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Updates in Endovascular Therapy

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Rhode Island Stroke Symposium

Financial Relationship Disclosure(s)

Mahesh Jayaraman, MD, FACR

- Nothing to disclose

Updates in Endovascular Therapy

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BROWN
Alpert Medical School

Disclosures

- No Financial disclosures
- Off-Label use of certain devices/products may be discussed

The Journey to date

2015	2017	2022	2023
MR CLEAN EXTEND-IA SWIFT PRIME ESCAPE REVASCAT	DAWN DEFUSE -3	BAOCHE ATTENTION	RESCUE-LIMIT ANGEL ASPECT SELECT-2 TENSION TESLA
ICA, M1 0-6h, NIHSS ≥ 6	ICA, M1 0-24h, NIHSS ≥ 6	Basilar 0-24h, NIHSS ≥ 6	ICA, M1 Large Core 0-24h, NIHSS ≥ 6

What’s “New”??

- Medium Vessel Occlusion

Medium Vessel Occlusion

- Lots of differences of opinion based on recent trial data
- Real patients are not always clinical trial patients
- Proximal M2 supplying >1/2 MCA territory should NOT be considered a “MeVO” and should usually be treated with EVT
- I’ll refrain from more discussion so that Fawaz and Maks can debate!

What is “Medium” ?

What's "New"??

- Medium Vessel Occlusion
- Neuroprotection

Neuroprotection

- Concept is attractive – find a way to halt ischemic core growth before revascularization therapy

2020 – ESCAPE –NA-1 Trial showed no benefit for one neuroprotectant (Nerinetide) despite promising pre-clinical animal data.

Trend towards benefit in those without IV tPA

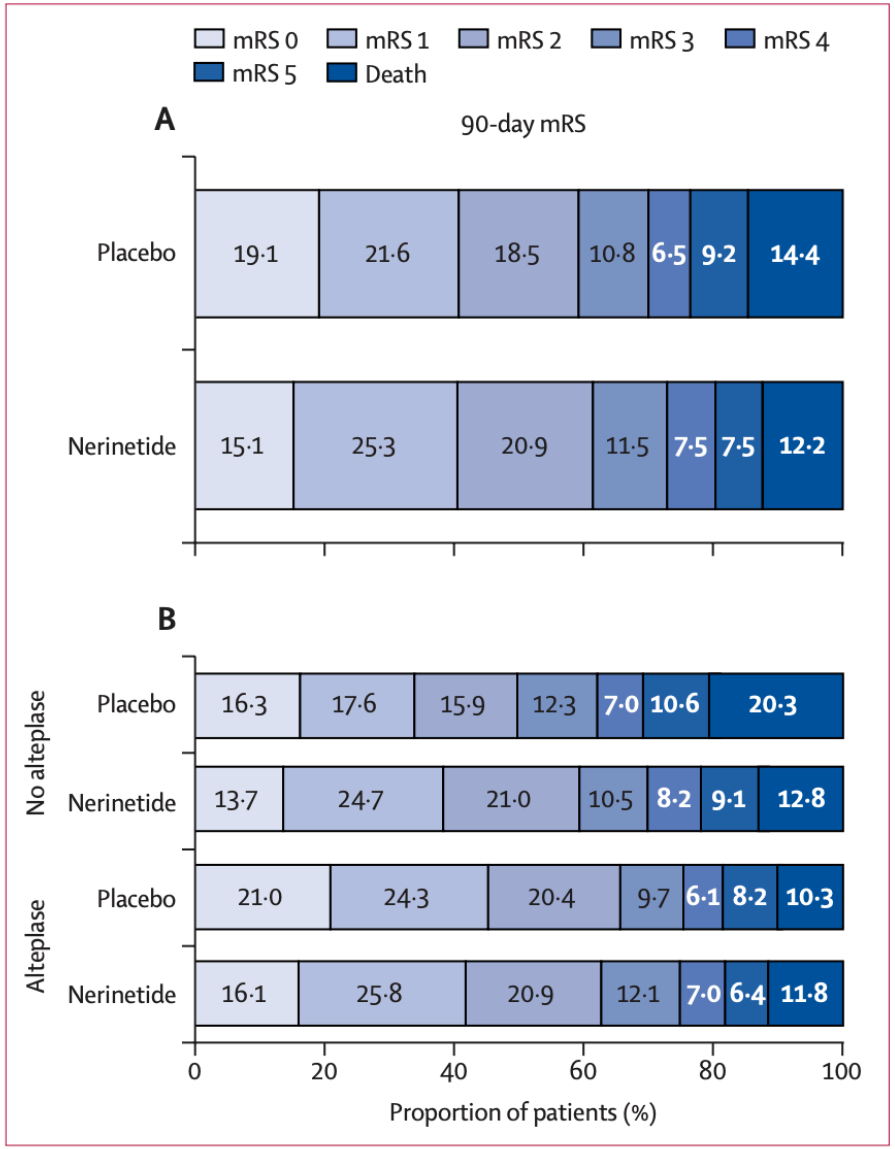


Figure 2: **Primary outcome overall and stratified by alteplase use**
Horizontal stacked bar graphs show the primary outcome (mRS) distribution by nerinetide and placebo groups. Bars are labelled with proportions. (A) Primary outcome overall distribution by nerinetide and placebo groups (n=1105). (B) Primary outcome distribution by nerinetide and placebo groups according to alteplase treatment (n=659 with alteplase, n=446 with no alteplase); $p_{interaction}$=0·0330, on binary outcome mRS 0–2. mRS=modified Rankin Scale.

Escape-NEXT

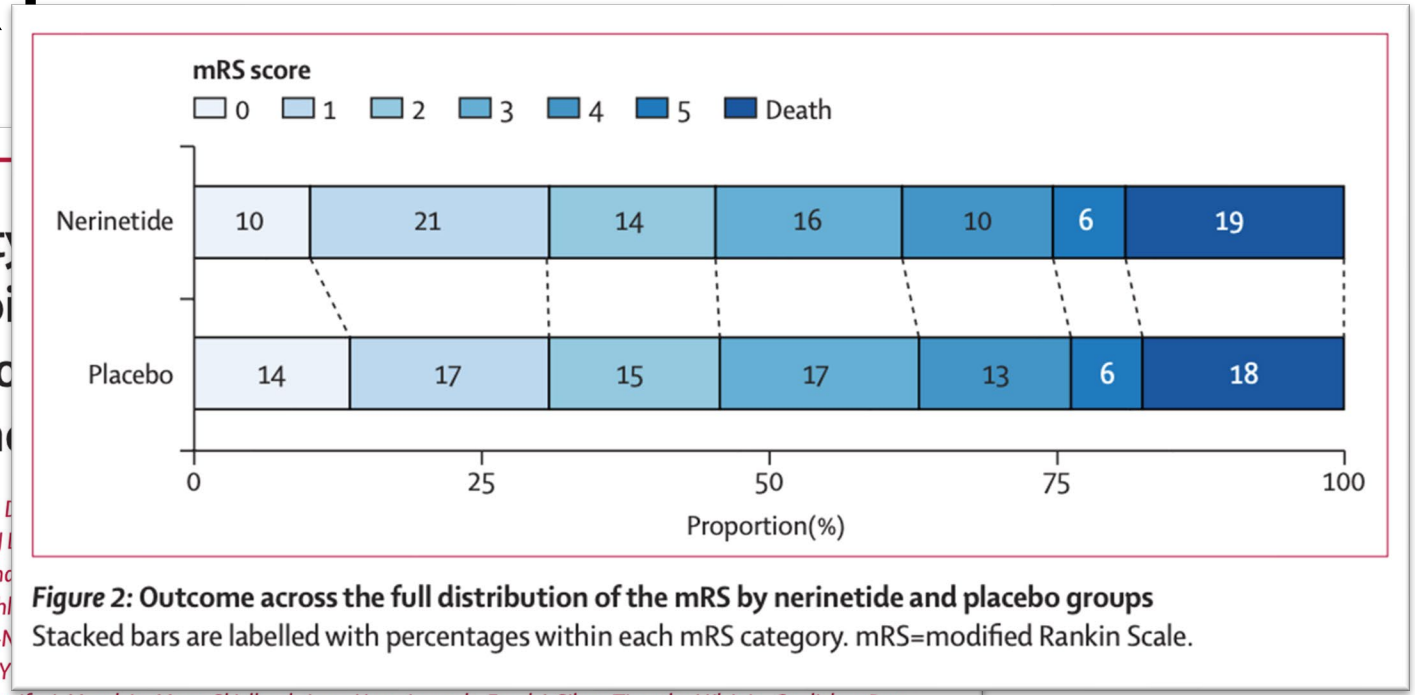


Figure 2: **Outcome across the full distribution of the mRS by nerinetide and placebo groups**
Stacked bars are labelled with percentages within each mRS category. mRS=modified Rankin Scale.

Efficacy and safety patients undergoi previous thrombo double-blind, ran

Michael D Hill, Mayank Goyal, Andrew M D
Mirko Pham, Karl G Haeusler, Diedrick W J
Richard H Swartz, Leodante Da Costa, Joha
David J Garman, Corey Adams, Yatika Kohl
Leonard L L Yeo, Jason W Tarpley, Marios-N
Bruce C V Campbell, Sven Poli, Alexandre Y
Michael Devlin, Pablo Garcia-Bermejo, Jennifer L Mandzia, Mona Skjelland, Anne Hege Aamodt, Frank L Silver, Timothy J Kleinig, Guglielmo Pero,
Jens Minnerup, Ryan A McTaggart, Ajit S Pu
Eric Sauvageau, Sibu Mundiyanapurath, Da
Konstantin Dimitriadis, Dheeraj Gandhi, Re
Wolf-Dirk Niesen, Rajiv Advani, Agnethe Elt
Markus Holtmannspoetter, Victoria Hellste
Christian Maegerlein, Carol Huilian Tham, M

Nerinetide did not improve outcomes in larger randomized trials of patients undergoing thrombectomy who did not receive IV thrombolytics

Lancet 2025; 405: 560–70

Summary

Background In the ESCAPE-NA1 trial, treatment with nerinetide, an eicosapeptide that interferes with post-synaptic

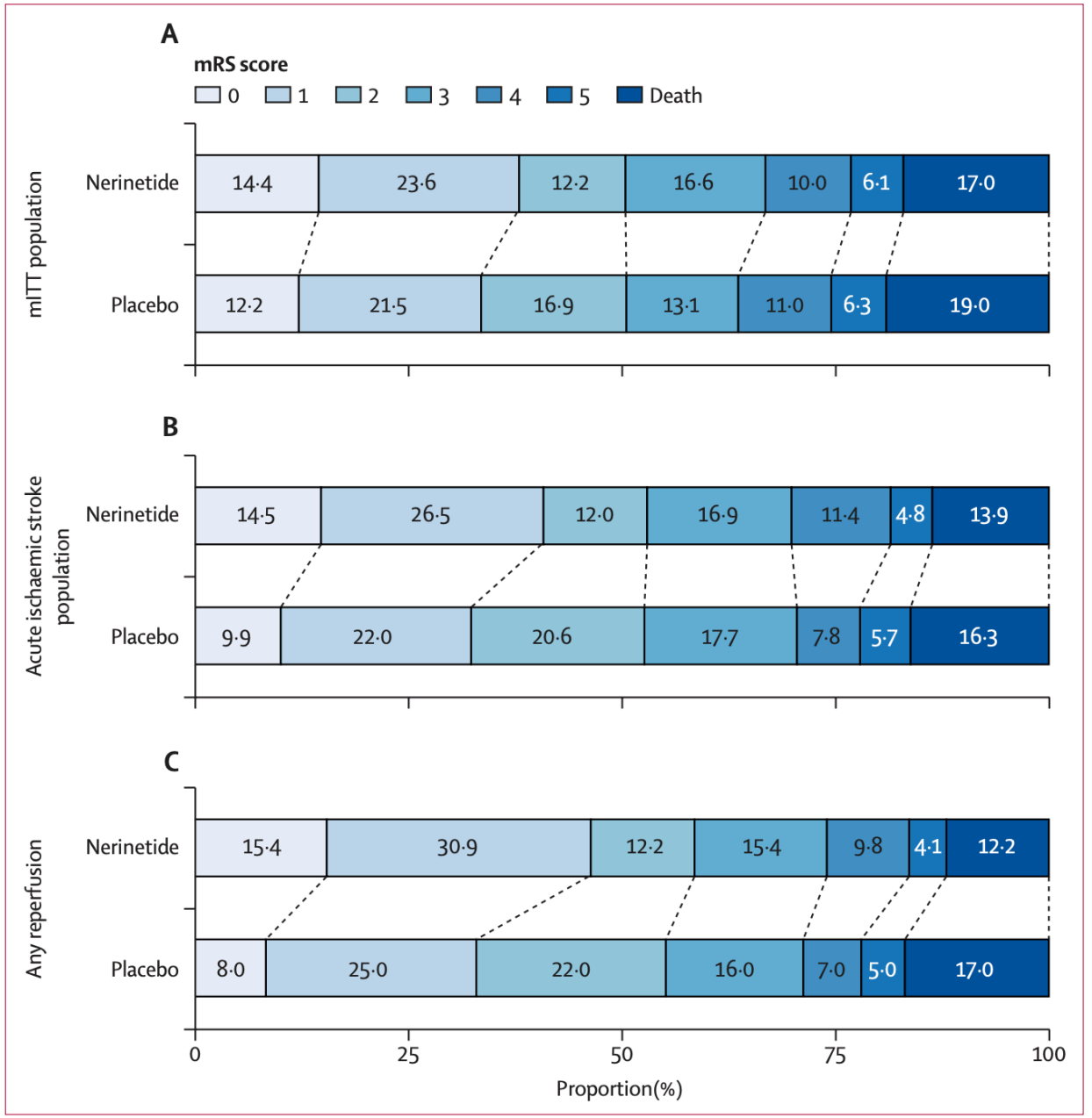
A new FRONTIE

Efficacy and safety of intravenous
paramedics in the field for acute c
3 h of symptom onset (FRONTIER

Across ALL patients – no benefit to pre-hospital Nerinetide

Some suggestion of benefit for those have ischemic stroke with reperfusion therapies

Challenge: How to identify those patients early enough to offer treatment…



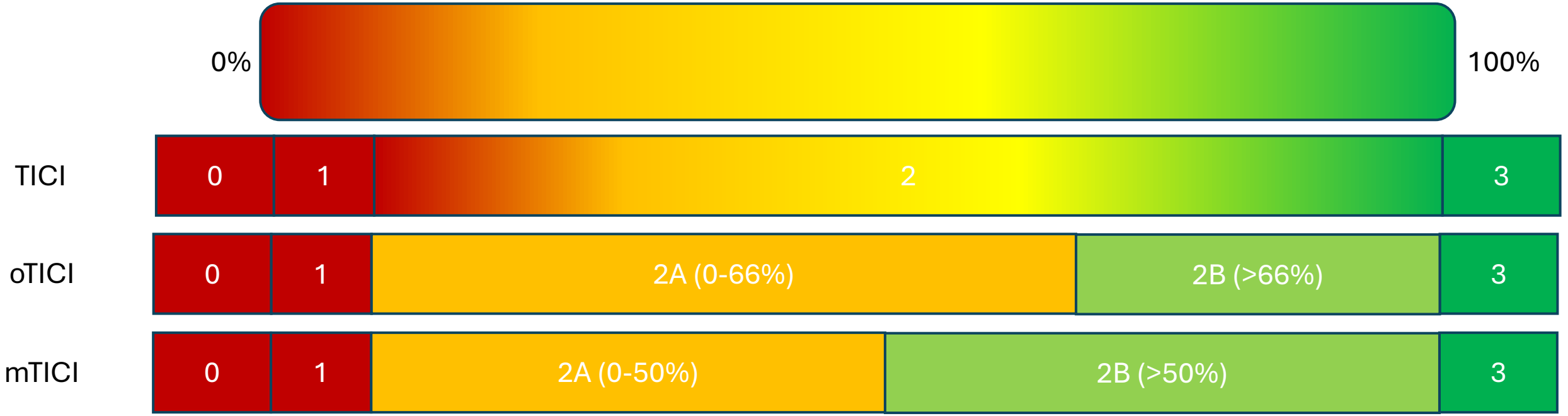
An interesting time

- After years of positive trials after positive trials, have we reached the “limits” of whom we can treat?
- So what CAN we focus on?
- If we can’t expand WHOM we treat, can we improve HOW we treat?

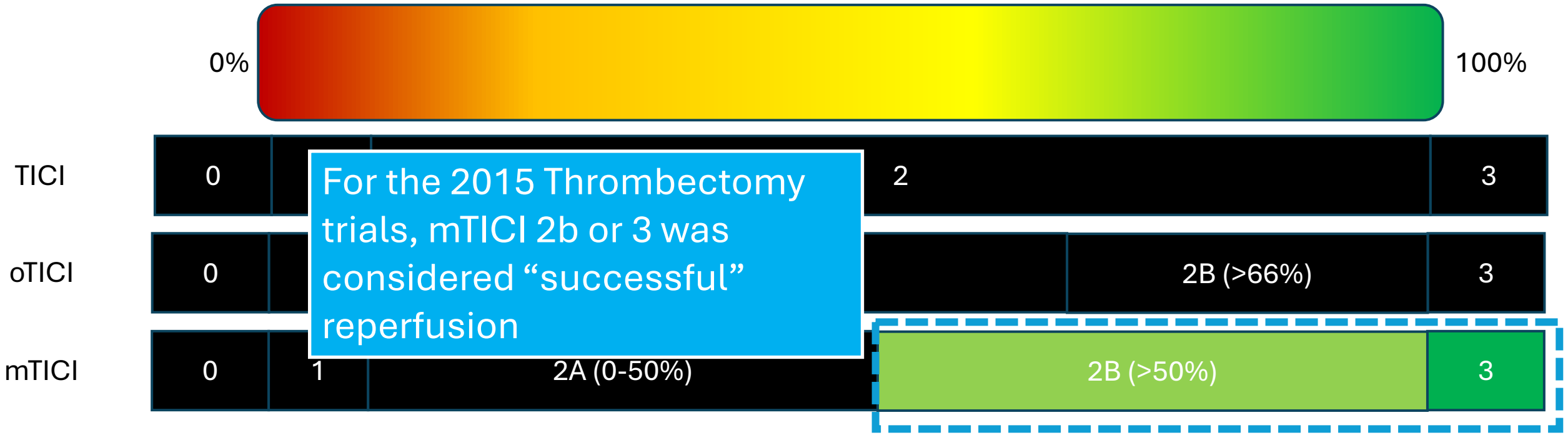
The Quality and *Speed* of Recanalization matters...

A LOT!

TICI TICI TICI - What's in a scale??



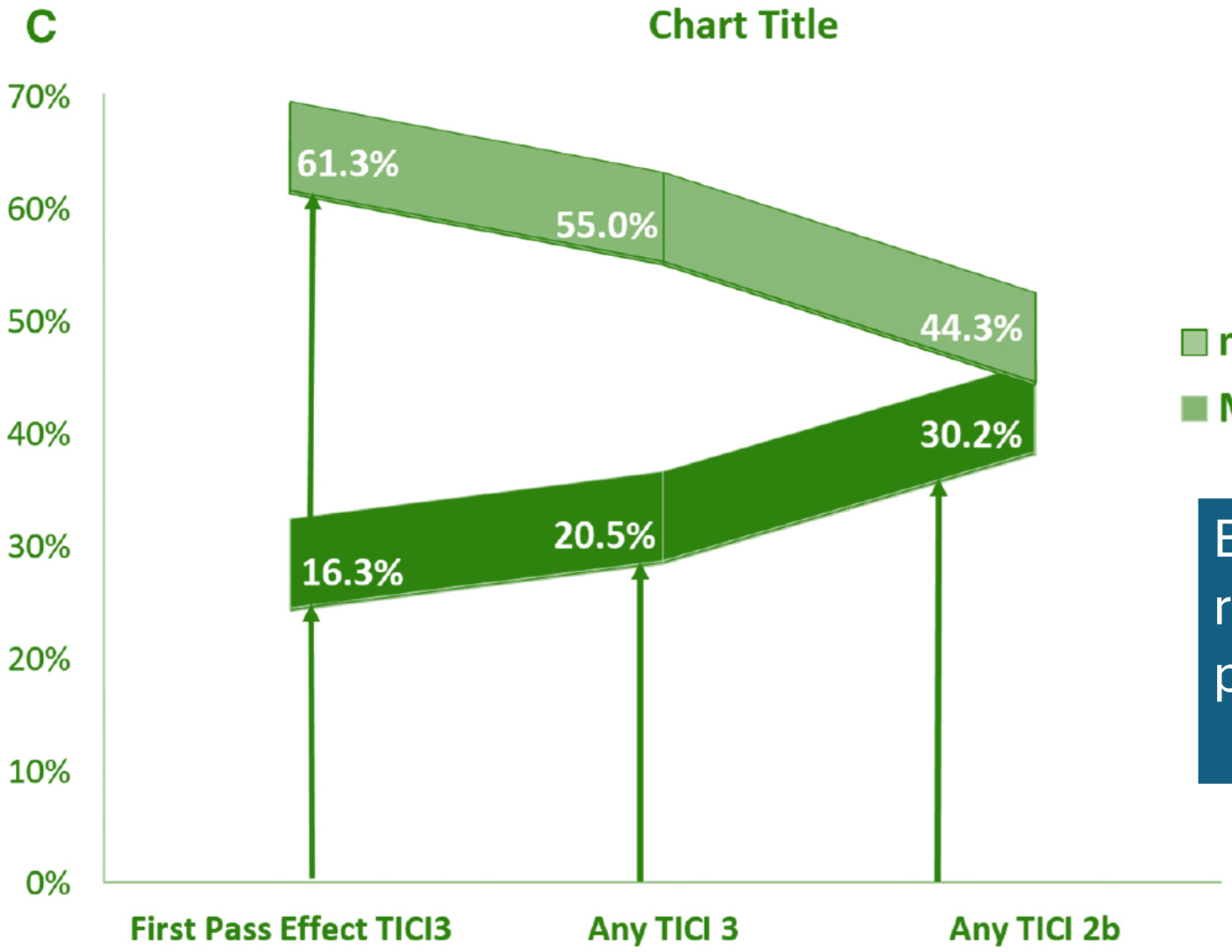
TICI TICI TICI - What's in a scale??



For the 2015 Thrombectomy trials, mTICI 2b or 3 was considered "successful" reperfusion

So wait… is 51% recanalization as good as 100%???

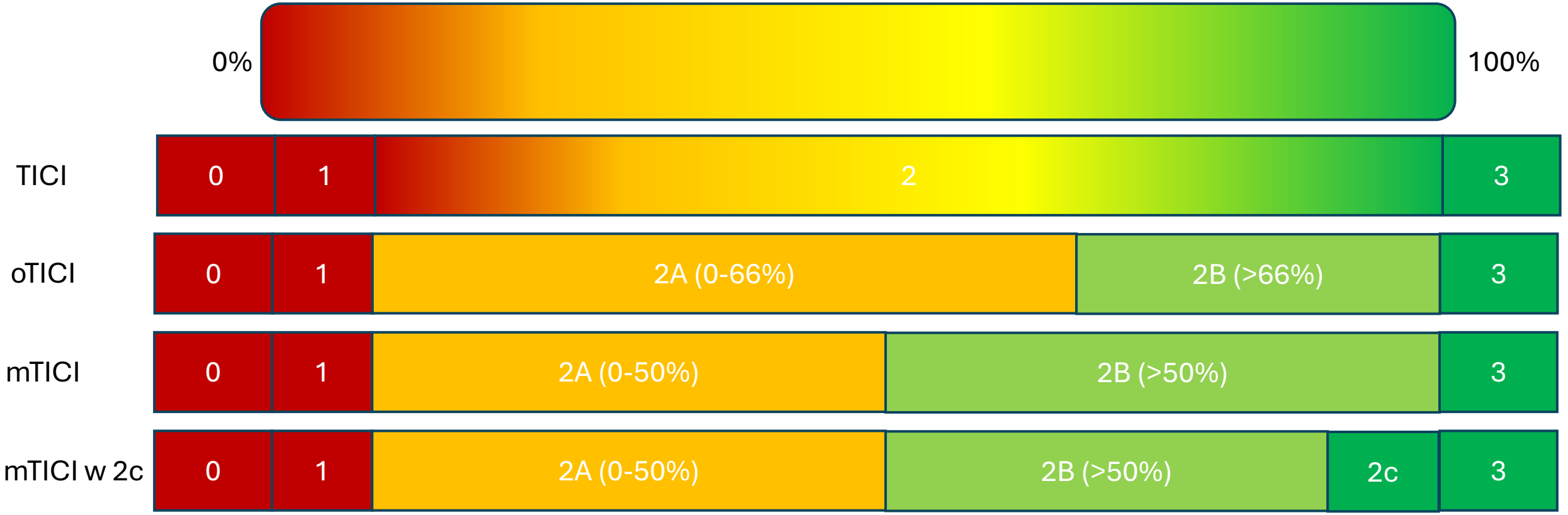
NO, 51% is NOT good enough!



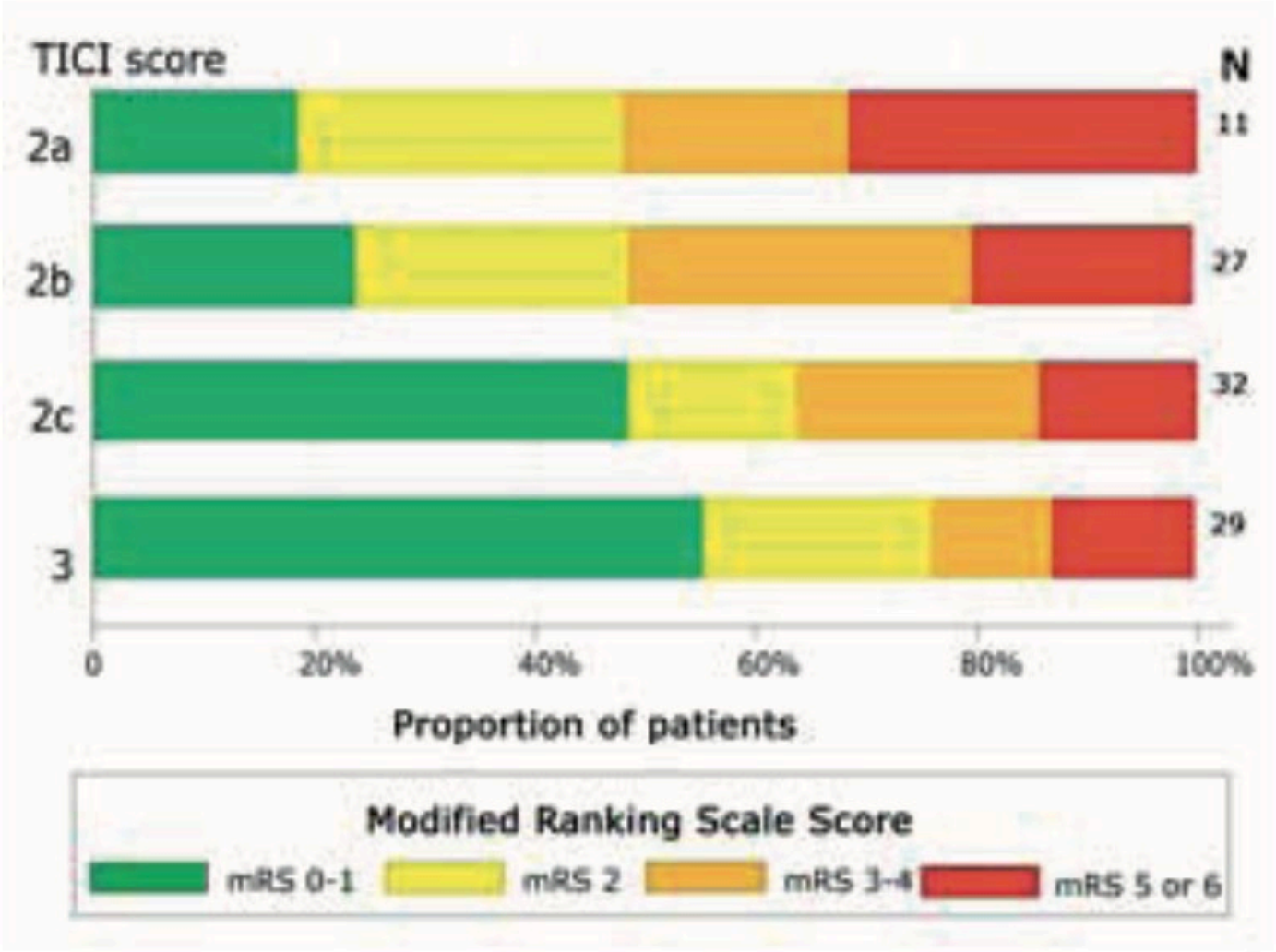
Best outcomes with complete recanalization with just one pass of thrombectomy device

Zaidat et al. *Stroke* 2018

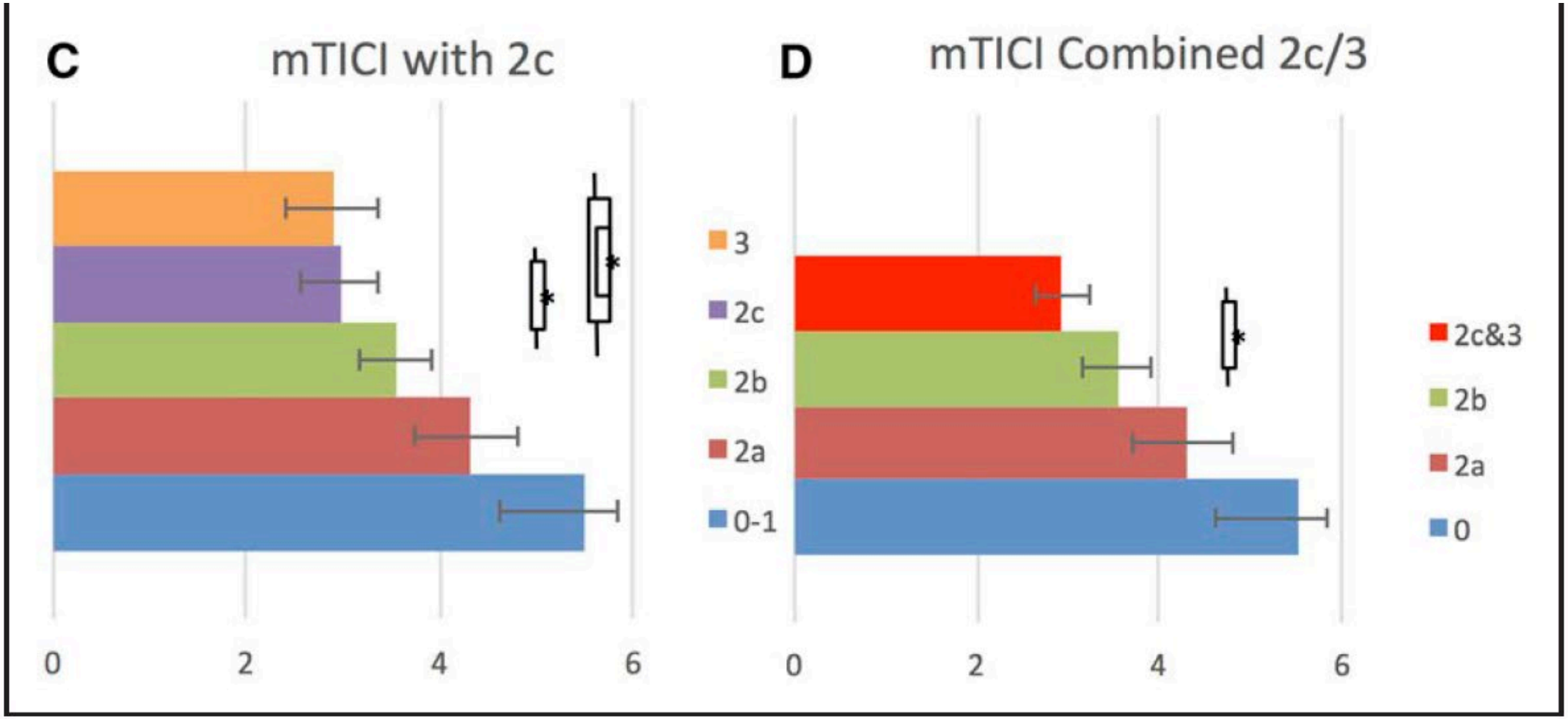
TICI TICI TICI - What's in a scale??



TICI 2c/3 gets you better outcomes



TICI 2c/3 gets you better outcomes



Under Pressure: Time in the angio suite

Benefit of First Pass effect only held true if puncture to recan < 30 minutes

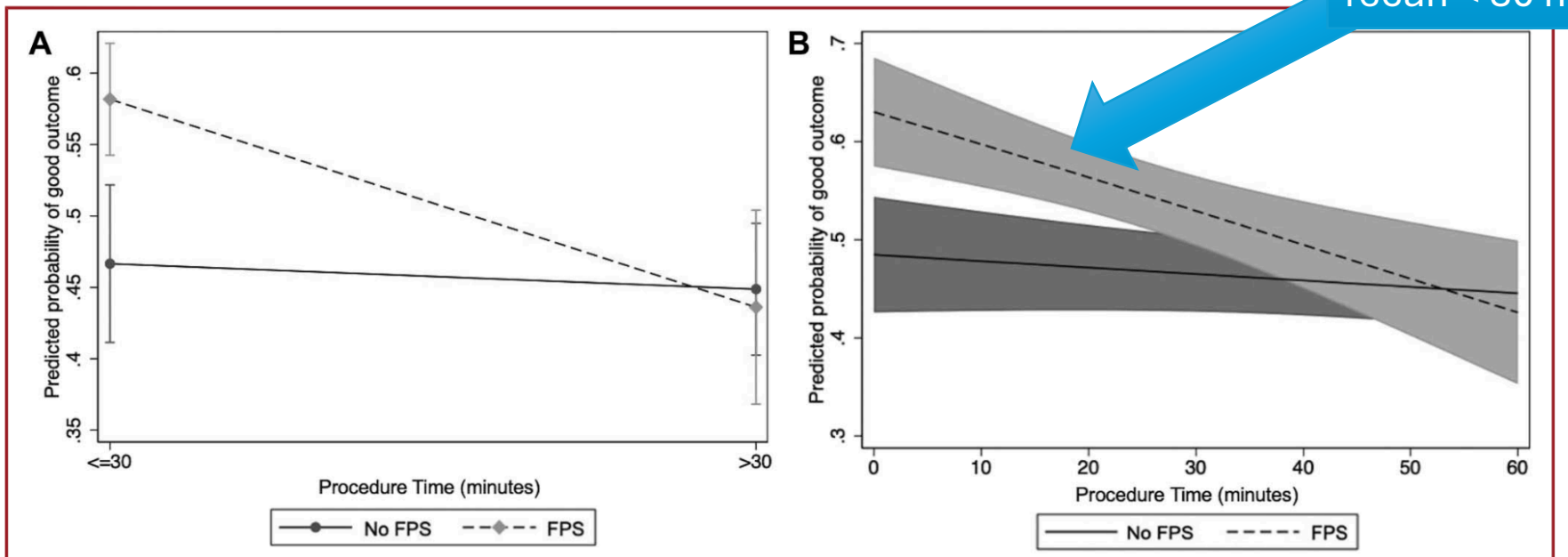
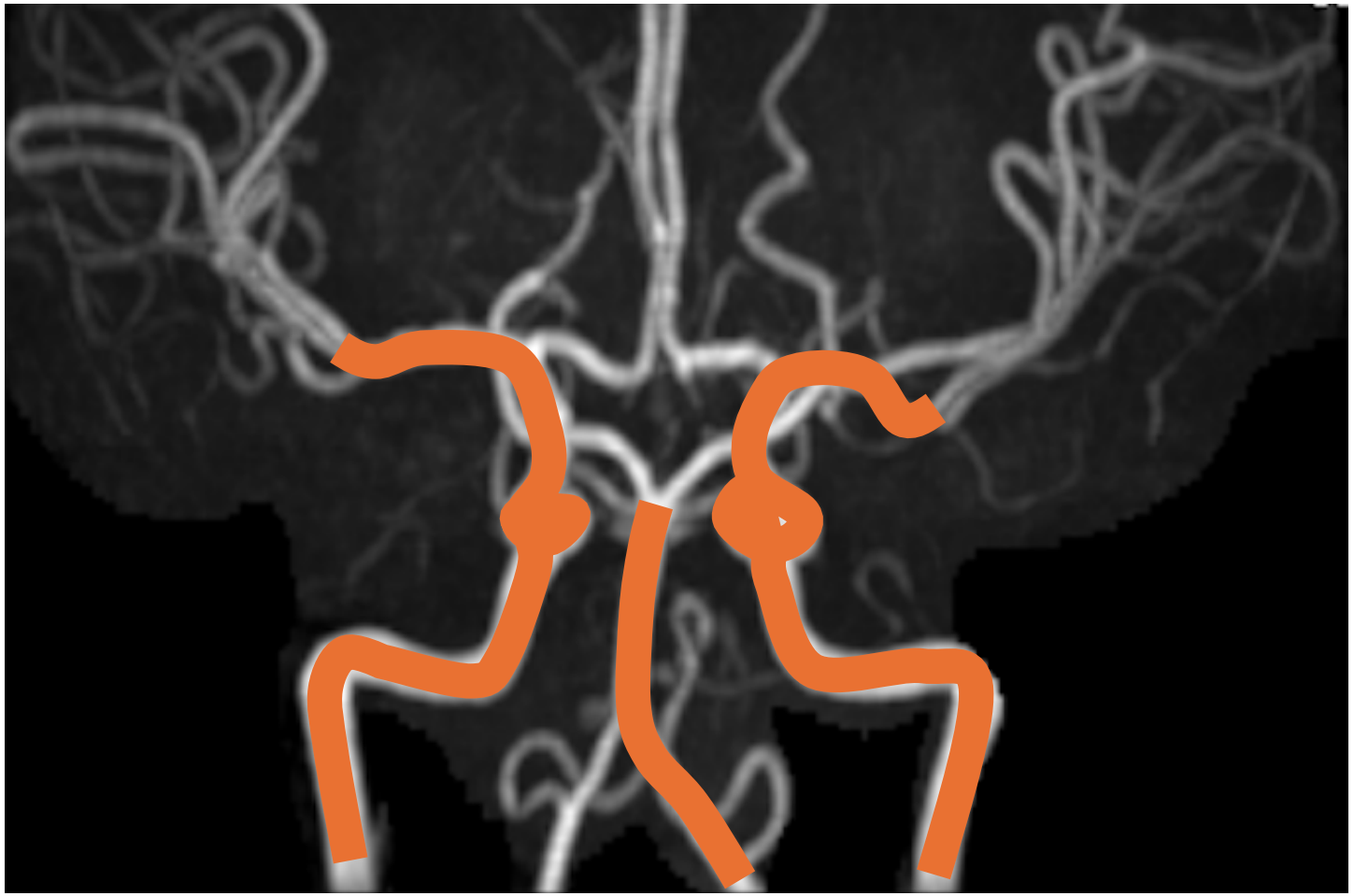


FIGURE 1. *Predicted probability of good functional outcome defined as 90-day mRS score of 0–2, shown by procedure time (puncture-to-recanalization)* **A**, *dichotomized by 30 minutes and* **B**, *treated as a continuous variable in patients with vs without FPS. Adjusted for age, diabetes, admission National Institutes of Health Stroke Scale, prestroke mRS, symptom onset-to-puncture time, hypertension, any intracerebral hemorrhage, and Alberta Stroke Program Early Computed Tomography Score. FPS, first pass success; mRS, modified Rankin scale.*

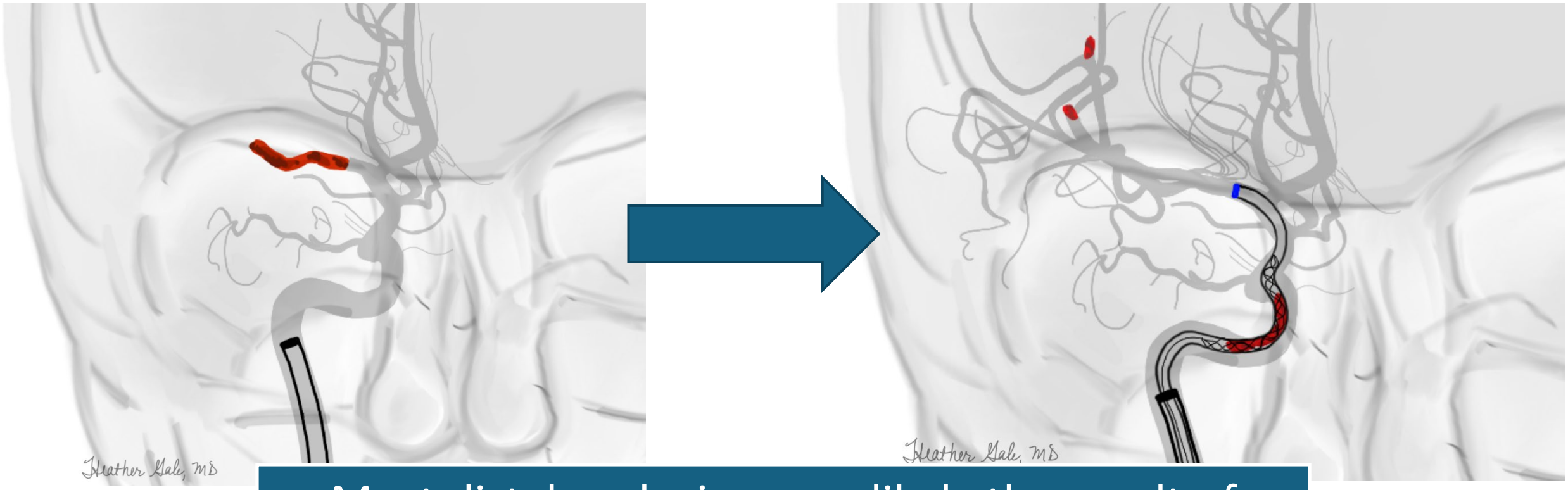
OK, if mTICI 2c/3 is so important, how do we do that?

Technique - LVO



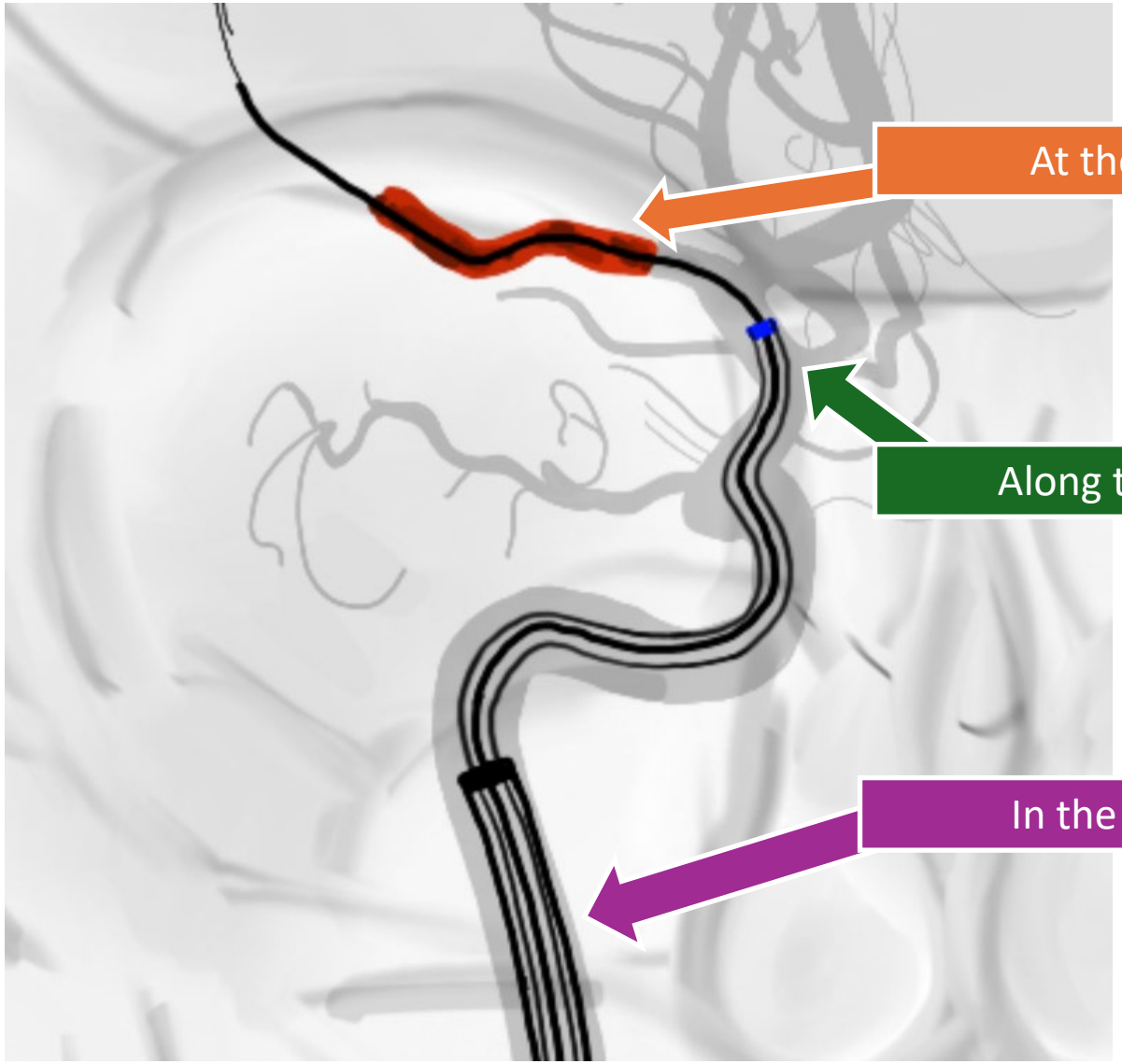
LVO – Large Vessel Occlusion
ICA, M1, Proximal M2
Dominant V4, Basilar

Where do the distal emboli come from?



Most distal occlusions are likely the result of fragmentation of the proximal clot

Thrombectomy Technique: Prix Fix menu



At the Clot

Stent-retriever at the clot

Aspiration catheter alone

Along the way

Local Aspiration Catheter

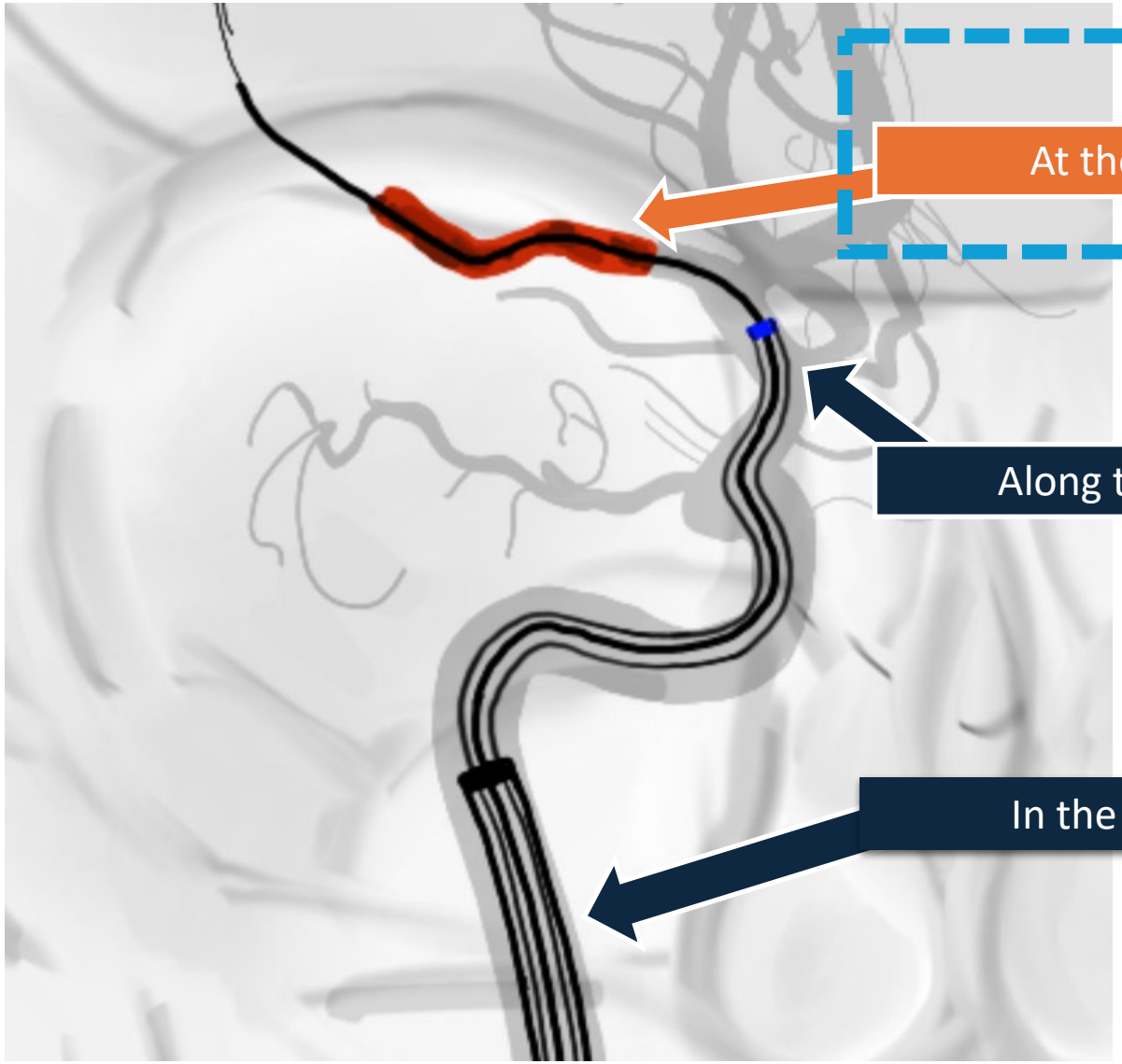
No additional catheter

In the neck

Balloon Guide Catheter

Standard Long Sheath

Thrombectomy Technique: Prix Fix menu



At the Clot

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Standard Long Sheath

Contact Aspiration vs. Stent-retrievers

JAMA | Original Investigation

Effect of Endovascular Contact Aspiration vs Stent Retriever on Revascularization in Patients With Acute Ischemic Stroke and Large Vessel Occlusion

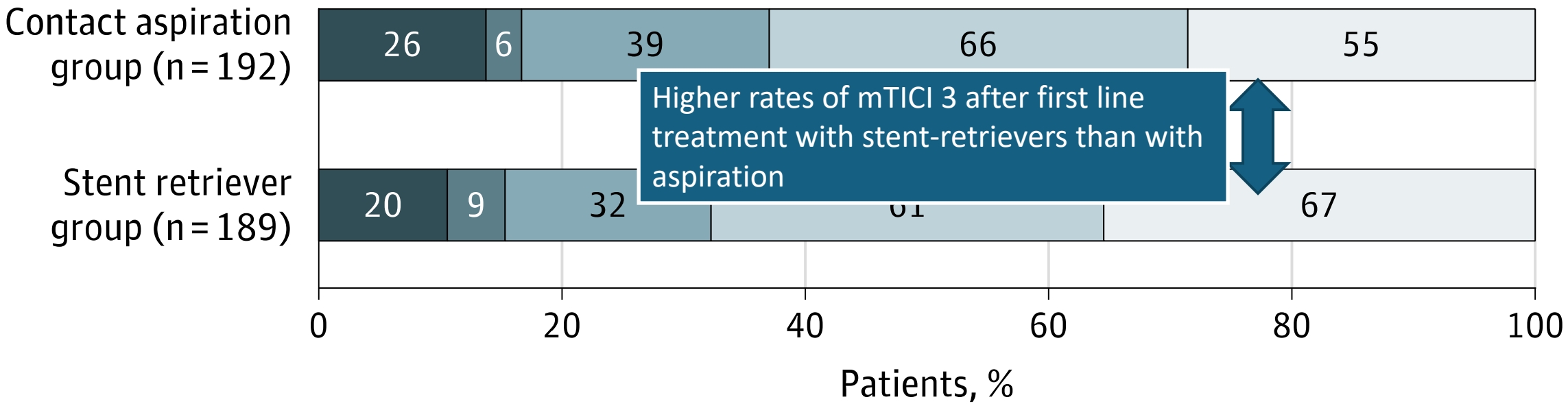
The ASTER Randomized Clinical Trial

Bertrand Lapergue, MD, PhD; Raphael Blanc, MD, MSc; Benjamin Gory, MD, PhD; Julien Labreuche, BST; Alain Duhamel, PhD; Gautier Marnat, MD; Suzana Saleme, MD; Vincent Costalat, MD, PhD; Serge Bracard, MD; Hubert Desal, MD, PhD; Mikael Mazighi, MD, PhD; Arturo Consoli, MD; Michel Piotin, MD, PhD; for the ASTER Trial Investigators

Prospectively randomized
381 patients
8 Centers

Are they ***really*** equal?

B mTICI score after first-line strategy alone[b]

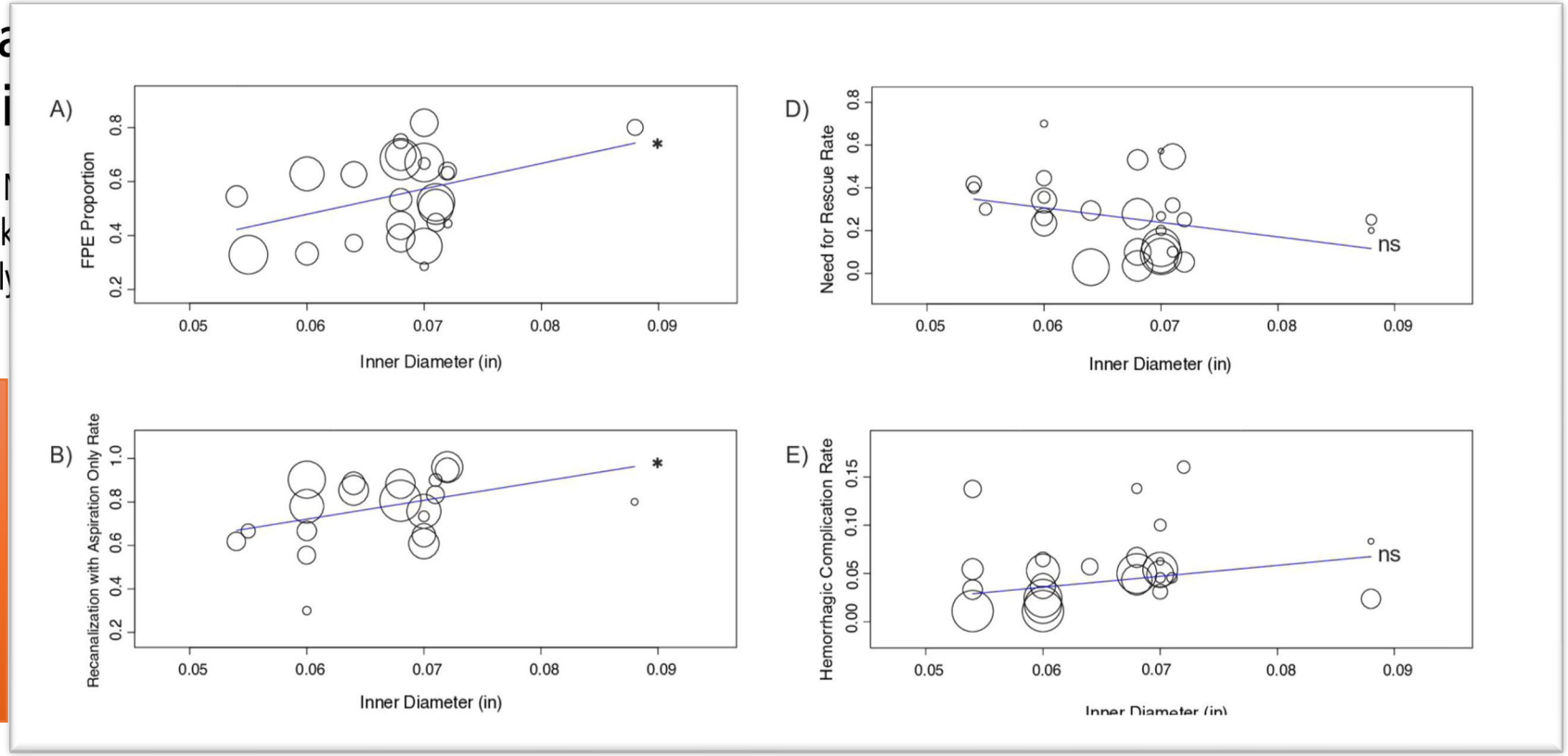


Aspiration: Size matters

Original research

Impact of a
outcomes i

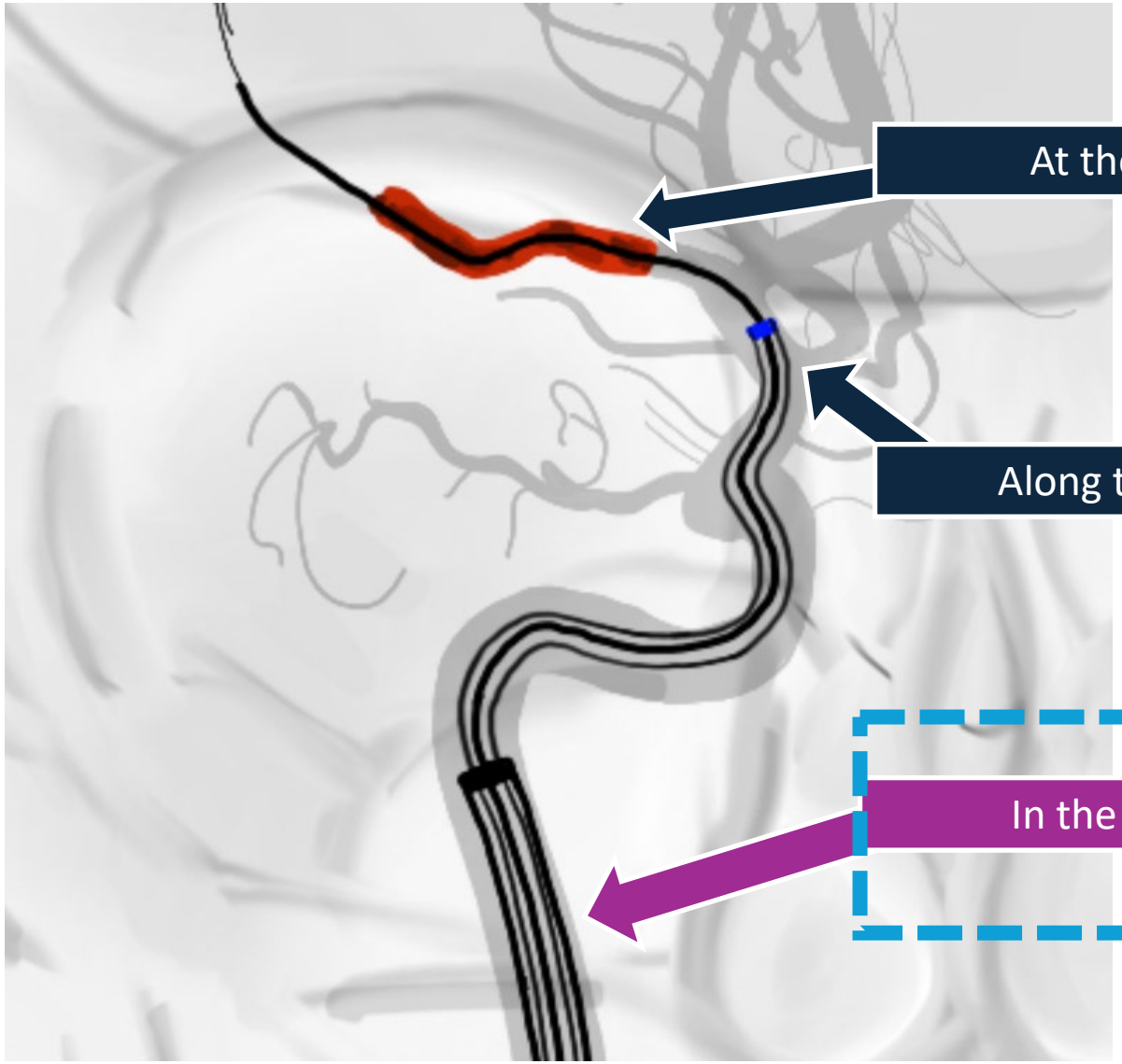
Derrek Schartz,[1] M
Sajal Medha K Ak
Thomas Mattingly



For ICA, M1 occlusions there is a clear relationship between size of catheter and success of reperfusion

Bigger is better

Thrombectomy Technique: Prix Fix menu



At the Clot

Stent-retriever at the clot

Aspiration catheter alone

Along the way

Local Aspiration Catheter

No additional catheter

In the neck

Balloon Guide Catheter

Standard Long Sheath

AI is coming for our jobs!!!

You

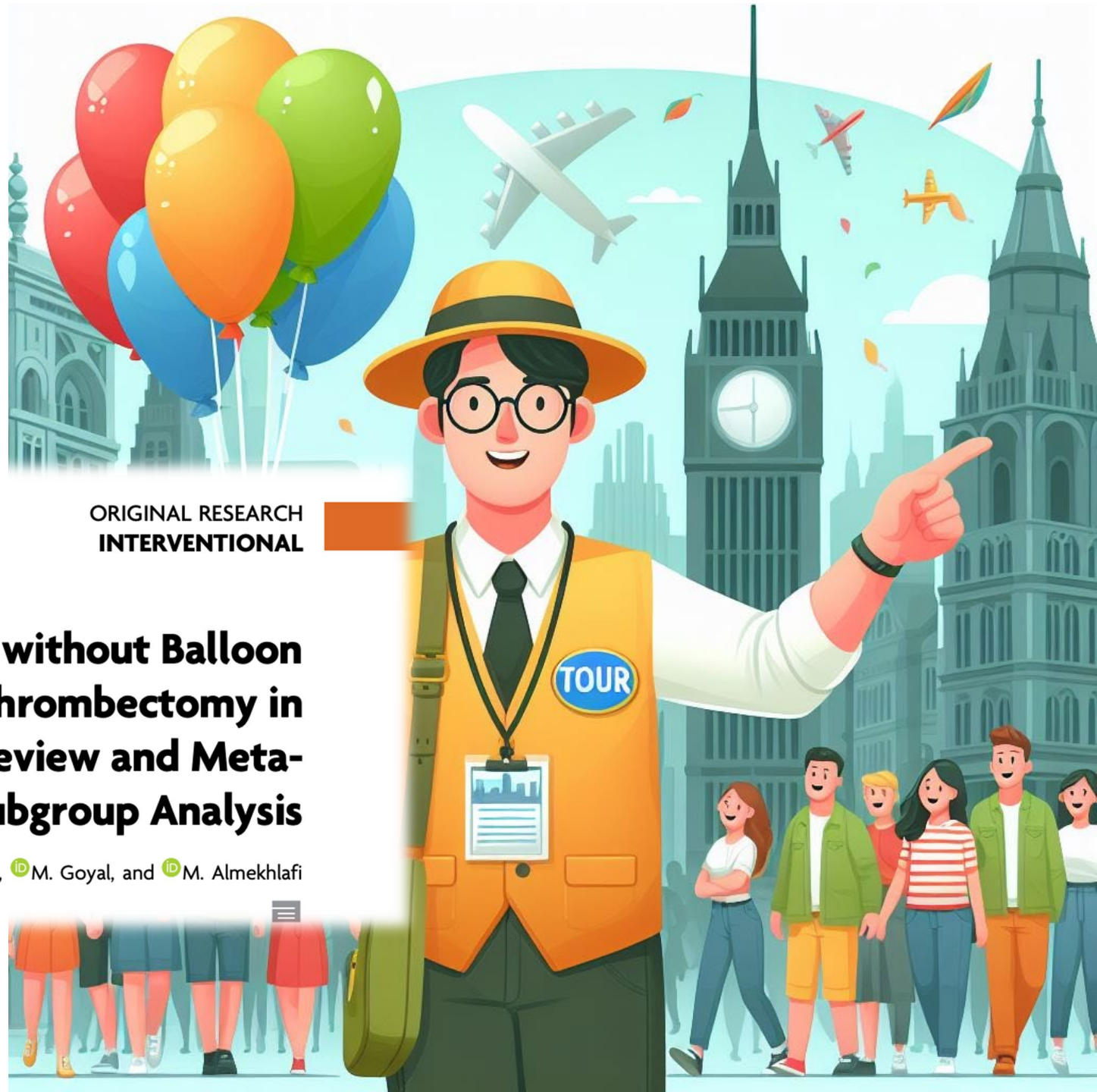
show me a picture of a balloon guide

Copilot

I'll try to create that.


What happens when the clot gets pulled in?
Prototype Stent-retriever
Not a commercial device

Love the Balloon!

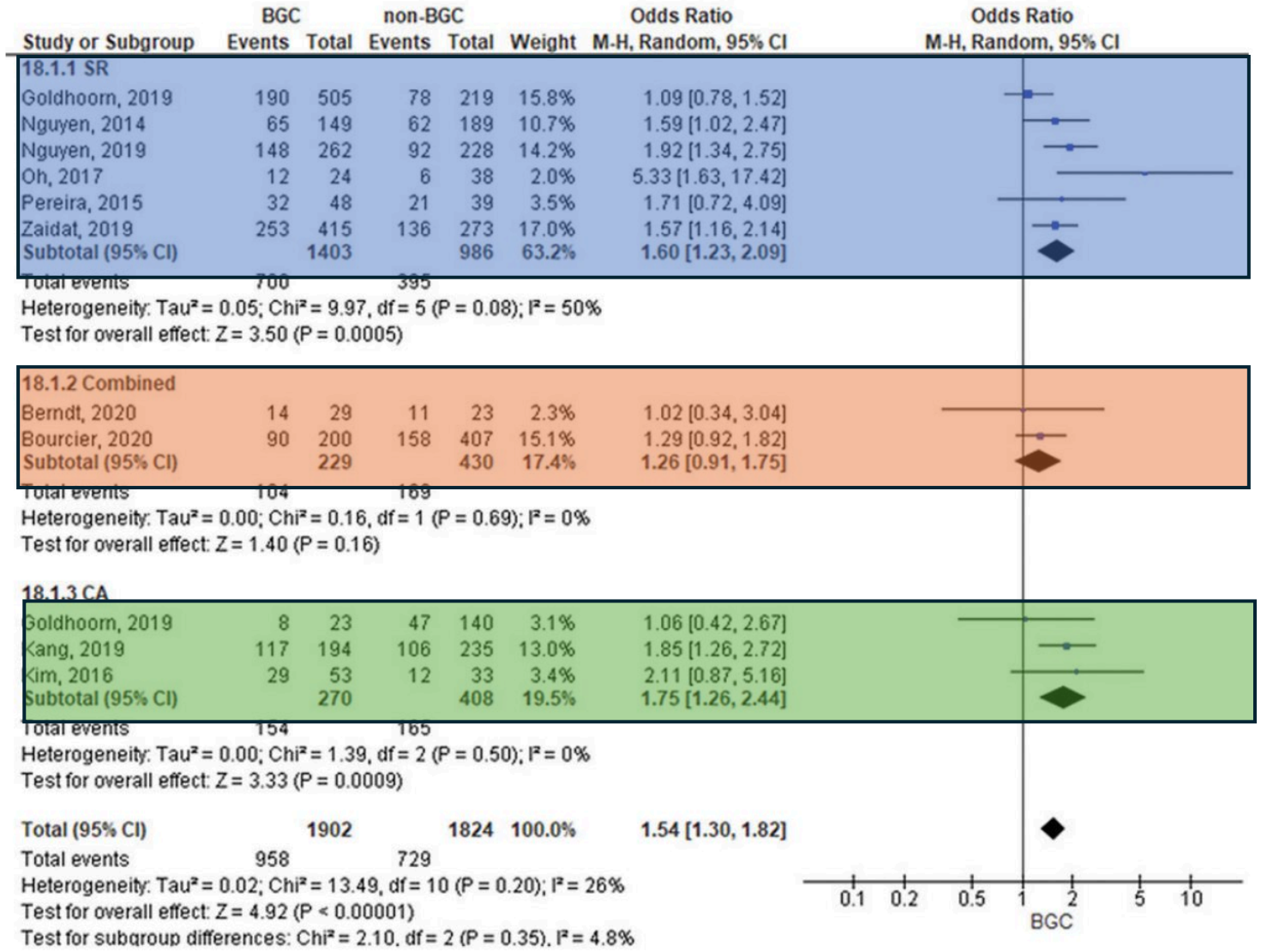


ORIGINAL RESEARCH
INTERVENTIONAL

Clinical and Procedural Outcomes with or without Balloon Guide Catheters during Endovascular Thrombectomy in Acute Ischemic Stroke: A Systematic Review and Meta-analysis with First-line Technique Subgroup Analysis

A. Podlasek, P.S. Dhillon, G. Jewett, A. Shahein, M. Goyal, and M. Almekhlafi

BGC for the win!

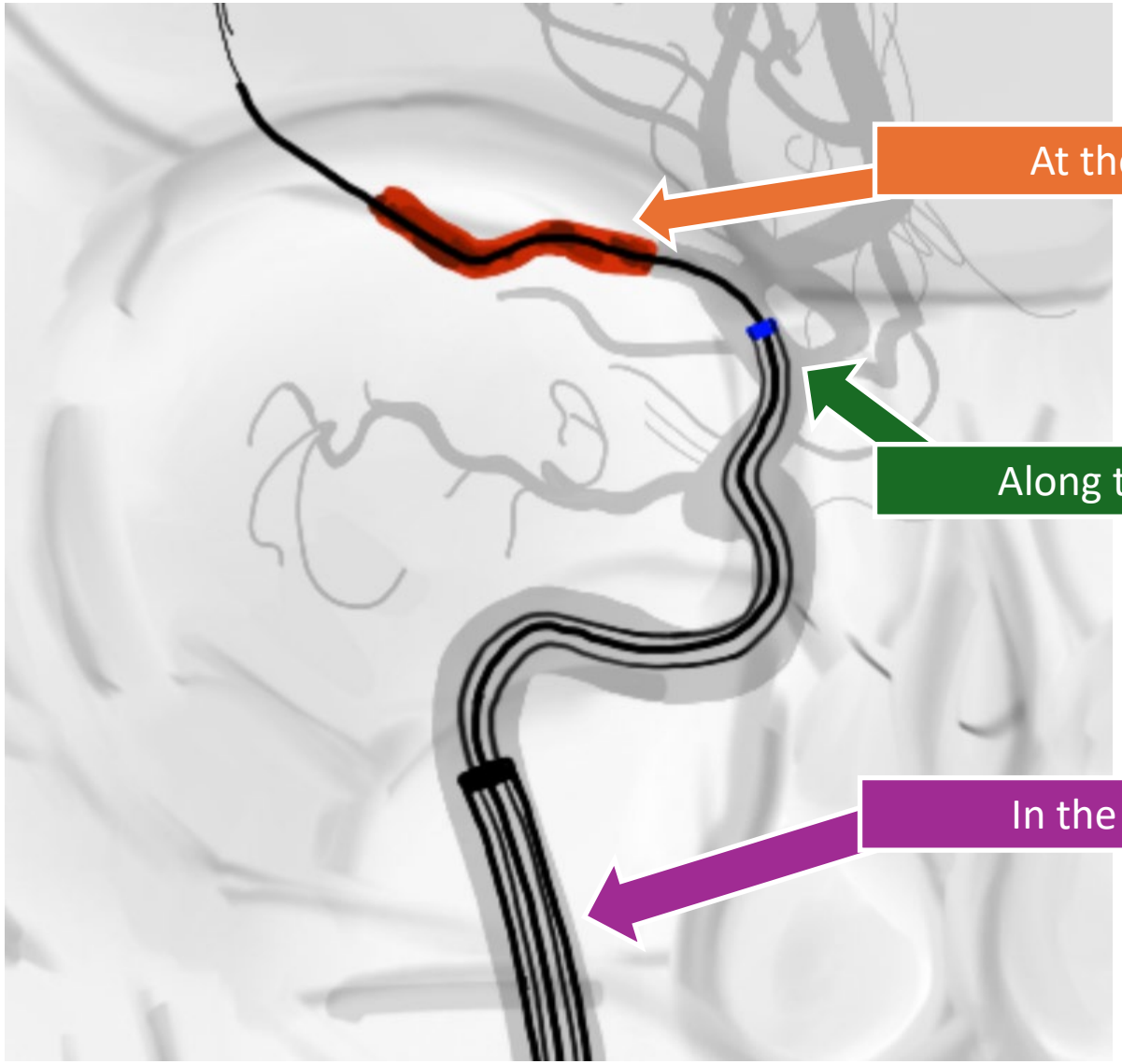


Stent-Retrievers Alone

Combined approach

Aspiration alone

Thrombectomy Technique: Prix Fix menu



At the Clot

Stent-retriever at the clot

Aspiration catheter alone

Along the way

Local Aspiration Catheter

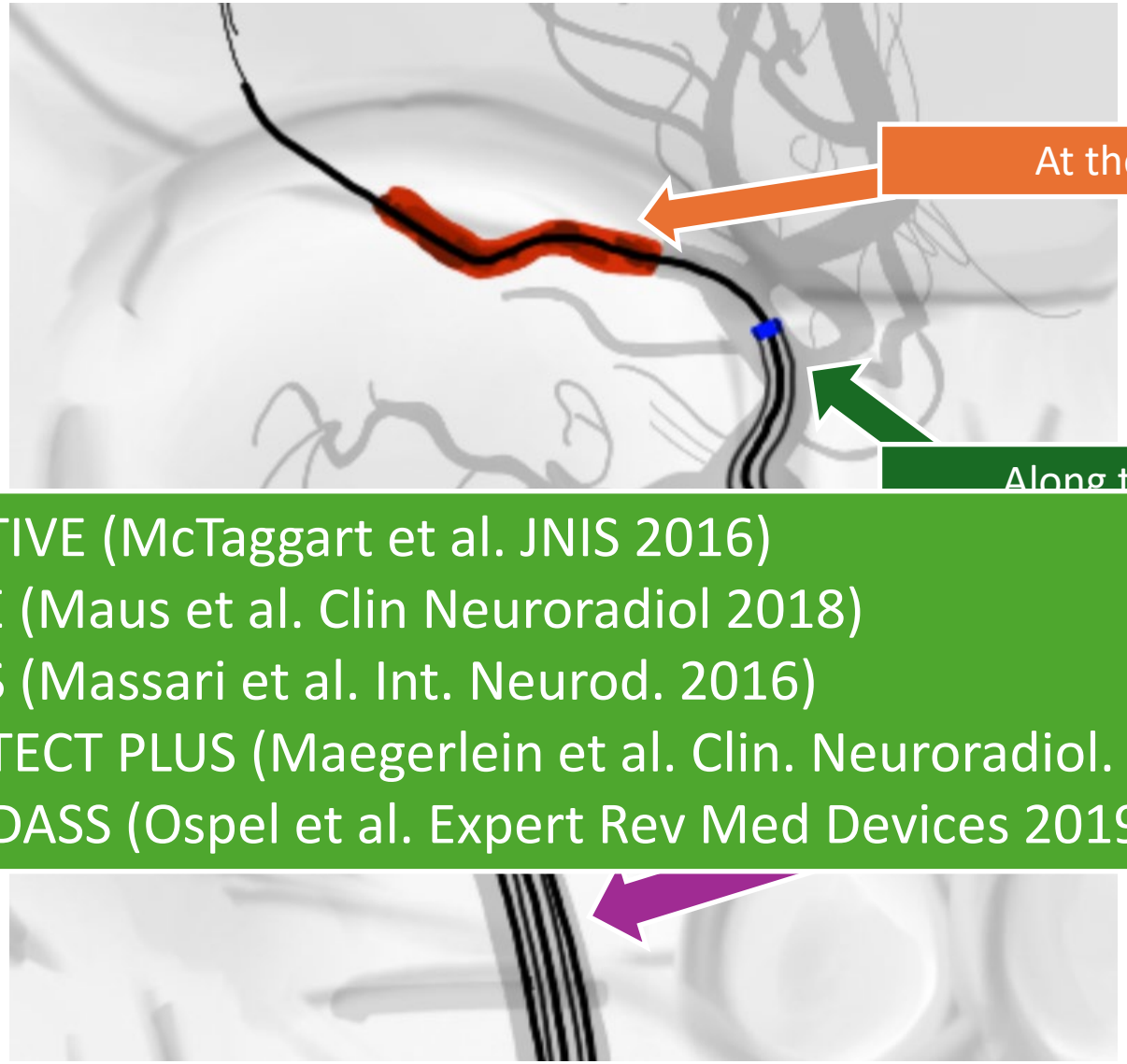
No additional catheter

In the neck

Balloon Guide Catheter

Standard Long Sheath

The Primary Combined Approach



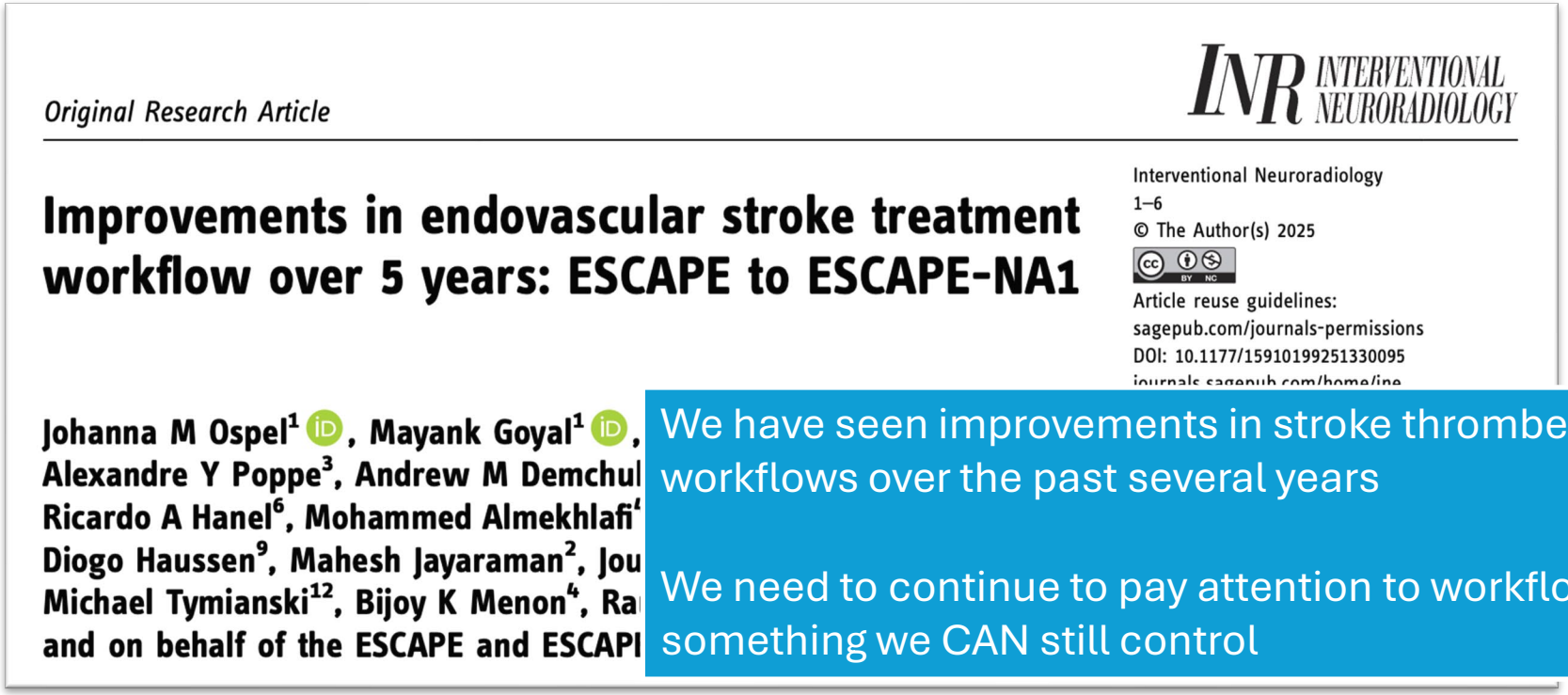
At the Clot

Along the way

CAPTIVE (McTaggart et al. JNIS 2016)
SAVE (Maus et al. Clin Neuroradiol 2018)
ARTS (Massari et al. Int. Neurod. 2016)
PROTECT PLUS (Maegerlein et al. Clin. Neuroradiol. 2018)
BADDASS (Ospel et al. Expert Rev Med Devices 2019)

Stent-retriever at the clot	Aspiration catheter alone
Local Aspiration Catheter	No additional catheter
Balloon Guide Catheter	Standard Long Sheath

What else can we do today



Original Research Article

INR INTERVENTIONAL NEURORADIOLOGY

Improvements in endovascular stroke treatment workflow over 5 years: ESCAPE to ESCAPE-NA1

Interventional Neuroradiology
1–6

DOI: 10.1177/15910199251330095
journals.sagepub.com/home/ine

Johanna M Ospel[1], Mayank Goyal[1],
Alexandre Y Poppe[3], Andrew M Demchul
Ricardo A Hanel[6], Mohammed Almekhlafi
Diogo Haussen[9], Mahesh Jayaraman[2], Jou
Michael Tymianski[12], Bijoy K Menon[4], Ra
and on behalf of the ESCAPE and ESCAPI

We have seen improvements in stroke thrombectomy treatment workflows over the past several years

We need to continue to pay attention to workflow as this is something we CAN still control

Summary

- After several years of consistently positive trials, we have had a pause with neutral MeVO and Neuroprotection trials
- Perhaps we can use this time to refocus on improving what we can control – how quickly and how well we open the vessel