Abstract E-088 Figure 1 90 day mRS outcomes for all patients undergoing mechanical thrombectomy

Results We identified a total of 195 MCA occlusion patients over a 3 ½ year period meeting our inclusion criteria. There were no significant differences in age, gender, race, comorbidities, or median NIHSS between the ATA not visualized (n=103) versus visualized (n=92) cohort. There were significantly more wake-up strokes in the ATA visualized group (26.7% vs 11.9%, p=0.0091). In regard to imaging variables, there was no significant differences in baseline ASPECT scores, post intervention TICI scores, or interval from last known well to revascularization (p=0.7499, p=0.7235, and p=0.5337, respectively). Perfusion parameters were less favorable in patients where the ATA was not visualized with larger core infarct (8cc vs 0cc, p=0.005, CBF < 30% of normal tissue) and larger penumbra (134cc vs. 117cc, p=0.004, T max >6 seconds). There was a non-significant trend for favorable outcome (mRS≤3) at 90 days in patients where the ATA is visualized (69.6% vs. 56.3%, p=0.0562) (figure 1). Independent predictors of favorable outcome were age (p<0.0001), hypertension (p=0.02), and baseline NIHSS (p<0.0001).

Conclusion Though the presence of the anterior temporal artery in patients undergoing recanalization for MCA occlusion did not reach statistical significance for predicting independent outcomes, there was a strong trend for improved outcomes. Particularly for institutions without CTP capability or when CTP data is not-reliable, this association with ATA visualization should be further investigated as a predictor for good outcome after successful mechanical thrombectomy.

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E-089

SYSTEMATIC REVIEW AND META-ANALYSIS OF FACTORS ASSOCIATED WITH DISTAL CLOT MIGRATION

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Introduction Distal clot migration (DCM) is defined as the moving of an occluding clot from its initial location on pre-procedural imaging to a more distal location, identified on peri-procedural angiographic images. In a recent study, clot migration was associated with incomplete reperfusion and negative patient outcomes, making it an important factor to consider in thrombectomy.

Aim To identify factors associated with DCM.

Objective To categorize risk factors and outcomes that have a significant association with DCM through a systematic review and meta-analysis.

Methodology Comprehensive search of several databases limited to English language and excluding animal studies was conducted. The databases included Ovid MEDLINE(R), Ovid Embase, Ovid Cochrane Central Register of Controlled Trials, Ovid Cochrane Database of Systematic Reviews, and Scopus. Studies were filtered based on our inclusion criteria and data on baseline demography, procedural details and outcomes was collected. Measures of association with DCM were calculated using random effect size with restricted maximum likelihood.

Results Eight studies with 3115 patients were included in this study. The incidence rate of DCM was 17.2% (95% CI, 11.5%-24.9 %). Use of IV-tPA was the only pre-procedural factor that had significantly higher odds associated with DCM (OR, 2.8; 95% CI, 1.1-7.3; p<0.05). For post-procedural outcomes, the odds of having a hemorrhagic conversion were significantly higher in patients with DCM (OR, 2.4; 95% CI, 1.1-5.4; p<0.05). Other pre-procedural factors such as history of dyslipidemia and hypertension and peri-procedural factors such as recanalization rate were not significantly associated with DCM.

Conclusion DCM is a new phenomenon described in the literature with unknown risk factors and outcomes associated with it. This review identified the use of IV-tPA and hemorrhagic conversion as statistically significant factors associated with DCM.

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E-090

MECHANICAL MECHANISMS OF EFFECTIVE BLOOD CLOT REMOVAL

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The efficacy of neurovascular thrombectomy depends on several fluid dynamic and material property considerations. Only an entirely impermeable clot that completely obstructs the tip of a thrombectomy device will be governed in its removal by force (of suction) divided by area (of the catheter lumen).

However, nearly all blood clots are both porous and deformable. Clot porosity enables continuous fluid flow, which results in drag forces on the solid elements of the network¹ that promote ingestion. Clot permeability is closely related to clot perviousness, which is a measure of contrast agent accumulation within clots, detectable by computed tomography angiography.² Moreover, clot perviousness is associated with first pass success with thrombectomy.³ Clot deformation also promotes clot ingestion into a narrow bore catheter. Benchtop data has demonstrated that clots can elongate from 20% to 100% prior to breakage.⁴⁻⁵ Therefore, greater fluid flow during thrombectomy promotes greater clot ingestion through multiple mechanisms. Greater fluid flow can also promote more rapid clot ingestion during thrombectomy since the higher velocities convect clots faster during ingestion. Decreases in thrombectomy procedure time will reduce risk and post-procedure complications. New benchtop experimental and pre-clinical data will be presented that support the relevance of these mechanical mechanisms of effective blood clot removal in neurovascular applications.

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E-091 OUTCOME FOLLOWING MECHANICAL THROMBECTOMY FOR ANTERIOR CIRCULATION LARGE VESSEL OCCLUSION STROKE IN OCTOGENARIANS AND NONAGENARIANS COMPARED TO YOUNGER AGE

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Objective Pooled data of randomized controlled trials investigating mechanical thrombectomy (MT) to treat anterior circulation large vessel occlusion has demonstrated safety and effectiveness across all age groups, including ≥ 80 years of age. However, only a few nonagenarians were in the ≥ 80 years subgroup. Therefore, the benefit of MT in nonagenarians is mostly unknown.

Methods Two comprehensive stroke centers retrospectively reviewed all acute ischemic stroke patients who underwent mechanical thrombectomy for anterior circulation large vessel occlusion (LVO) stroke between 02/2016 and 08/2020. Revascularization TICI2b/3, symptomatic intracranial hemorrhage (ICH), and functional outcome using modified Rankin scale (mRS) were assessed for cases aged < 80 , 80 - 89, and ≥ 90 years. A favorable (moderate) functional outcome was defined as mRS 0 - 2 (mRS 0 - 3) or reaching pre-stroke mRS.

Results The final data set comprised a total of 736 cases. Of these, 466 aged < 80 years, 219 aged 80 - 89 years, and 51 aged 90 - 99. TICI 2b/3 revascularization was observed in 84.3% of nonagenarians, and symptomatic ICH was observed in 4% of nonagenarians. These rates did not differ across age

groups. A favorable functional outcome (19.6%), a moderate functional outcome (29.4%), and the death rate (51.0%) among nonagenarians were significantly poorer compared to aged < 80 ($p < 0.001$) and numerically lower compared to octogenarians ($p = ns$).

Conclusion A moderate outcome among nonagenarians is observed in about 30%, while mortality rates are about 50%. Withholding mechanical thrombectomy does not appear justifiable, although the absolute treatment effect among nonagenarians remains unknown.

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E-092 MECHANICAL THROMBECTOMY FOR ANTERIOR VERSUS POSTERIOR CIRCULATION LARGE VESSEL OCCLUSION STROKE: A TWO-CENTER OUTCOME ANALYSIS

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Objective While there is class I evidence for mechanical thrombectomy for anterior circulation large vessel occlusion (LVO) stroke; no high-class evidence exists for the posterior circulation. Multiple retrospective case studies have assessed thrombectomy for posterior circulation LVO but incorporated data before 2015. The authors sought to explore outcomes of post-2015 posterior LVO mechanical thrombectomy.

Methods Acute ischemic stroke patients who underwent mechanical thrombectomy for anterior and posterior large vessel occlusion (LVO) stroke between 02/2016 and 08/2020 from two comprehensive stroke centers were reviewed. Anterior and posterior LVO strokes were compared. Predictors for a favorable outcome (mRS 0-2), death (mRS 6), and futile revascularization (mRS 4-6 despite TICI 2b/3 revascularization) for posterior LVO were analyzed.

Results Collectively, 813 LVO thrombectomy cases were analyzed, and 77/813 (9.5%) were located in the posterior circulation. While favorable 90-day functional outcome rates did not differ between anterior and posterior LVO, death was significantly more frequent among posterior LVO cases. Posterior, compared to anterior location, independently predicted death in multivariable analysis. In the posterior LVO subgroup, a primary aspiration technique and successful revascularization TICI 2b/3 irrespective of time to the intervention was independently associated with achieving a favorable outcome and preventing death. Higher risk of futile revascularization, however, was independently associated with treatment beyond the six-hour time window.

Conclusion Posterior circulation LVO mechanical thrombectomy appears safe and effective in judiciously selected patients. The use of a primary aspiration technique and achieving successful revascularization appear fundamental.

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