CLINICAL OUTCOMES, IMAGING OUTCOMES, AND TREATMENT OF GIANT INTRACRANIAL ANEURYSMS: PREDICTORS OF OUTCOMES IN TANDEM ANTERIOR CIRCULATION OCCLUSIONS FOLLOWING MECHANICAL THROMBECTOMY

Background and Purpose

Traditional endovascular treatments of giant intracranial aneurysms are associated with high rates of complications and retreatment. Our objective was to examine the safety and long-term efficacy of the Pipeline Embolization Device for treatment of giant intracranial aneurysms.

Methods

This retrospective study using the IntrePED database included all patients with giant intracranial aneurysms treated with the Pipeline device between July 2008 and February 2013. Efficacy outcomes were stratified using the Raymond–Roy Occlusion Classification. Predefined safety outcomes included spontaneous rupture of the target aneurysm; ipsilateral intracranial hemorrhage; ischemic stroke; parent artery stenosis; and sustained cranial neuropathy.

Results

Sixty-six embolizations were performed to treat 63 giant intracranial aneurysms (including 2 ruptured): 49 (77.8%) in the anterior and 14 (22.2%) in the posterior circulation. The median follow-up was 22.4 (0.1–60.5) months. Class 1 angiographic occlusion was achieved in 72.0% (36/50). The neurological morbidity and mortality rate was 23.8% (15/66), with higher rates in the posterior circulation (22.4% vs. 28.6%). Among 7 deaths, 5 had neurological causes. The procedure-related neurological morbidity and mortality rates were 22.7% (15/66) and 7.6% (5/66), respectively. The spontaneous rupture rate was 4.5% (3/66). Two spontaneous ruptures (1 death), all postprocedural intracranial hemorrhages, and 6 ischemic events occurred within 30 days post-treatment. In-stent stenosis and new-onset cranial neuropathy were not observed during the angiographic follow-up period.

Conclusions

Although the procedure-related neurological morbidity and mortality rates are not insignificant, this study confirms the feasibility and long-term efficacy of the Pipeline Embolization Device in the treatment of giant intracranial aneurysms.

Disclosures

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occlusions are particularly ominous, often requiring angioplasty and/or stenting of the extracranial lesion. Controversy remains regarding appropriate management for anterior circulation tandem occlusions requiring mechanical thrombectomy. Herein, predictors of outcome are analyzed for these challenging lesions.

Methods A retrospective analysis of all patients that were managed with an anterior circulation tandem mechanical thrombectomy from 1/1/2014 to 5/31/2020 at a single comprehensive stroke center. Patient demographics, occlusion characteristics, intraoperative/post-operative management, and in-hospital/discharge outcomes, were abstracted from the medical record of eligible patients. Outcomes analyzed included intracerebral hemorrhage, symptomatic intracerebral hemorrhage, TICI score, and discharge NIHSS. For univariate analysis, Welch’s two-sample t-test for continuous data and chi-squared test for frequency-based variables were used. Multivariate analysis used multivariate linear and Firth’s logistic regression.

Results During the study period, 54 patients were identified with an anterior circulation tandem occlusion undergoing a mechanical thrombectomy. The average age was 66.5 (SD = 13.10), and 65% were male. 72% of patients had hypertension, 35% had atrial fibrillation. 17% had a prior history of stroke. 92% had a baseline modified Rankin Scale (mRS) of ≤ 2. The average initial National Institutes of Health Stroke Scale (NIHSS) score was 15.41 (SD = 6.69) at presentation. Intravenous TPA was given in 44.4% prior to the intervention. The mean post-treatment infarct volume was 71.53 ±85.00 mm. Concomitant intracranial M1 occlusion was observed in 75% of patients. 83% of patients had good reperfusion (TICI ≥ 2B). Discharge NIHSS was 10.3 ±7.4. On multivariate analysis, male sex, hyperlipidemia, prior history of anticoagulant use, and extracranial stenting was associated with increased risk of any intracerebral hemorrhage (ICH) on post-operative computed tomography (CT). However, only infarct volume (OR = 1.02, 95% CI: 1.00–1.06, p = 0.03) was associated with symptomatic ICH. Extracranial stenting was associated with a significantly greater odds of good final reperfusion (TICI ≥ 2B, OR = 28.694, p = 0.014). Predictors of the number of passes required included prior anticoagulation use and concomitant M1 occlusion (OR = 2.72, 1.611, p < 0.05, respectively). Post-procedure infarct volume and initial NIHSS were also predictors of discharge NIHSS (p = 0.02). When investigating optimal thresholds for predicting ICH following stenting, a threshold of 118.5 mm predicted symptomatic ICH (AUC = 0.915, accuracy = 92%).

Discussion In this study, we present outcomes of patients undergoing tandem mechanical thrombectomy. We demonstrate that stenting is associated with improved final reperfusion, but increased odds of asymptomatic ICH. Additional clinical trials should be performed to optimize the procedure and improve patient outcomes.


Abstract E-024 Figure 1 The three-step approach of the proposed model