

Manuscript

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1. Navigate to Manuscript

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Abstract

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Background: High-quality evidence exists for mechanical thrombectomy (MT) treatment of acute ischemic stroke (AIS) due to large vessel occlusion of the anterior circulation (AC-LVO). The evidence for MT treatment of posterior circulation large vessel occlusion (PC-LVO) is weaker, largely drawn from lower quality studies specific to PC-LVO and extrapolated from findings in AC-LVO, and ambiguous with regards to technical success. We performed a systematic review and meta-analysis to compare the technical success and functional outcomes of MT in PC-LVO versus AC-LVO patients.

Methods: We identified comparative studies reporting on patients treated with MT in AC-LVO versus PC-LVO. The primary outcome of interest was thrombolysis in cerebral infarction (TICI) $\geq 2b$. Secondary outcomes included rates of TICI 3, 90-day functional independence, first-pass-effect, average number of passes, and 90-day mortality. A separate random effects model was fit for each outcome measure. Subgroup analyses were performed comparing studies with recruitment periods prior to 2014 versus after 2014.

Results: Twenty studies with 12,911 patients, 11,299 (87.5%) in the AC-LVO arm and 1,612 (12.5%) in the PC-LVO arm, were included. AC-LVO and PC-LVO patients had comparable rates of successful recanalization [OR=1.02 [95% CI: 0.79–1.33], $p=0.848$]. However, the AC-LVO group had greater odds of functional independence at 90 days (OR=1.26 [95% CI: 1.00; 1.59], $p=0.050$) and lower odds of mortality at 90 days (OR=0.58 [95% CI: 0.43; 0.79], $p=0.002$). In the subgroup analysis, AC-LVO patients (51.8% [95% CI: 38.4–64.8]) were found to achieve functional independence more often than PC-LVO (40.7% [95% CI: 21.8–62.8%]) patients treated after 2014, but this effect was not observed prior to 2014.

Conclusions: MT achieves similar rates of recanalization with a similar safety profile in PC-LVO and AC-LVO patients. Patients with PC-LVO are less likely to achieve functional independence after MT. Future studies should identify PC-LVO patients who are likely to achieve favorable functional outcomes or those in whom MT is futile.

Key Insights:

Mortality in Thrombectomy patients unaffected by Standard Medical Therapy

View in Context

The odds of Mortality for Mechanical thrombectomy were 1.01 times as likely as Mechanical Thrombectomy with concomitant intravenous Thrombolysis (95% CI [0.852, 1.21]) across 5,511 patients. There was no significant difference in the rate of mortality between these two therapeutic groups (16.6% [16.5%, 20.8%] for Thrombectomy vs. 14.3% [11.9%, 17.0%]).

Parent artery location was equivalent across therapies

View in Context

For Thrombolysis, Thrombectomy, or Thrombectomy with concomitant Thrombolysis, the rates of clot presence in the ICA was between 15% and 20%, the rate of clot presence in the MCA was between 65% and 70%, and all other occlusions were Tandem Occlusions. No significant differences were found among parent artery locations.

2. Interacting with Manuscript

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Title	First Author	Year	Interventions
Thrombectomy within 8 hours after symptom onset in ischemic stroke.	Jovin, Tudor G	2015	Stent-tri-er: We randomly assigned 206 patients in a 1:1 ratio to receive either medical therapy (including intra-venous alteplase when eligible) and endovascular treatment with the Solitaire stent retriever (thrombectomy group) or medical therapy alone (control group). ; Standard Care/Medical Therapy: We randomly assigned 206 patients in a 1:1 ratio to receive either medical therapy (including intra-venous alteplase when eligible) and endovascular treatment with the Solitaire stent retriever (thrombectomy group) or medical therapy alone (control group).
Clinical treatment efficiency of mechanical thrombectomy combined with rPro-UK thrombolysis for acute moderate/severe cerebral infarction.	Zhao, Q-S	2018	Mechanical Thrombectomy + IVT: Mechanical thrombectomy combined with thrombolysis presented favorable efficiency in the treatment of moderate to severe acute cerebral infarction than single treatment.
Endovascular therapy for ischemic stroke with perfusion-imaging selection.	Campbell, Bruce C V	2015	IVT alone: All patients received alteplase at a dose of 0.9 mg per kilogram as standard care. Patients were ran-domly assigned in a 1:1 ratio to receive either al-teplase plus endovascular therapy (endovascular-therapy group) or no further therapy (alteplase-only group) by means of a centralized website and stratified according to the site of arterial occlu-sion: the internal carotid artery or the first or second segment of the middle cerebral artery; Stent-tri-er + IVT: The Solitaire FR retrievable stent (Covidien) was deployed at the site of intra-cranial-vessel occlusion and then removed under negative-pressure aspiration.
SWIFT DIRECT: Solitaire™ With the Intention For Thrombectomy Plus Intravenous t-PA Versus DIRECT Solitaire™ Stent-retriever Thrombectomy in Acute Anterior Circulation Stroke: Methodology of a randomized, controlled, multicentre study.	Fischer, Urs	2022	Mechanical Thrombectomy + IVT: Patients were randomly assigned (1:1) via a centralised web server using a deterministic minimisation method to receive stent-retriever thrombectomy alone or intravenous alteplase plus stent-retriever thrombectomy.
A randomized trial of intraarterial treatment for acute ischemic stroke.	Berkhemer, Olvert A	2015	IAT: We randomly assigned eligible patients to either intraarterial treatment plus usual care or usual care alone.; Unknown MT + IAT: Mechanical treatment could involve thrombus re-traction, aspiration, wire disruption, or use of a retrievable stent.
Aspiration thrombectomy versus stent retriever thrombectomy as first-line approach for large vessel occlusion (COMPASS): a multicentre, randomised, open label, blinded outcome, non-inferiority trial.	Turk, Aquilla S	2019	Stent-tri-er: We randomly assigned participants (1:1) via a central web-based system without stratification to either direct aspiration first pass or stent retriever first line thrombectomy. ; Aspiration: We randomly assigned participants (1:1) via a central web-based system without stratification to either direct aspiration first pass or stent retriever first line thrombectomy.
Effect of Endovascular Treatment Alone vs Intravenous Alteplase Plus Endovascular Treatment on Functional Independence in	Zi, Wenjie	2021	Unknown MT: In the endovascular thrombectomy alone group, patients underwent endovascular treatment only, which included thrombectomy with stent retrievers, thromboaspiration, intraarterial

References

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3. How does this differ from a Publication?

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