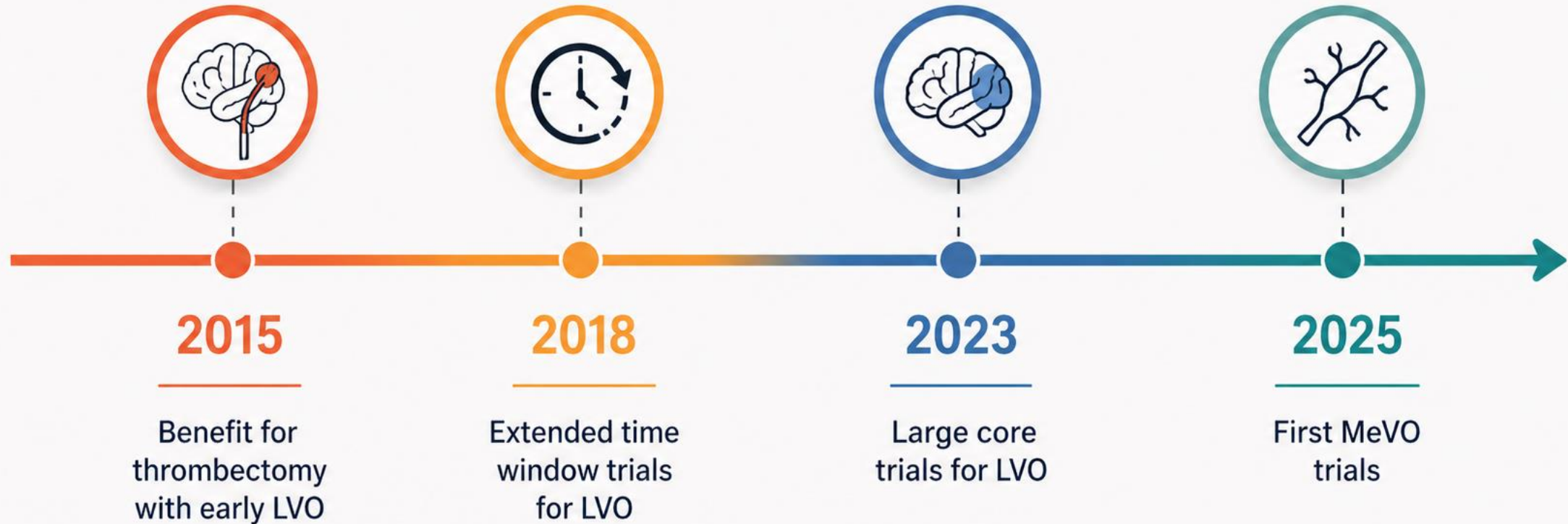
OBJECTIVES

- To define MEVO and provide visual examples
- To review recent clinical trials in MEVO
- To discuss future care for patients in this subgroup



TIMELINE OF THROMBECTOMY ADVANCES

Expanding Evidence. Improving Outcomes.



A WORD ABOUT LVO

Improved Functional Outcome at 90 Days (mRS 0–2)

MEDICAL THERAPY ALONE (STANDARD CARE)

33–40%

achieve functional
independence
(mRS 0–2)



MECHANICAL
THROMBECTOMY

~2X MORE LIKELY

to achieve functional
independence

MECHANICAL THROMBECTOMY + STANDARD CARE

60–70%

achieve functional
independence
(mRS 0–2)



MECHANICAL THROMBECTOMY SIGNIFICANTLY REDUCES DISABILITY

More patients return to independent living and the activities that matter most.

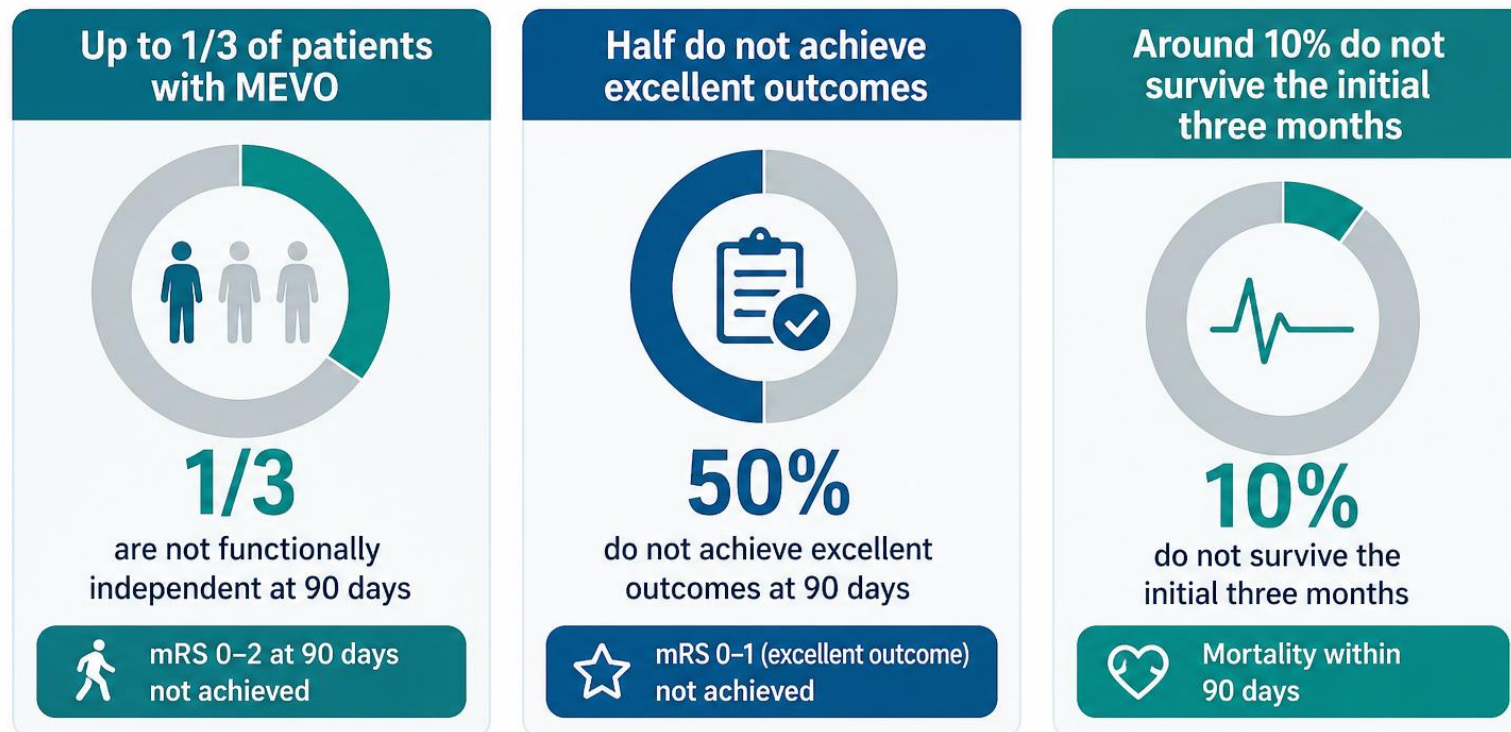


mRS = modified Rankin Scale (0–2: functional independence) | LVO = Large Vessel Occlusion



BEYOND LVO-THE MEVO

- MeVO is common. 25-40% of all strokes
- While MeVO has higher recanalization rate after tPA and TNK, 50% do not recanalize



MEVO stroke is not always “mild.”
Many patients face significant disability or do not survive.

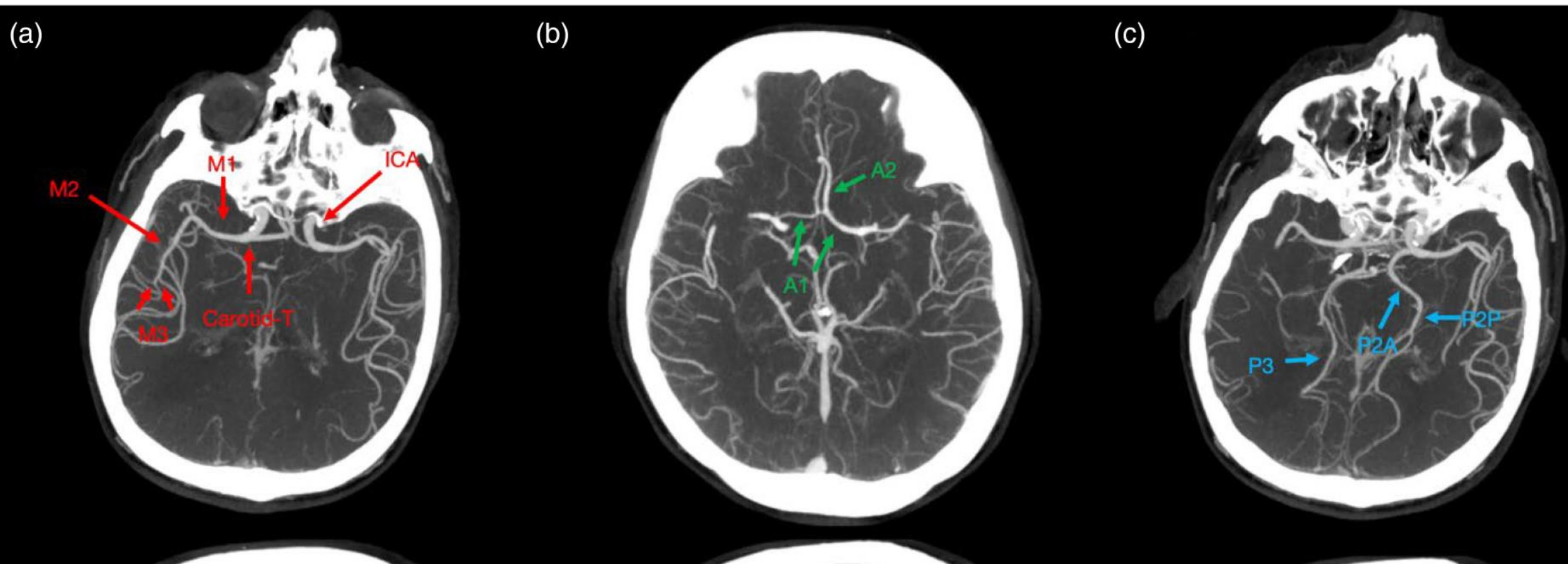
MEVO = Medium Vessel Occlusion



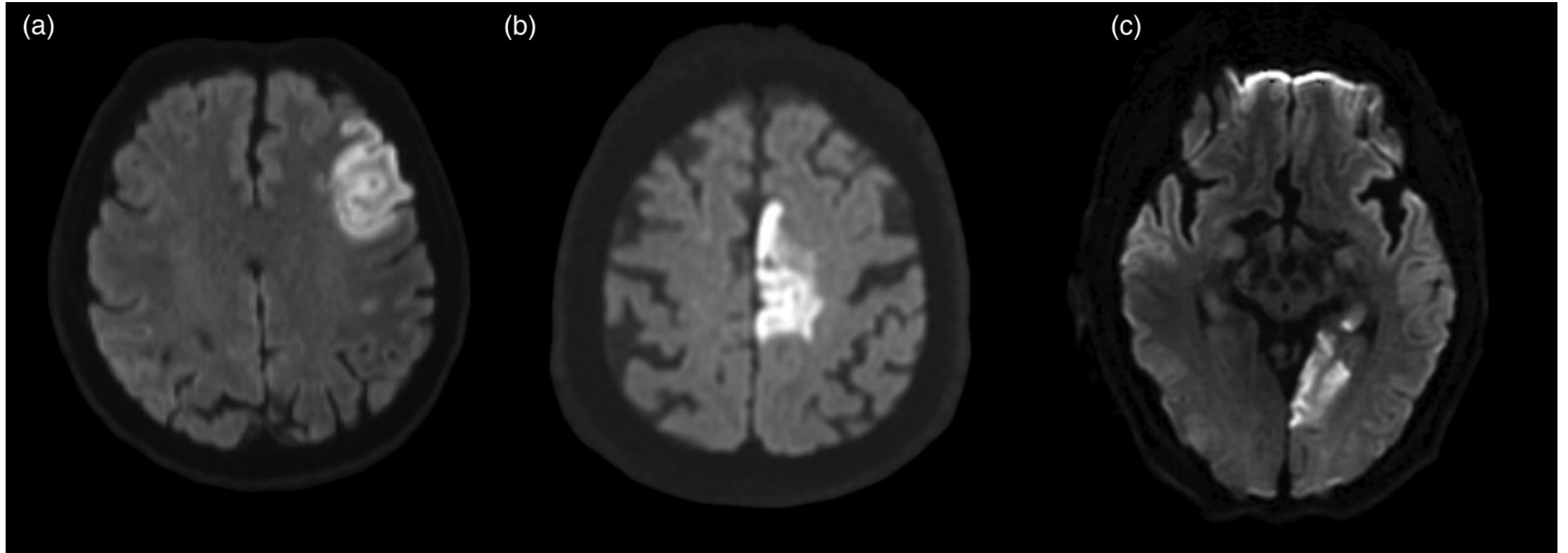
WHAT ARTERIES ARE MEVO?

nondominant or codominant M2 segment of the middle cerebral artery [MCA]; the M3 or M4 segment of the MCA; the A1, A2, or A3 segment of the anterior cerebral artery; or the P1, P2, or P3 segment of the posterior cerebral artery

Stebner A, Bosshart SL, Fujiwara S, et al. Interv Neuroradiol. 2025 Apr;31(2):262-273.



STROKE PATTERNS IN MEVO



Stebner A, Bosshart SL, Fujiwara S, et al. Interv Neuroradiol.
2025 Apr;31(2):262-273



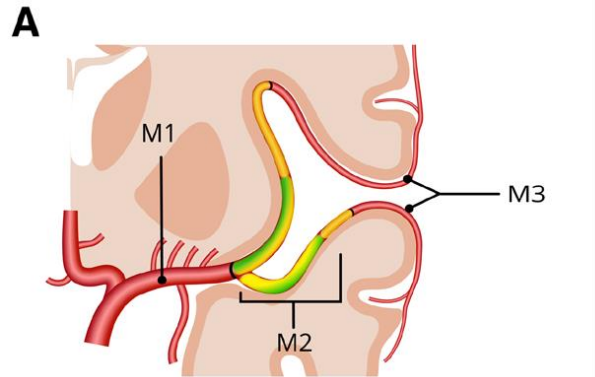
MEVO-DOMINANT ARTERY

- dominant division: supplying $>50\%$ of the MCA territory
- co-dominant: supplying 50% of the MCA territory
- non-dominant: supplying $<50\%$



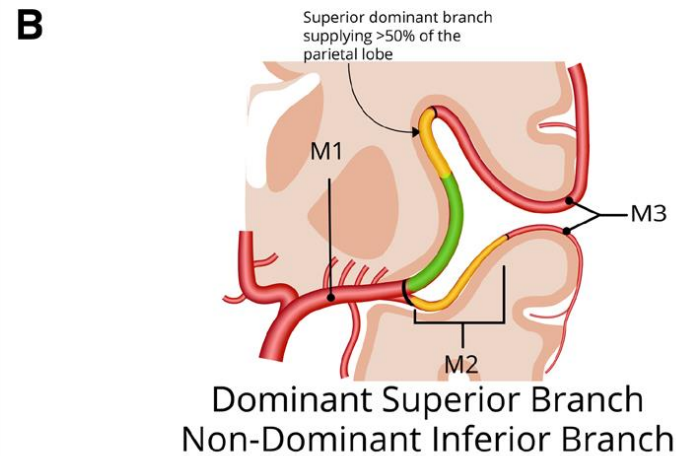
MEVO DEFINITIONS

M2 segments we should treat vs M2 segments Included in MeVO trials (equipoise)

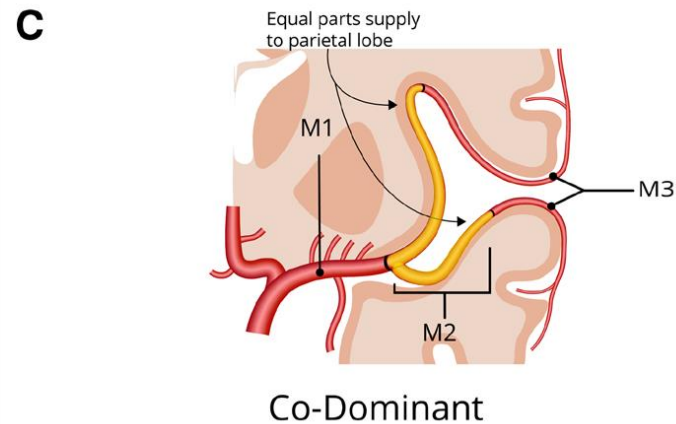


Proximal M2 Occlusion

Yellow Included in (all) recent MeVO trials
Green Included in ESCAPE MeVO trial



Green Should treat
Yellow Included in recent MeVO trials



Yellow Included in recent MeVO trials

Mehta A, Goldman D, Raz E, et al. Should We Stop Endovascular Treatment of M2 Occlusions?: A Critical Look at Recent Evidence. Stroke. 2025 Sep;56(9):2819-2829.

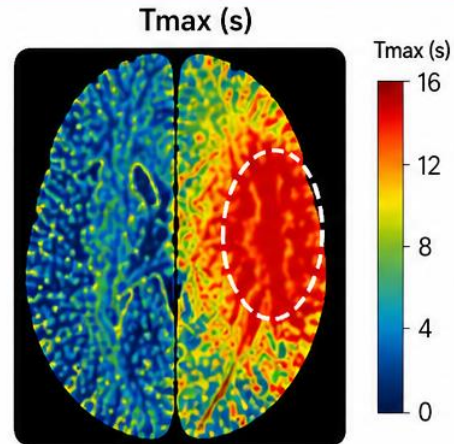


MEVO DOMINANT VS NON-DOMINANT

Tmax (s) Maps Only

DOMINANT MEVO

M2 occlusion in dominant

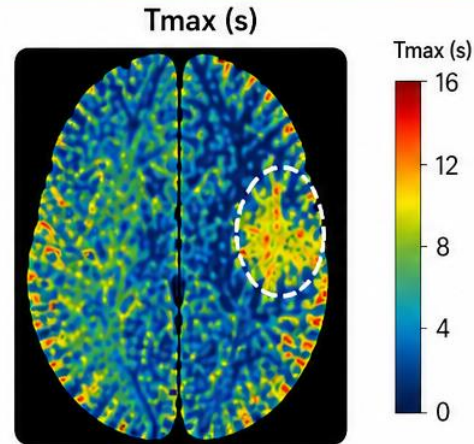


Core (Tmax > 6s)	14 ml
Penumbra (Tmax > 6s)	72 ml
Mismatch Volume	58 ml
Mismatch Ratio	5.1

LARGE PENUMBRA WITH SMALL CORE
FAVORABLE PERFUSION PROFILE

CO-DOMINANT MEVO

M2 occlusion in co-dominant

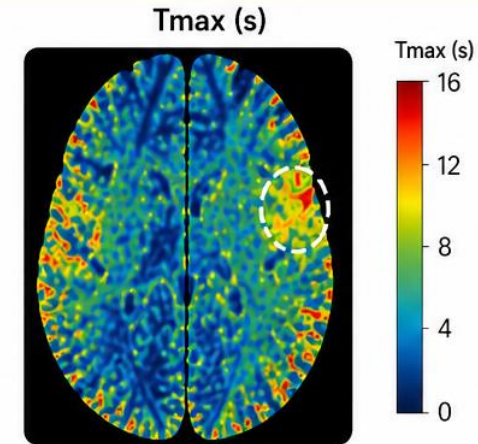


Core (Tmax > 6s)	9 ml
Penumbra (Tmax > 6s)	34 ml
Mismatch Volume	25 ml
Mismatch Ratio	2.8

MODERATE PENUMBRA WITH SMALL CORE
INTERMEDIATE PERFUSION PROFILE

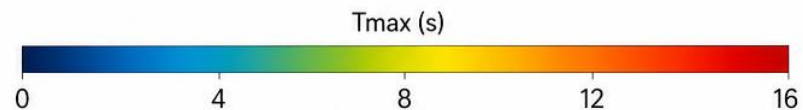
NON-DOMINANT MEVO

M2 occlusion in non-dominant



Core (Tmax > 6s)	4 ml
Penumbra (Tmax > 6s)	12 ml
Mismatch Volume	8 ml
Mismatch Ratio	2.0

SMALL PENUMBRA WITH SMALL CORE
LESSER PERFUSION DEFICIT



Tmax > 6 seconds is used to define
hypoperfused (penumbral) tissue.



TREATMENT EFFECT FOR M2 OCCLUSIONS IN HERMES COLLABORATION

- HERMES Collaboration of seven randomized controlled trials of LVOs
- EVT, especially in patients with proximal or dominant M2 segment MCA, results in improvement in functional ability at 90 days when compared with best medical care (130 patients)

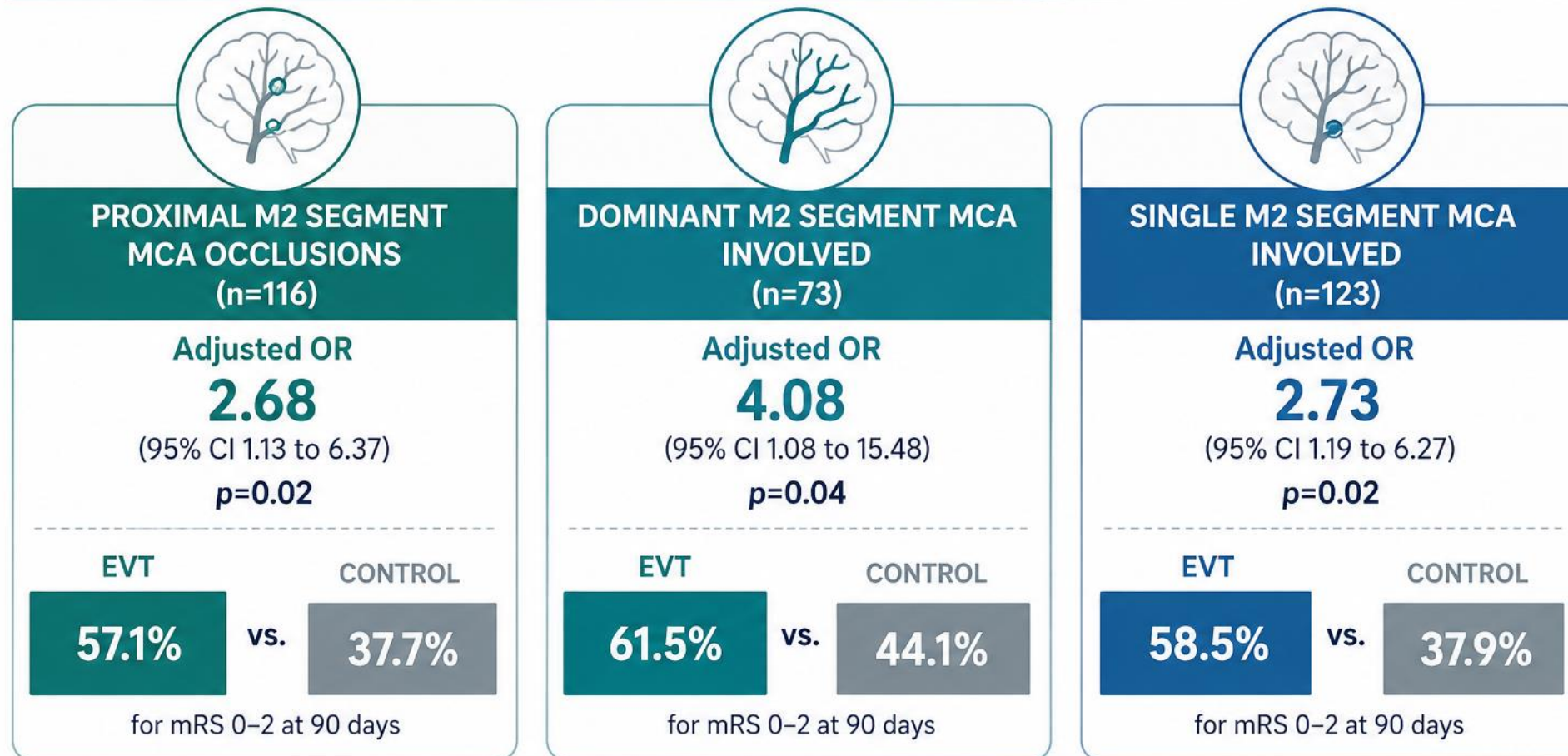
Menon BK, Hill MD, et al... J Neurointerv Surg. 2019 Nov;11(11):1065-1069.





Treatment effect favoring EVT was maximal in patients with proximal M2 segment MCA occlusions

Outcome: mRS 0-2 at 90 days



Menon BK, Hill MD, et al... J Neurointerv Surg. 2019 Nov;11(11):1065-1069.



All results favor EVT over control for improved functional independence (mRS 0-2) at 90 days.



PATIENT EXAMPLE



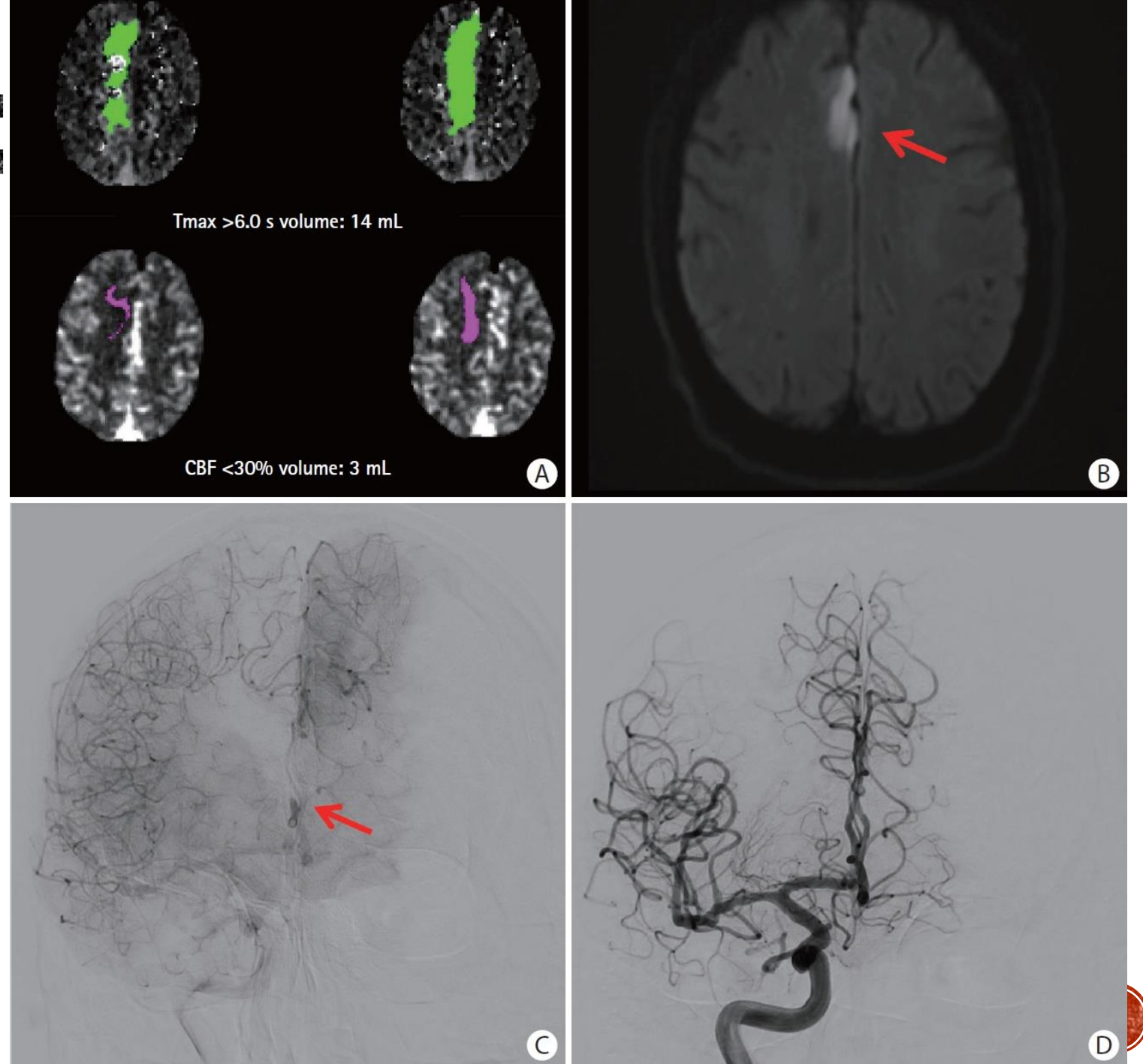
PATIENT EXAMPLE



IMAGING EXAMPLE

- 68 year old man presents with left leg weakness

Distal Medium Vessel Occlusion
Strokes: Understanding the
Present and Paving the Way for a
Better Future
J Stroke. 2024;26(2):190-202.



MEVO-THE TRIALS

- DISTAL
- ESCAPE-MeVO



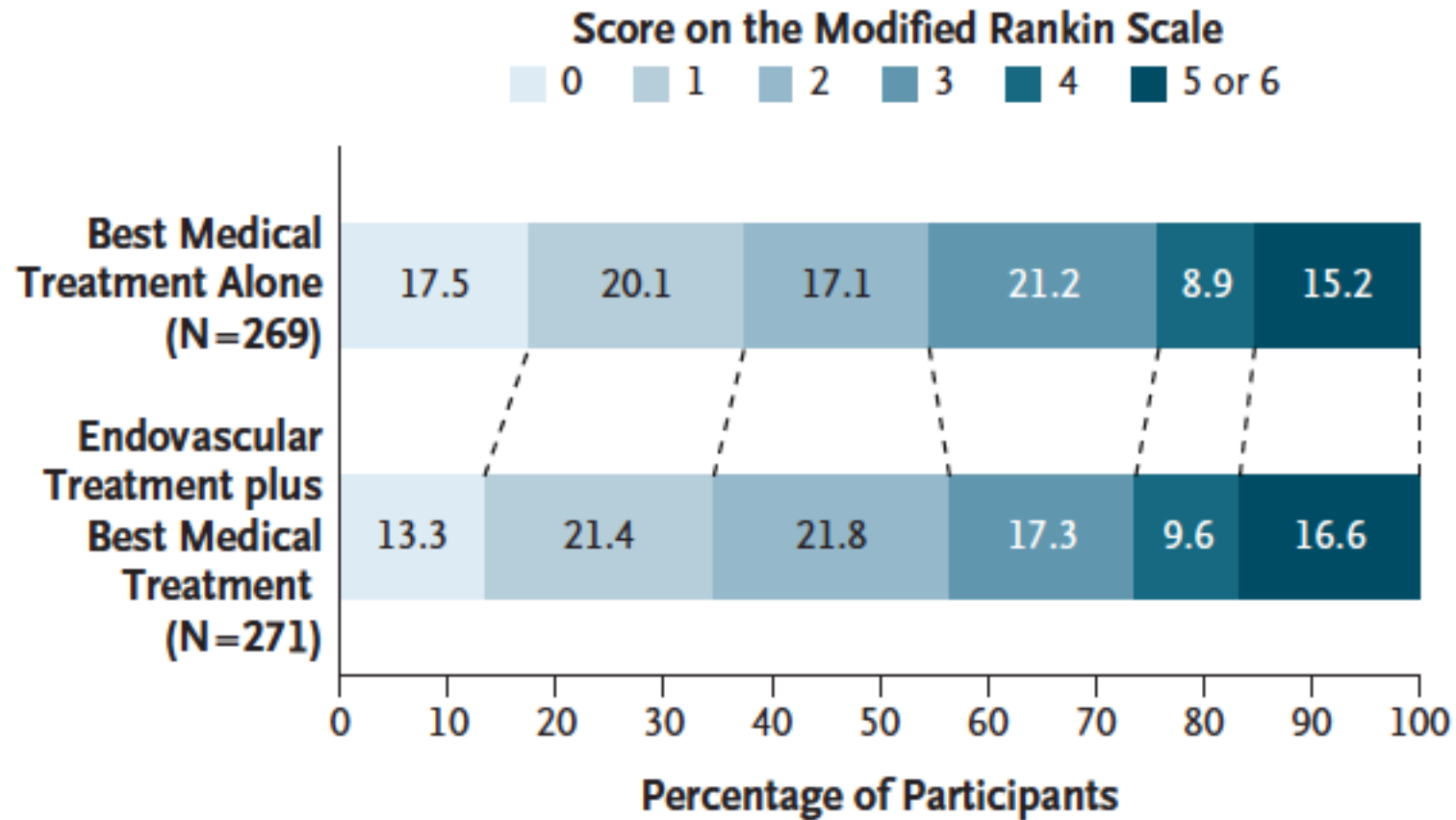
DISTAL

- 543 participants (women, 44%; median age, 77 years)
 - 271 were assigned to receive EVT plus best medical treatment
 - 272 to receive best medical treatment alone.
- NIHSS median was 6 (interquartile range, 5 to 9).
- Intravenous thrombolysis: 65.4% of the participants
- The predominant occlusion locations were:
 - M2 segment (in 44.0% of the participants),
 - M3 segment (in 26.9%),
 - P2 segment (in 13.4%), and P1 segment (in 5.5%).
- Randomization within 6 hours after last seen to be well or within 6 to 24 hours after last seen to be well if neuroimaging suggested salvageable tissue



DISTAL RESULTS





EVT did not result in a lower level of disability or a lower incidence of death than best medical treatment alone.



DISTAL MEVO-ADVERSE OUTCOMES

SAFETY OUTCOMES AT 90 DAYS

Comparison of Thrombectomy vs. Best Medical Therapy (BMT)

OUTCOME	THROMBECTOMY (n=271)	BEST MEDICAL THERAPY (BMT) (n=271)	ADJUSTED EFFECT (Adj HR or RR) (95% CI)
 Death from any cause at 90 days — no. (%)	32 (11.8%)	29 (10.7%)	1.14 (0.69 to 1.90) ^{¶¶}
 Symptomatic intracranial hemorrhage within 24 hr — no. (%)	16 (5.9%)	7 (2.6%)	2.38 (0.44 to 6.14) ^{¶¶}
 Serious adverse events within 90 days — no.	114	88	1.27 (0.84 to 1.97)
 Adj HR = Adjusted Hazard Ratio RR = Risk Ratio CI = Confidence Interval ^{¶¶} Adjusted for stratification factors. Values >1 favor thrombectomy.			



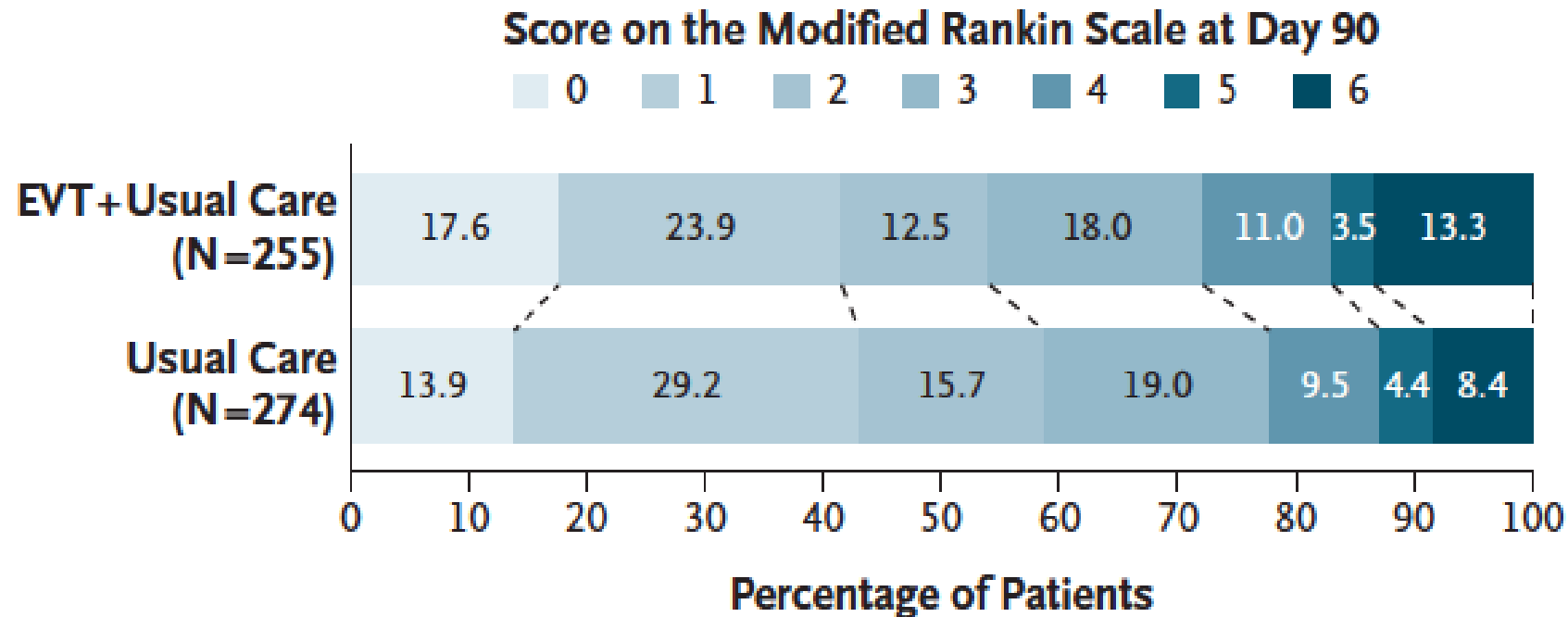
ESCAPE-MEVO

- 530 participants from five countries were enrolled between April 2022 and June 2024
 - 255 patients assigned to the EVT group
 - 275 to the usual-care group
- baseline NIHSS score greater than 5
- Vessel occlusions defined as an occlusion of the M2 or M3 segment of the middle cerebral artery, occlusion of the A2 or A3 segment of the anterior cerebral artery, or occlusion of the P2 or P3 segment of the posterior cerebral artery
- occlusion who presented within 12 hours from the time that they were last known
- did not include considerations for dominance versus codominance or nondominance of the proximal M2 segments

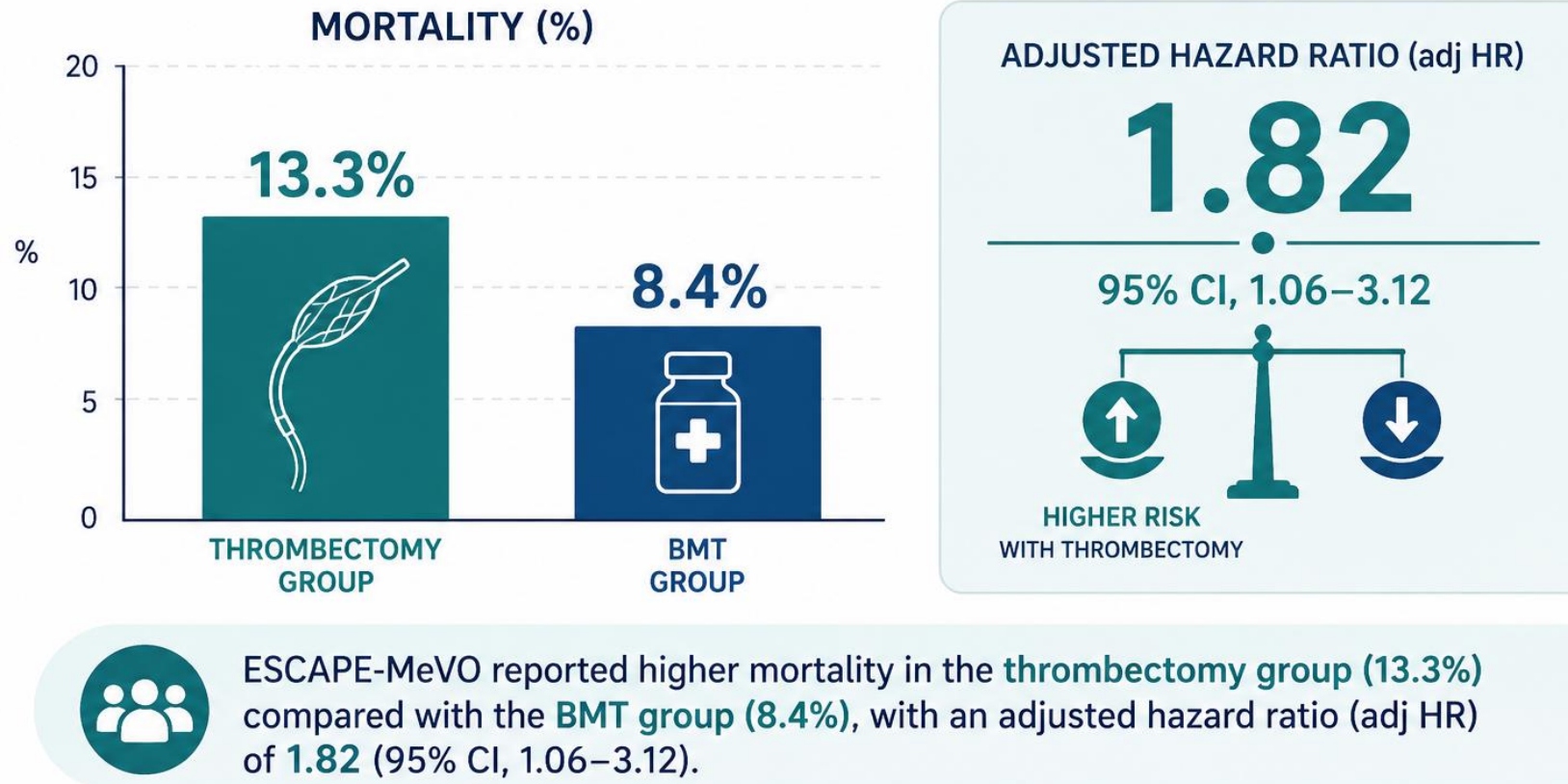


ESCAPE MEVO RESULTS

- Endovascular treatment for acute ischemic stroke due to medium-vessel occlusion within 12 hours did not lead to better outcomes at 90 days than usual care.



ESCAPE-MEVO, ADVERSE OUTCOMES



CAVEATS OF THE MEVO TRIALS

Trials included relatively low NIHSS—perhaps sites did not randomize participants with more disabling deficits

Decades older median age in DISTAL and ESCAPE-MEVO as compared with HERMES—did physicians choose treatment rather than randomization for younger patients?

Both trials showed lower percentages of reperfusion (about 70%) than expected

Much higher percentage of general anesthesia--?increased times

Trials included patients with baseline disability (mRS 0-2)



2026 AHA ACUTE STROKE GUIDELINES

Thrombectomy 0 to 6 hours for dominant proximal M2 division MCA occlusions		
2a	B-NR	7. In patients with AIS from occlusion of the dominant proximal M2 division of the MCA presenting within 6 hours from onset of symptoms with a prestroke mRS score of 0 to 1, NIHSS score of ≥ 6 , and ASPECTS of ≥ 6 , EVT is reasonable to improve functional outcomes, but the benefits are uncertain. ^{21–23}
Thrombectomy 0 to 6 hours for nondominant proximal M2 division MCA, distal MCA, anterior cerebral artery, and posterior cerebral artery occlusions		
3: No Benefit	A	8. In patients with AIS from occlusion of the proximal nondominant or codominant division proximal M2 segment of the MCA, or distal MCA, anterior cerebral artery (ACA), or posterior cerebral artery (PCA), EVT is not recommended to improve functional outcomes. ^{23,24}



WHAT IS ONE TO DO?

- Consider patient selection when making decisions on MeVO and EVT
 - Consider dominant vs co-dominant vs non-dominant
- Consider not offering EVT for patients who are older with less severe deficits and higher baseline disability, as they may have inferior clinical outcomes to those treated medically



THE PATH FORWARD-IS THIS A DETOUR?

- Careful design of future clinical trials based
 - Imaging selection
 - Time work flows
 - Different aspiration techniques
 - Outcome measures that incorporate quality of life

