Endovascular Treatment for Acute Ischemic Stroke: Medium & Distal Vessel Occlusion

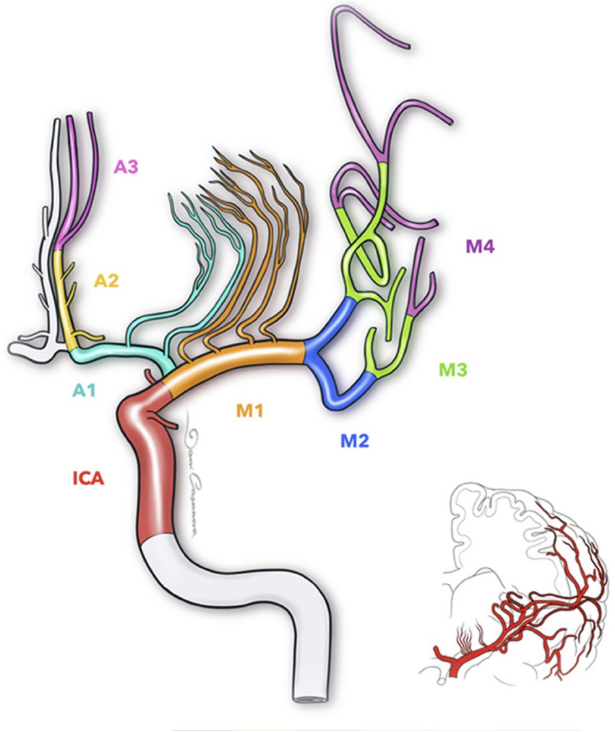
The DISTAL & ESCAPE-MeVO Trials

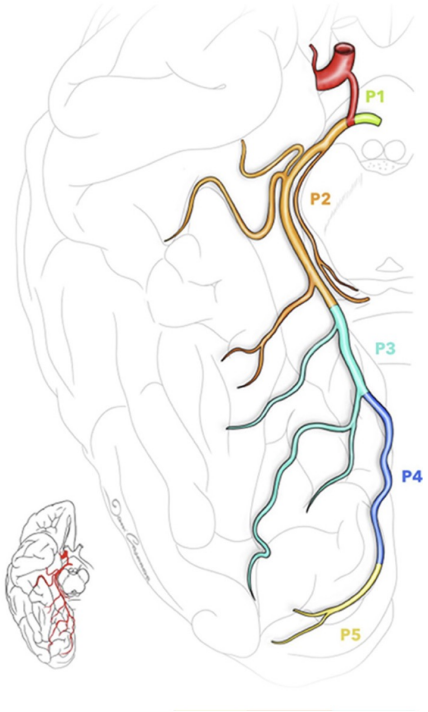
Background

- Endovascular treatment (EVT) improves functional outcomes for intracranial large vessel occlusive (LVO) acute ischemic stroke (AIS)
- AIS due to medium vessel occlusions (MeVO) and distal vessel occlusions:
  - Previously lacked evidence from randomized controlled trials
  - Observational studies suggested potential benefit
  - Significant disability can still result despite better natural history than LVO
- Two recent trials assessed EVT efficacy for MeVO and distal occlusions

Trial Overview

- *DISTAL excluded dominant M2 MCA occlusions*
- *ESCAPE-MeVO excluded A1 ACA and P1 PCA occlusions and required imaging evidence of salvageable brain tissue*





Trial	N	Presentation Window	NIHSS Criteria	Medium/Distal Vessel Occlusion
DISTAL	543	≤24 hours	≥4 or disabling deficit	Non-dominant or co-dominant M2, M3-M4 MCA; ACA (A1-A3); PCA (P1-P3)
ESCAPE-MeVO	530	≤12 hours	>5, or 3-5 if disabling deficit	M2-M3 MCA; A2-A3 ACA; P2-P3 PCA

Key Baseline Characteristics

Characteristic	DISTAL Trial (N=543)	ESCAPE-MeVO Trial (N=530)
Median age (IQR)	77 (68-83) years	75 (64-82) years
Female sex	44%	46.3% (EVT), 46.4% (control)
Median NIHSS (IQR)	6 (5-9)	8 (6-11) EVT, 7 (5-11) control
IV thrombolysis	65.4%	56.5% (EVT), 60.2% (control)
Occlusion locations	M2 (44.0%), M3 (26.9%), P2 (13.4%), P1 (5.5%)	M2 (50.2%), M3 (35.6%), A2-A3/P2-P3 (14.2%)
Time to randomization	3.9 hours (median)	270 min (EVT), 253 min (control)
ASPECTS (median)	9 (8-10)	9 (8-10) EVT, 10 (9-10) control
Successful reperfusion rate	71.7%	75.1%
General anesthesia use	No data provided	43.1%

Key Results

Both trials showed no clear benefit of EVT compared with medical management alone for improving functional independence or reducing disability in patients with MeVO and distal occlusions

Outcome	ESCAPE-MeVO	DISTAL
Primary outcome (functional outcome at 90 days)	No benefit (mRS 0-1): EVT 41.6% vs. usual care 43.1% (P=0.61)	No difference in disability (mRS distribution: OR 0.90; 95% CI, 0.67–1.22; p=0.50)
Mortality (90 days)	Significantly higher with EVT (13.3% EVT vs. 8.4% usual-care; aHR 1.82; 95% CI, 1.06–3.12)	Similar (15.5% EVT vs. 14.0% usual-care; OR 1.17; 95% CI, 0.71–1.90)
Symptomatic Intracranial Hemorrhage	Higher with EVT (5.4% EVT vs. 2.2% usual care)	Non-significantly higher with EVT (5.9% EVT vs. 2.6% usual care)
Reperfusion Rate	75.1%	71.7%

Modified Rankin Scale Distribution (90 Days)

- DISTAL

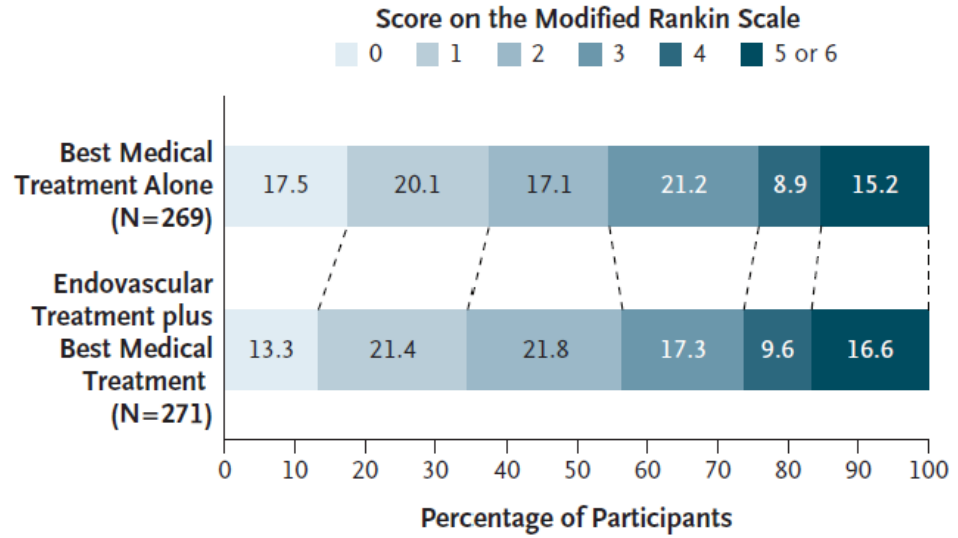


Figure 2. Modified Rankin Scale Scores at 90 Days.
Scores on the modified Rankin scale range from 0 to 6, with higher scores indicating more severe disability.

Common odds ratio for improvement in the score: 0.90 (95% CI, 0.67 to 1.22; P=0.50)

- ESCAPE-MeVO

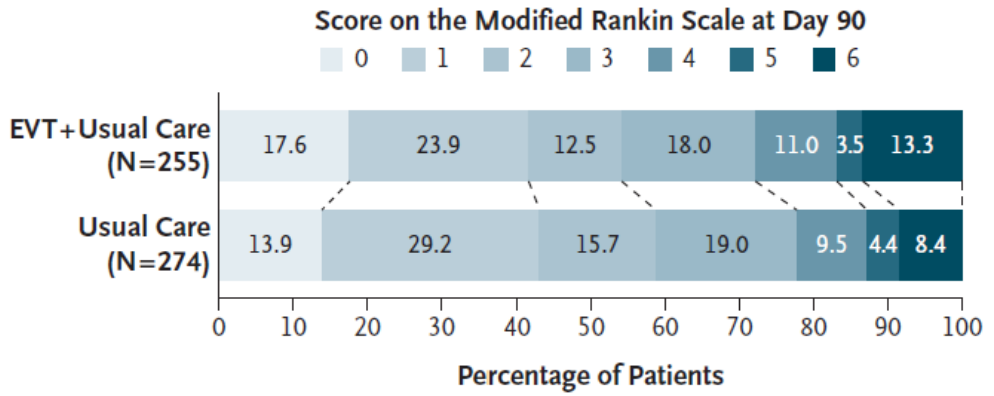


Figure 1. Distribution of Scores on the Modified Rankin Scale at 90 Days (Intention-to-Treat Population).

Primary outcome (mRS 0-1): 41.6% EVT vs. 43.1% usual care (adjusted rate ratio, 0.95; 95% CI, 0.79 to 1.15; P=0.61)

Subgroup Analyses

- DISTAL
  - No significant treatment effect across all predefined subgroups
- ESCAPE-MeVO
  - Possible heterogeneity according to time to treatment, but no clear heterogeneity in subgroups defined by:
    - Baseline NIHSS score
    - Sex
    - Age
    - Intravenous thrombolysis
    - Occlusion location (M2 vs. M3 vs. anterior/posterior circulation)
    - Tandem occlusion
  - *Results in the prespecified subgroup of participants with a moderate-to-severe stroke (NIHSS >5): common odds ratio for improvement 1.02; 95% CI, 0.69 to 1.51*

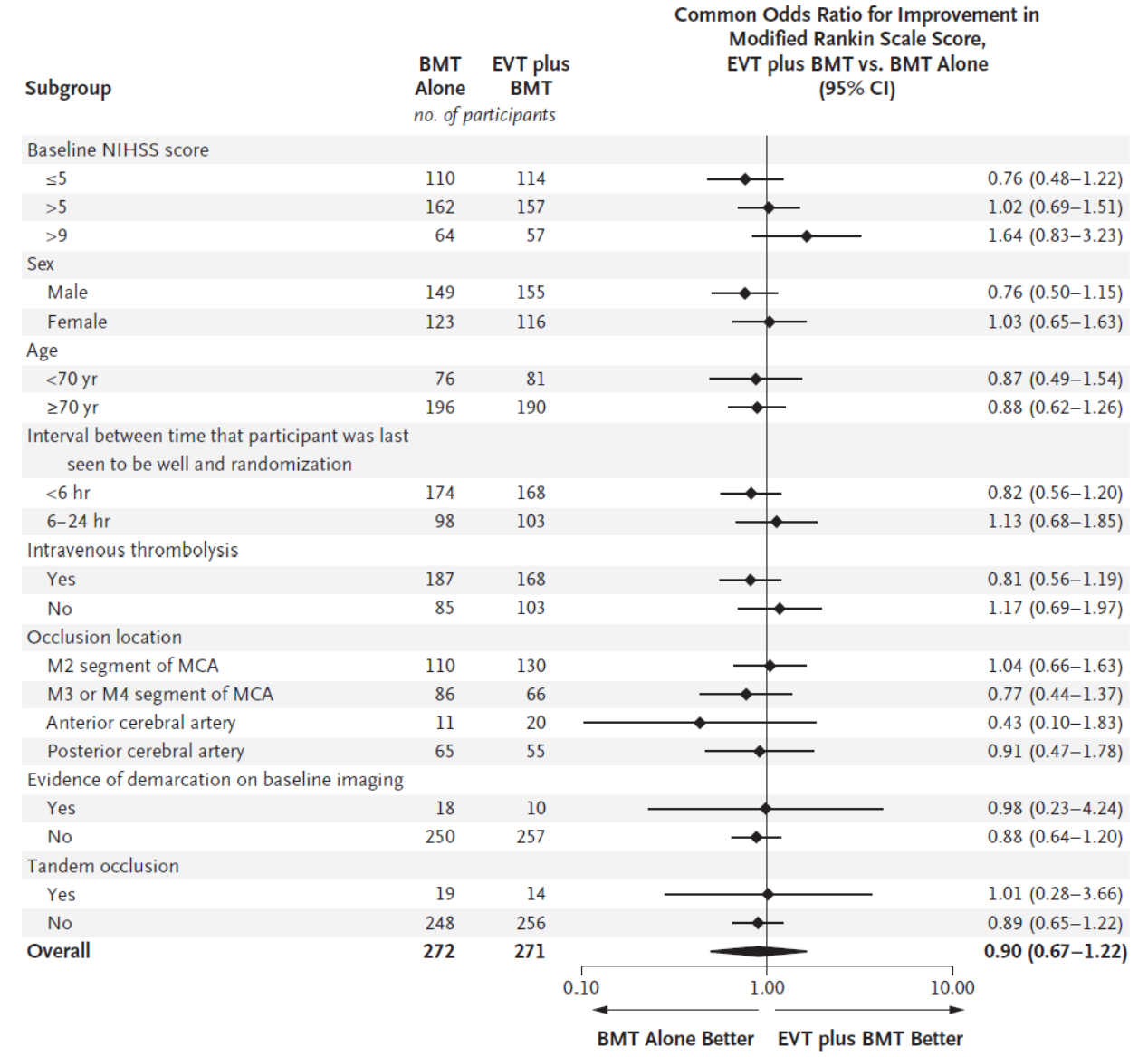


Figure 3. Subgroup Analyses.

Limitations

- Baseline Stroke Severity: Relatively mild deficits (median NIHSS: DISTAL 6; ESCAPE-MeVO 8)
- Participant Age: Higher median age (DISTAL: 77 years; ESCAPE-MeVO: 75 years) compared to LVO trials
- Technical Limitations: Lower reperfusion rates (71-75%) compared to previous LVO trials
- Selection Bias: Treating clinicians may have selected more favorable candidates for direct EVT treatment outside trials

Future Directions

- Meta-analyses to identify specific subgroups who might benefit from EVT
- Development of better technical approaches for medium and distal vessels
- Improved patient selection criteria
- Studies with faster workflow times and treatment
- Proper assessment of treatment effect in patients with higher severity strokes and younger patients

Clinical Implications

The Evidence Does Not Support

✗

Routine EVT for acute ischemic stroke caused by medium- and distal-vessel occlusions

Current Benefit Established For

✓

Intracranial ICA, M1 segment MCA, or basilar occlusion

Proximal (≤1cm) or dominant M2 segment MCA occlusion with evidence of salvageable tissue

References

1. DISTAL
2. ESCAPE-MeVO
3. J Mocco NEJM Editorial
4. Current challenges in the endovascular treatment of medium vessel occlusions