Predictors of Favorable Clinical Outcome in Posterior Circulation Acute Ischemic Stroke | Insights from STAR

Introduction Endovascular thrombectomy (ET) is the standard of care for acute ischemic strokes (AIS) secondary to large-vessel occlusions. The evidence regarding benefit of ET for posterior circulation AIS (pcAIS) remains uncertain and under-explored. Two randomized controlled trials, BEST and BASICS, failed to show any statistically significant benefit with ET. Given the uncertain evidence, it is important to identify factors that can predict favorable clinical outcomes in pcAIS and help in optimizing patient selection for ET. In this study, we investigate the efficacy of ET and address the clinical, radiological, and procedural predictors of favorable clinical outcome in pcAIS.

Methods Patients with pcAIS from the Thrombectomy and Aneurysm Registry (STAR) were included. Based on the 90-day functional outcome on the modified Rankin Scale (mRS), patients were grouped under favorable (mRS 0-3) and poor (mRS 4-6) functional outcomes. Baseline demographic, clinical, radiological, and procedural characteristics were analyzed by the two outcome groups. In addition, initial CT angiogram (CTA) findings, and composite scores for collateral circulation (BATMAN score) and clot burden (pc-CTA score) were reported. Adverse events of interest included distal emboli, symptomatic intracranial hemorrhage (sICH), and mortality. Predictors of favorable outcomes were assessed via univariate (UVA) and multivariate (MVA) logistic regressions.

Results A total of 383 patients with pcAIS received ET between 2012 and 2020; 216 (49%) achieved favorable outcomes. Patients with favorable outcomes had lower mean pre-admission mRS scores (0.3 vs. 0.7; P = <.001), lower mean admission National Institute of Health Stroke Scale (NIHSS) (11 vs. 16; P = <.001) and were less likely to have prior stroke (11.3 vs. 24%; P = 0.003). Prevalence of vertebral artery (VA) and proximal basilar artery (PBA) occlusions was higher among patients with poor outcomes (VA: 43.6% vs. 21.8%; P <.001, PBA: 32% vs. 17%; P = 0.035). Patients achieving favorable outcomes had shorter total procedure times (63.9 vs. 48 minutes; P = 0.003), better first pass efficacy (FPE) (62.7 vs. 38.6%; P <.001), and higher final reperfusion rates (77.5 vs. 88.6%; P = 0.01). Higher complication rates were associated with poorer outcomes; particularly distal emboli (11.8 vs. 2.3%; P = 0.01), sICH (3.7 vs. 0.6%; P = 0.047), and vessel rupture (5 vs. 0%; P = 0.009). On UVA, FPE was associated with increased odds of favorable outcomes (OR: 2.676; P < 0.001). Several negative predictors of favorable outcomes were identified on UVA including higher pre-admission NIHSS, African American race, VA occlusion, occluded VA contralateral to the ET catheter access site, use of a combination of aspiration/stent retriever, longer procedure times, distal emboli, and hemorrhagic conversion, however, prior AIS, high admission NIHSS, and combined ET technique remained the only independent negative predictors of favorable outcome on MVA.

Conclusion Procedure time, FPE, and reperfusion rates are significant predictors of functional outcomes in pcAIS. Initial NIHSS, history of AIS, and combined technique were the only independent predictor of functional outcome in our study. Larger cohorts are needed to identify further potential factors associated with functional independence in pcAIS population.


Robotic Transcranial Doppler with Artificial Intelligence to Identify Cerebral Emboli During Transcatheter Aortic Valve Replacement - A Novel Neuromonitoring Tool

Introduction Despite advancements in cardio-intervention device technology and enhanced operator experience, peri-procedural ischemic stroke remains a major and serious complication with increased mortality in patients undergoing transcatheter aortic valve replacement (TAVR). We aimed to use a novel Robotic Transcranial Doppler (NovaGuide Intelligent Ultrasound, NovaSignal Corp., Los Angeles CA USA) with Artificial Intelligence for real-time intraoperative neuro-monitoring during TAVR in order to establish the safety and validity of this tool in detecting cerebral emboli and report perfusion outcomes in real-time. We also sought to highlight the critical stages of TAVR in terms of embolic disruption and differences seen between emboli count with and without cerebral protection device, overall providing preliminary data to establish a neuromonitoring tool.

Methods Consecutive patients who underwent TAVR at our institution were identified and consented. Basic demographics and procedural details such as use of sentinel cerebral protection device, type of aortic valve used, and any intra- or post-procedure complications were also noted. In terms of follow-up, comprehensive neurologic examinations were performed post-procedure and at 30-days. For the purposes of identifying crucial parts of the procedure during which most catheter and