E-017 ROBOTIC NEUROVASCULAR SURGERY: SINGLE CENTER EXPERIENCE AND REVIEW OF THE LITERATURE

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Introduction Robotics could expand treatment of rapidly progressive pathologies such as acute ischemic stroke, with the potential to provide populations in need prompt access to neuro-endovascular procedures.

Methods Robotically-assisted (RA) neuro-endovascular procedures (RANPs) performed at our institution were retrospectively examined (RA-group, RG). A control group of manual neuro-endovascular procedures was selected (manual group, MG). Total operating room (OR) time, procedural time, contrast media use, fluoroscopy time, conversion from RA to manual control, procedural success, and complication rates were compared. A learning curve was identified.

Results Forty-one (41) RANPs were analyzed. Ages ranged from 20–82 y.o. Indications included diagnostic cerebral angiography (37), extracranial carotid artery stenting (3), and transverse sinus stent (1). Total OR time was longer in RG (median 86 vs. 71 min, $p < 0.01$). Procedural time (median 56 vs. 45 min, $p = 0.12$), fluoroscopy time (median 12 vs. 12 min, $p = 0.69$) and contrast media usage (82 vs. 92 ml, $p = 0.54$) were not significantly different. Patient radiation exposure was similar, considering similar fluoroscopy times. Radiation exposure and lead apron use were virtually absent for the main surgeon in RG. Procedural success was 83% and conversion from RA to manual control was 17% in RG. No treatment-related complications occurred. A learning curve showed that, after the fifth procedure, procedural times reduced and stabilized.

Conclusions This series may contribute to further demonstrating the safety and feasibility of RANPs. RANPs can potentially reduce radiation exposure and physical burden for health personnel, expand acute cerebrovascular treatment to underserved areas, and enhance telementoring. Prospective studies are necessary for results to be generalized.

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E-018 A COMPARISON OF TWO AUTOMATED CTP ALGORITHMS FOR ESTIMATION OF CORE INFARCT

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Introduction Automated analysis of CT perfusion data has become an integral part of stroke triage. Many vendors calculate cerebral blood flow (rCBF) and time to maximum

perfusion (Tmax) in attempts to estimate core infarct, reported as rCBF<30%, versus tissue at risk, reported as Tmax>6 seconds. We compare the algorithms of two widely available software platforms, iSchemaView Rapid and Viz.AI.

Methods All patients on whom CT perfusion imaging for the suspicion of acute ischemic stroke was performed and also had subsequent underwent MRI imaging within 24 hours of CTP were included. As, some patients underwent mechanical thrombectomy, rCBF<30% volumes were calculated to restrict analysis to core infarct. Both iSchemaView Rapid and Viz.AI software platforms were concurrently used. Final infarct volume was estimated off the B1000 sequence, in which areas of high signal were manually segmented using Slicer 3D.

Results 26 patients were identified. 14 underwent mechanical thrombectomy (53.8%), of which 13 were recanalized to TIC1 2C or better (92.9%). rCBF<30% volumes calculated by both RAPID and Viz were to the segmented final infarct volume on MRI. The average differences was 30.73 (+/- 38.7) cc for RAPID and 23.05 (+/- 39.7) cc for Viz, which was not significantly different ($p=0.515$).

Conclusions There was not a statistically significant difference in calculated rCBF<30% volumes between Viz or Rapid, compared to the manually segmented volumes from the 24 hour diffusion MRI.

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E-019 MECHANICAL THROMBECTOMY FOR NONAGENARIAN WITH M1 OCCLUSION: ANALYSIS FROM MULTICENTER COHORT

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Introduction Elderly individuals are at an increased risk for stroke and are responsible for a substantial portion of the total stroke burden. The safety and efficacy of thrombectomy in nonagenarians is not fully understood, as they have traditionally been excluded from major endovascular trials. Recent literature suggests 7% of patients have functional independence at 3 months following medical management. This research aims to determine the outcomes of thrombectomy in patients ≥ 90 years with proximal intracranial occlusion.

Methods We performed a multicenter retrospective analysis of consecutive acute ischemic stroke patients with M1 occlusion treated within 24 hours from the time of last known well who were greater than 89 years of age. Patient demographics, periprocedural metrics, and discharge and 90-day modified Rankin Scale (mRS) scores were collected. Successful recanalization was defined as TICI 2B or better. Favorable outcome was defined as 90-day mRS ≤ 2 for patients prestroke mRS < 2, and no worsening of prestroke mRS at 90-day in patients with prestroke mRS > 2.

Results Seventy-one patients over 89 years old were identified. Fifty-two (73.2%) were female. Pre-stroke mRS scores were available for 70 patients. The baseline median mRS was 2. Successful recanalization was achieved in 95.8% of patients. TICI 2C or greater was accomplished in 64.8% of cases. Functional outcome data at 90-days were available for 57 patients (80.2%). At three months, 7 total patients had an mRS between 0–2 (12.3%), and an additional 11 patients had an mRS of 3 (19.2%). The rate of 90-day mortality was 42%.

Conclusions Mechanical thrombectomy in nonagenarians is technically feasible with high rate of successful reperfusion and it may improve clinical outcome. More research is needed to determine if thrombectomy results in significantly better functional outcomes than medical management for nonagenarians.

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E-020

A NOVEL TECHNIQUE TO TREAT TANDEM OCCLUSION BY UTILIZING STENTRIEVER AS THE DISTAL PROTECTION DEVICE WITH ASPIRATION CATHETER

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Background Revascularization in acute ischemic stroke (AIS) with tandem occlusion (TO) is technically challenging due to the involvement of two large vessel occlusions (LVO) in the same vascular territory, usually with a large clot burden. There are two traditional approaches to re-establish the blood flow

from TO; initial intracranial mechanical thrombectomy (MT) (head-first) or initial angioplasty ± stenting (neck-first). We developed a novel technique to simultaneously revascularize distal and proximal occlusions. This is accomplished by utilizing a stent-retriever as a distal protection device and a large inner diameter aspiration catheter with a balloon guiding catheter to retrieve clot and prevent distal migration (flow-arrest proximal protection).

Subject and Methods Since January of 2018, we performed MT for 142 LVO in AIS of the anterior circulation, of which we treated 12 TO. For the last six cases of TO, the Novel technique was applied to revascularize and restore perfusion. Patient demographics, procedure time (artery puncture to closure), procedure safety including symptomatic intracranial hemorrhage (sICH), angiographic outcomes (TICI score), and clinical outcomes (mRS) were evaluated.

Results The novel technique procedure in detail: an 8–9-French balloon-guided catheter is advanced to the distal common carotid artery and the balloon is inflated for flow arrest proximal protection. A microcatheter and microguide-wire are passed through the steno-occlusive site of the proximal internal carotid artery (ICA) and advanced into the M1 segment. After removing the micro-guidewire, a stent-retriever is navigated into the microcatheter and deployed at the distal M1 occlusion. Subsequently, the microcatheter is removed. The stent-retriever promotes flow restoration and captures distal emboli. During several minutes of flow restoration, a balloon angioplasty catheter is navigated to the proximal ICA steno-occlusive site over a stent-retriever wire, and balloon angioplasty is performed. After balloon angioplasty catheter removal, an aspiration catheter is advanced into the internal carotid artery, followed by the M1 segment, over the stent-retriever wire. Clot aspiration, retrieval, and capture of the stent-retriever is then performed. Carotid stenting is not used due to concerns for intracranial hemorrhage related to antiplatelet therapy in the acute phase. Among six patients, the mean age was 68 yo (41 – 83), median NIHSS at presentation was 18 (5 – 24), sICH was 1/6, and mortality was 1/6. One patient died from concomitant COVID-19 pneumonia despite successful revascularization and neurological improvement. TICI IIB or III was achieved in 5/6 patients, and mRS 0–2 was observed in 3/6 patients. The mean procedure time was 122 minutes (89 – 157), which was shorter than the TO group treated with traditional approaches 144 minutes (95 – 184), though this was not statistically significant (p=0.05 t-test). However, with improved experience, the procedure time decreased, and the last two cases' procedure times were 89 and 91 minutes respectively.

Conclusion The novel technique to revascularize tandem occlusion utilizing a stent-retriever as a distal protection device along with an aspiration catheter and a balloon-guided catheter is feasible. Immediate flow restoration at the distal occlusion site with simultaneous revascularization of the proximal ICA steno-occlusive lesion potentially improves the puncture to reperfusion time.

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