Comparative Efficacy of Endovascular Treatment Alone versus in Combination with Thrombolysis in Acute Ischemic Stroke: A Meta-Analysis of Randomized Controlled Trials

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Background

- Acute ischemic stroke (AIS) due to large vessel occlusion (LVO) is a leading cause of disability and death globally.
- Endovascular treatment (EVT) has transformed stroke management by improving recanalization and functional outcomes.
- The role of adjunct thrombolysis—either intravenous (IVT) or intra-arterial (IAT)—prior to EVT remains debated.
- Concerns include potential delays, increased hemorrhagic risk, and uncertain additive benefit.

Aim

To systematically evaluate whether bridging therapy (thrombolysis + EVT) improves functional and safety outcomes compared to EVT alone in patients with AIS due to LVO.

Materials & Methods

Study Design:

Systematic review and network meta-analysis conducted according to PRISMA and Cochrane guidelines.

Data Sources:

PubMed, Embase, CENTRAL, and ClinicalTrials.gov (January 2015 – March 2025).

Eligibility Criteria:

- Population: Adults (≥18 years) with acute ischemic stroke due to large vessel occlusion.
- Interventions: EVT ± thrombolysis (IV or IA).
- Comparators: EVT alone.
- Study Type: Randomized controlled trials (RCTs).

Primary Efficacy Outcomes:

- Functional independence at 90 days (modified Rankin Scale 0–2).
- Successful reperfusion (TICI 2b–3).

Safety Outcomes:

- Symptomatic intracerebral hemorrhage (sICH) within 24 hours.
- All-cause mortality at 90 days.

Statistical Analysis:

- Pooled odds ratios (OR) with 95% CI using random-effects models when heterogeneity (I^2) > 50%.
- GRADE used to assess certainty of evidence.
- Sensitivity and subgroup analyses performed to assess consistency and robustness.

Results

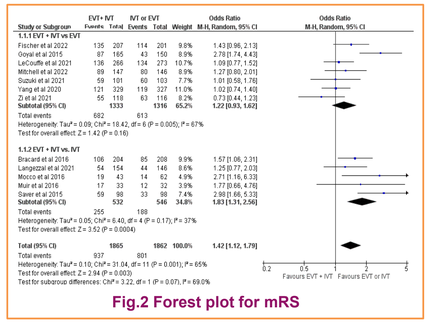

Fig.2 Forest plot for mRS

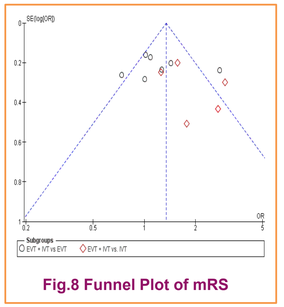

Fig.8 Funnel Plot of mRS

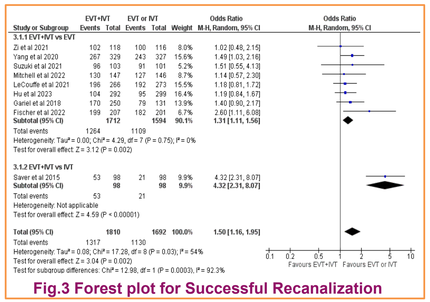

Fig.3 Forest plot for Successful Recanalization

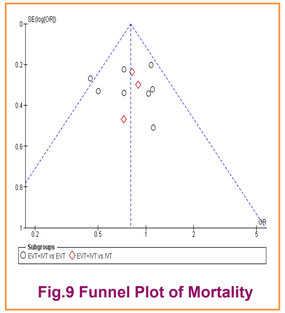

Fig.9 Funnel Plot of Mortality

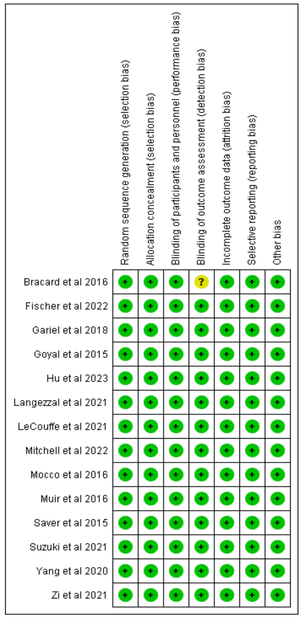

Fig.6 Summary of RoB

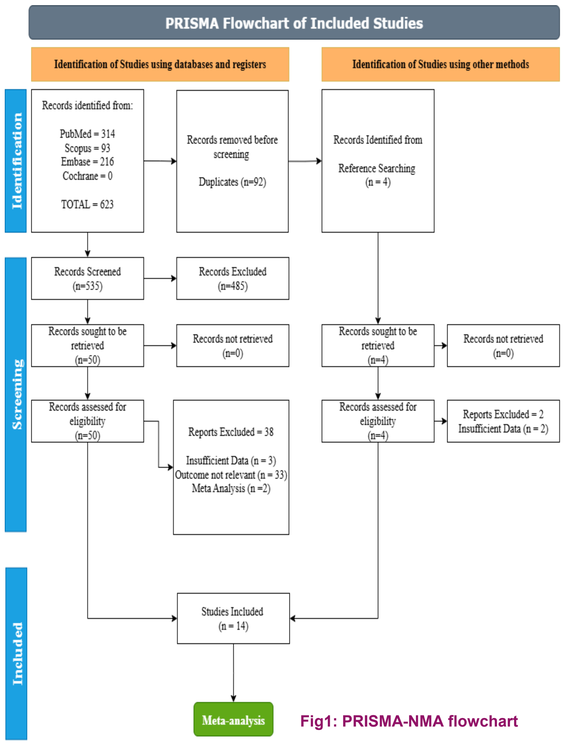

Fig1: PRISMA-NMA flowchart

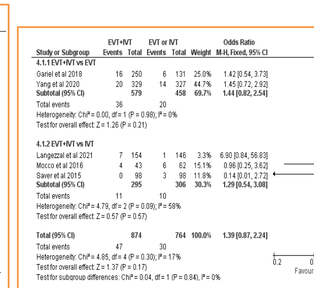

Fig.4 Forest plot for Mortality

Fig.5 Forest plot for sICH

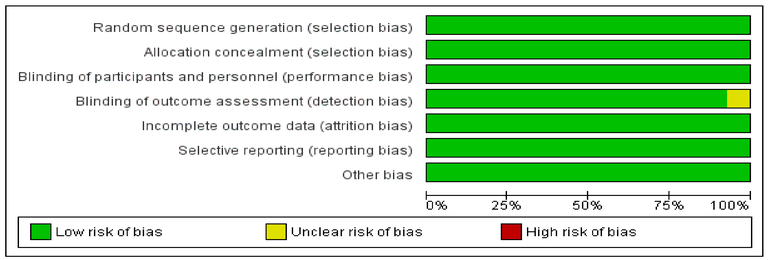

Fig.7 RoB Graph

Conclusions

- Bridging therapy improved functional outcomes and reperfusion success without a significant rise in hemorrhagic risk, and it reduced 90-day mortality—indicating a favorable efficacy–safety profile over EVT alone.
- These results support the continued use of bridging therapy as an effective treatment approach in acute ischemic stroke.

Study Summary:

14 RCTs (total n = 4,699 patients).
Comparable baseline characteristics: age ≈ 68 years, median NIHSS ≈ 17

Key Outcomes and Interpretation:

- **Functional Independence (mRS 0–2 at 90 days):** Patients receiving **bridging therapy** had **1.42 times higher odds** of achieving functional independence compared with those receiving EVT alone (95% CI: 1.12–1.79; $p < 0.05$).
- **Successful Reperfusion (TICI 2b–3):** The odds of achieving successful reperfusion were **1.5 times higher** in the bridging therapy group than in the EVT-only group (95% CI: 1.16–1.95; $p < 0.05$), suggesting a **significant procedural advantage** with bridging therapy.
- **Symptomatic Intracranial Hemorrhage (sICH):** Although the odds of sICH were slightly higher with bridging therapy (OR 1.39; 95% CI: 0.87–2.27), the result was **not statistically significant**, indicating **no clear evidence of increased hemorrhagic risk**.
- **All-Cause Mortality at 90 days:** Bridging therapy was associated with a **20% lower odds of mortality** at 90 days compared to EVT alone (OR 0.80; 95% CI: 0.66–0.96; $p < 0.05$), reflecting a **significant survival benefit**.