aneurysms, 94% endovascular vs 79% surgical patients (p<0.01) were functionally independent at discharge (96% endovascular vs 92% surgical patients (p=0.3) discharged to home/rehab). At follow-up of ruptured aneurysms, 92% endovascular vs 72% surgical patients (p<0.01) were functionally independent (94% endovascular vs 79% surgical (p=0.01) living at home). At follow-up of unruptured aneurysms, 96% of endovascular vs 88% surgical patients (p=0.02) were functionally independent (97% endovascular vs 98% surgical (p>0.5) living at home). Post-procedural angiographic outcomes were similar for ruptured and unruptured aneurysms. Recurrence/retrieval occurred in 15% endovascular (21% ruptured, 11% unruptured) vs 8% surgical patients (p<0.01). Conclusion Endovascular treatment of intracranial aneurysms was associated with better overall clinical outcomes than surgical clipping with improved disability free survival and better disposition at discharge or follow-up, across both ruptured and unruptured aneurysms. Although intraoperative complications were higher for ruptured aneurysms treated with endovascular treatment, there was no difference in unruptured aneurysms versus surgical clipping. Post-operative complications were lower for the endovascular cohort regardless of presentation. Overall, these data support ongoing primary adoption of endovascular treatment of both ruptured and unruptured aneurysms, though the long-term effects of reduced durability and increased recurrence/retrieval rates remains unclear.


Background The safety and efficacy of mechanical thrombectomy (MT) for the M2 segment of the middle cerebral artery (MCA) has been shown to be effective and safe in recent post-hoc or observational studies. There is, however, no known benefit to MT for the M2 segment in the delayed time window (>6 hours). Here, we perform a propensity score analysis of MT for MCA M1 and M2 segments in a delayed time window using the multi-national, multi-institutional (Stroke Thrombectomy and Aneurysm Registry) STAR registry to test the safety and efficacy of MT in this patient population.

Methods The STAR registry is a prospective, multicenter, non-randomized observational study registry for acute ischemic stroke thrombectomy and aneurysm treatment. We analyzed all patients who underwent MT within a late time window (>6 hours from onset) involving isolated M1 or M2 occlusions. Patients with missing clinical outcomes were excluded. Each center independently collected basic demographics, medical history, comorbidities, baseline functional status (using the modified Rankin scale, mRS), details of presentation (including the NIHSS), details of the MT (including location and technique), clinical outcomes, and complications. Unbalanced cohorts with a nonrandom distribution of patients between the cohorts were accounted for by using propensity score (PS) matching. After PS-matching, all variables were compared again using univariate hypothesis tests between the isolated M2 and PS-matched M1 cohorts to determine whether the PS-matching algorithm yielded balanced comparison groups.

Results Of 1083 consecutive patients analyzed, propensity matching yielded 180 well matched M1 and M2 pairs; the remaining 723 patients were discarded from the analysis. Baseline demographics were well balanced between the groups (M1 and M2). ASPECTS score (7.6 ± 1.7 versus 8.3 ± 1.5, P<0.001) was higher in the M2 group. Intravenous thrombolysis (IV tPA) use was numerically higher in the M2 group but did not reach statistical significance (20.0 versus 23.3; P=0.522). Procedural technique (ADAPT, Stent-retriever, Solitaire) thrombectomy duration (35.2 ± 25.3 versus 36.1 ± 28.8; P=0.754) and the number of passes (2.3 ± 2.1 versus 2.3 ± 1.7; P=0.978) were similar in both groups. Final mTICI score 2b/2c/3 (26.7 ± 12.4 ± 24.1 versus 38.3 ± 13.3 ± 38.9; P=0.053) were not significantly different. Post-procedural asymptomatic hemorrhage rates were similar (29.4 versus 27.8; P=0.816), but symptomatic hemorrhage rates were higher in the M1 group (7.2 versus 2.2; P=0.047). Rates of good clinical outcome (mRS 0–2) were similar at 3 month follow-up (43.9% versus 46.7%; P=0.672). The overall mortality was similar between the cohorts (12.8% versus 13.9%; P=0.877).

Conclusion In the STAR registry, M2 occlusions achieved similar rates of recanalization and good functional outcome compared to M1 occlusions. There was less symptomatic intracranial hemorrhage in the M2 compared to M1 group in the delayed time window (>6 hours). Analysis of the STAR registry, a large multinational and multi-institutional database, shows a relatively generalizable result for safety and efficacy of M2 thrombectomy in a delayed time window.

Background Endovascular thrombectomy (EVT) is the standard of care for proximal large vessel occlusion (LVO) stroke. Due to the high effect size of EVT, neurointerventionalists have expanded the indications of EVT to include more distal occlusions. Data on technical and clinical outcome in distal vessel occlusions (DVOs) remain limited. We evaluated technical and clinical outcomes after EVT in distal occlusion stroke while comparing different frontline thrombectomy techniques.

Methods We report an international multicenter retrospective study of patients, 18 years or older, undergoing EVT for ischemic stroke at 32 centers between 01/2015 and 12/2021. Patients were divided into proximal occlusions (ICA/M1/Vertebralbasilar), medium vessel occlusions (M2, A1, P1) or isolated distal vessel occlusions (M3, M4, A2, A3, P2/3) and categorized by the thrombectomy technique. Primary outcome was a good functional outcome (mRS 0–2) at 90 days and compared between different techniques. Secondary outcomes included successful recanalization, procedure time, thrombectomy attempts, post-procedural hemorrhage and mortality. Multivariate logistic regressions were used to evaluate the impact of technical variables including procedure time, attempts, and frontline technique on clinical outcomes. Propensity score matching was used to compare outcome in patients with DVO treated with aspiration versus stent retriever as frontline approach.

Results We included 7,477 patients including 5,977 proximal occlusions and 213 distal occlusions. Distal location did not independently predict good functional outcome at 90 days compared to proximal when baseline covariates were accounted for (p = 0.467). In distal occlusions, successful recanalization was an independent predictor of good outcome at 90 days (aOR = 5.11, p < 0.05) irrespective of frontline technique. Younger age, use of bridging therapy and lower admission NIHSS were also predictors of good outcome. Procedure time less than 1 hr or thrombectomy attempts less than 3 were independent predictors of 90-day good outcomes in the DVO cohort irrespective of technique (aOR = 4.5 and 2.3 respectively, p < 0.05). There were no differences in technical or clinical outcomes in a matched cohort of aspiration versus stent-retriever in the DVO group (p > 0.5). Rates of hemorrhage and good outcome showed an exponential relationship to procedural metrics, and were more dependent on procedure time in the aspiration group compared to the number of attempts in the stent-retriever group.

Conclusions Clinical outcomes following EVT for DVO are comparable to those in LVOs with similar baseline covariates with no differences between the different frontline techniques. The golden hour or 3-pass rules in LVO thrombectomy still apply to DVO thrombectomy. Different frontline techniques may exhibit different futility metrics; SR thrombectomy was more influenced by more attempts whereas aspiration outcomes were more dependent on procedure time.