Large Vessel Occlusion Treatment

Acute Large Vessel Occlusion Treatment

see Acute ischemic stroke treatment.

Indications

Acute Large Vessel Occlusion Treatment Indications.

In a multicenter, prospective, randomized, controlled, open-label, adaptive, noninferiority trial with blinded primary end point evaluation. Between October 2019 and February 2022, multicenter participation occurred across 19 research hospitals and/or universities in the US and 5 in Germany. Patients with LVO stroke were enrolled and included up to 8 hours after symptom onset.

Interventions: Patients underwent 1:1 randomization to thrombectomy with the pRESET or Solitaire stent retriever.

Main outcomes and measures: The primary outcome was the difference in the rate of 90-day functional independence across the 2 devices, using a -12.5% noninferiority margin for the lower bound of the 1-sided 95% CI of the difference between pRESET and Solitaire retrievers.

Results: Of 340 randomized patients, 170 (50.0%) were female, and the median (IQR) age was 73.0 (64.0-82.0) years. The study procedure was completed in 322 of the 340 randomized patients. The primary end point of 90-day functional independence was achieved by 95 patients (54.9%; 95% CI, 48.7-61.1) in the pRESET group and in 96 (57.5%; 95% CI, 51.2-63.8) in the Solitaire group (absolute difference, -2.57%; 95% CI, -11.42 to 6.28). As the lower bound of the 95% CI was greater than -12.5%, the pRESET retriever was deemed noninferior to the Solitaire retriever. The noninferiority of pRESET over Solitaire was also observed in the secondary clinical end point (90-day shift in modified Rankin Scale score) and in both angiographic end points (Expanded Treatment in Cerebral Infarction [eTICI] score of 2b50 or greater within 3 passes: 146 of 173 [84.4%] vs 149 of 167 [89.2%]; absolute difference, -4.83%; 95% CI, -10.84 to 1.19; eTICI of 2c or greater following the first pass: 76 of 173 [43.7%] vs 74 of 167 [44.3%]; absolute difference, -0.63%; 95% CI, -9.48 to 8.21). Symptomatic intracranial hemorrhage occurred in 0 patients in the pRESET group and 2 (1.2%) in the Solitaire group. Mortality occurred in 25 (14.5%) in the pRESET group and in 24 (14.4%) in the Solitaire group at 90 days. Findings of the per-protocol and as-treated analyses were in concordance with findings of the intention-to-treat analysis.

In this study, among patients with Large Vessel Occlusion (LVO) stroke, thrombectomy with the pRESET stent retriever was noninferior to thrombectomy with the Solitaire stent retriever. Findings suggest that pRESET offers a safe and effective option for flow restoration and disability reduction in patients with LVO stroke [1)].

to bridge or not to bridge?

Xiong Y, Pan Y, Nogueira RG, Ren Z, Jovin TG, Wang Y. Treating acute large vessel occlusion stroke: to bridge or not to bridge? Stroke Vasc Neurol. 2021 Apr 26:svn-2021-000952. doi: 10.1136/svn-2021-000952. Epub ahead of print. PMID: 33903180.

1. EVT is the Standard of Care EVT is the established first-line treatment for anterior circulation LVO strokes, with consistent benefits shown in RCTs like MR CLEAN, ESCAPE, and SWIFT PRIME. A 2024 meta-analysis of 15 trials (n=3,897) confirmed significant improvement in 90-day functional independence (mRS 0-2 and 0-1) and recanalization rates.

2. Expanding Windows: EVT Beyond 6 Hours Supported by DAWN and DEFUSE 3, late-window thrombectomy (6–24h from last known well) benefits carefully selected patients with favorable imaging. Benefits now extend even beyond 24 hours in select cases.

3. Large-Core Strokes (ASPECTS ≤ 5) Six recent RCTs (e.g., SELECT2, ANGEL-ASPECT, TESLA) and a 2025 AHA advisory support EVT in patients with large infarct cores, marking a shift from prior exclusion. Outcomes still depend heavily on imaging and clinical context.

4. Clinical Nuances & Special Populations

- Mild Strokes (NIHSS < 6) Meta-analyses suggest modest benefit, especially in non-crossover cohorts. Higher risk of symptomatic ICH cautions against indiscriminate use.

- Tandem Occlusions Involving both cervical and intracranial blockages, these require complex management often involving stenting or angioplasty. Outcomes depend on operator skill and anatomic variation.

- Medium Vessel Occlusions (M2/M3) Evidence is emerging (e.g., ESCAPE-MeVO), with results highly contingent on collaterals and timing. Trials ongoing.

5. Safety & Logistics

- Symptomatic ICH rates are higher with EVT but not associated with increased mortality. - Faster treatment correlates with better outcomes. “Time is brain” remains a core principle. - EVT effectiveness relies on rapid imaging and streamlined interventional access.

Summary Table

Patient Group	Time Window	Evidence Level	Key Considerations
Standard LVO (ASPECTS ≥ 6)	≤ 6 h	High (multiple RCTs)	Strongest benefit, standard of care

Patient Group	Time Window	Evidence Level	Key Considerations
LVO with perfusion mismatch	6–24 h	High (DAWN/DEFUSE/Meta-analyses)	Requires advanced imaging
Large-core LVO (ASPECTS ≤ 5)	≤ 24 h	Moderate to High (6 RCTs + AHA Advisory)	Carefully selected patients
Mild LVO (NIHSS <6)	Variable	Low to Moderate (meta-analyses, mixed data)	Higher ICH risk; clinical equipoise
Tandem/M2-M3 Occlusions	Variable	Low to Moderate (observational/small RCTs)	Operator-dependent, imaging-based decisions

Final Thoughts for Practice

- EVT remains the backbone of LVO treatment. - Imaging and time-to-treatment are critical for outcome optimization. - Expansion to large-core and extended time windows is evolving rapidly, but real-world validation and nuance in patient selection remain essential.

1)
Nogueira RG, Lobsien D, Klisch J, Pielenz D, Lobsien E, Sauvageau E, Aghaebrahim N, Möhlenbruch M, Vollherbst D, Ulfert C, Bozorgchami H, Clark W, Priest R, Samaniego EA, Ortega-Gutierrez S, Ghannam M, Lopes D, Billingsley J, Keigher K, Haussen DC, Al-Bayati AR, Siddiqui A, Levy E, Chen M, Munich S, Schramm P, Boppel T, Narayanan S, Gross BA, Roth C, Boeckh-Behrens T, Hassan A, Fifi J, Budzik RF, Tarpley J, Starke RM, Raz E, Brogan G, Liebeskind DS, Hanel RA. Thrombectomy With the pRESET vs Solitaire Stent Retrievers as First-Line Large Vessel Occlusion Stroke Treatment: A Randomized Clinical Trial. JAMA Neurol. 2024 Jan 2. doi: 10.1001/jamaneurol.2023.5010. Epub ahead of print. PMID: 38165690.