Abstracts

O-009 FLOW DIVERTER PERFORMANCE FOR THE TREATMENT OF INTRACRANIAL ANEURYSMS: A MULTICENTER COMPARATIVE STUDY

1J Vivanco-Suarez*, 2,3 J Basilio Flores, 2 J Miranda, 4 G Foa-Torres, 6 D Altschul, 1 A Dajles, 1 C Zevallos, 1 M Galecio-Castillo, 1 M Faroqui, 2,3 H Aguilar-Melgar, 2 H Pacheco-Fernandez Baca, 1,2 J Ortega-Gutierrez. 1Neurology, The University of Iowa Hospitals and Clinics, Iowa City, IA; 2Neurosurgery, Hospital Nacional Daniel Alcides Carrion, Callao, Peru; 3School of Medicine, Universidad Nacional Mayor de San Marcos, Lima, Peru; 4Neuroradiology, Fleni, Buenos Aires, Argentina; 5Neuroradiology, Instituto Oulton, Cordoba, Argentina; 6Neurosurgery, Montefiore Medical Center, Bronx, NY; 7Radiology, The University of Iowa Hospitals and Clinics, Iowa City, IA.

Introduction/Purpose Flow diverters (FD) have consolidated as a logical alternative for the treatment of intracranial aneurysms (IA). FD technology reduces operative time and length of in-hospital stay while maintaining high aneurysm obliteration and low complication rates. Supporting evidence, however, is limited to single-arm prospective studies that preclude direct device comparison. In this study, we aimed to compare the safety and efficacy of four FDs (Pipeline Embolization Device [PED], Surpass Streamline [SS], Flow ReDirection Endoluminal Device [FRED], and Silk) in the treatment of IA.

Materials and Methods We performed a multicenter retrospective cohort study in three countries (United States, Argentina, and Peru), including consecutive adult patients with IA treated with either PED, SS, FRED, or Silk between 2015 and 2021. Demographic, clinical, angiographic, and follow-up data were collected. The efficacy outcome was aneurysm occlusion measured by the Raymond Roy (RR) class, dichotomized into 1 vs. 2–3, on the last imaging follow-up. Safety outcomes included technical and neurologic ischemic/hemorrhagic complications at follow-up. Multivariable logistic regression was used to compare outcomes of interest.

Results The analysis included 235 patients with 274 aneurysms; 102 patients were treated with PED, 58 with SS, 53 with FRED, and 40 with Silk. The median age was 57 years, and 202 (83%) were females. Asymptomatic cases for PED, SS, FRED, and Silk groups were 67%, 78%, 87%, and 88% (p < .001). The median baseline modified Rankin Scale score was 0. Most aneurysms were saccular (85%) located in the suprachainoid segment (75%). PED treated the biggest aneurysms (median dome diameter 6 mm), followed by Silk and SS (both in 4.6 mm)(p = .005). Six cases had > 1 device implanted. Technical complication rates, including incomplete wall apposition and fish mouthing, were not different between groups (8%, 14%, 2%, and 8% in PED, SS, FRED, and Silk groups, respectively)(p = .30). After adjusting for confounders, there was no statistical difference (p = .32).

Mean final follow-up was 12 months, complete occlusion rate was: 70%, 64%, 68%, and 74% in the PED, SS, FRED, and Silk groups, respectively (p = .2). After adjusting for confounders, odds ratios for occlusion were not different (p = .56). The rate of neurologic complications was: 4%, 12%, 0%, and 10% in the PED, SS, FRED, and Silk groups, respectively (p = .016). After adjusting for confounders, neurologic complications were associated with baseline mRS (p = .012), adjunctive device use (p = .007), and parent vessel stenosis (p = .001).

Conclusion Our data suggest a comparable performance between different FD in a heterogeneous patient population. Differences in device characteristics may dictate subtle technical and safety nuances that can be considered to individualize and optimize IA treatments.


O-010 ROBOTIC-ASSISTED INTRACRANIAL ANEURYSM TREATMENT: ONE YEAR FOLLOW-UP IMAGING AND CLINICAL OUTCOMES

1W Cancelliere*, 2J Lynch, 3K Turner, 4P Nicholson, 5T Marotta, 1J Spears, 2E Liu, 2V Mendes Pereira. 1Departments of Neurosurgery and Medical Imaging, St. Michael’s Hospital, Toronto, ON, Canada; 2Division of Neuroradiology, Department of Medical Imaging, Toronto Western Hospital, Toronto, ON, Canada; 3Siemens Healthineers, Corindus Vascular Robotics, Waltham, MA; 4Department of Neuroradiology, PRISMA Heath, Upstate Greenville, SC; 5Department of Medical Imaging, St. Michael’s Hospital, Toronto, ON, Canada; 6Department of Neuroradiology, St. Michael’s Hospital, Toronto, ON, Canada;

Background Robotic-assisted neurovascular intervention has been described and we performed a world first series of six patients that just completed long-term follow up.

Purpose We aim to describe one year follow-up imaging and clinical results from our case series of robotic-assisted intracranial aneurysm repairs.

Results To date, we have performed more than 35 robotic-assisted intracranial aneurysm embolizations using a neuroendovascular approach. The one-year results of six patients are presented. Four patients were treated with a neck-bridging stent (± coiling) and two patients were treated with a flow-diverting stent. Two patients were treated in the subacute period of subarachnoid haemorrhage and 4 patients were treated electively. All clinical procedures were technically successful, with all intracranial steps being performed robotically with no conversions to manual intervention or failures of the robotic system. The technical success rate of the procedures was 100%. There was no morbidity or mortality associated with the procedures. One year follow-up imaging showed that 4 aneurysms were completely obliterated (RROC class I) and the remaining 2 were occluded with a residual neck (RROC class II).

Conclusions Robotic neuro-procedures were safely and effectively performed. Our one-year results demonstrate stable occlusion results in the midterm follow-up.

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O-011 PREDOMINANCE AND OUTCOMES OF UNRUPTURED INTRACRANIAL ANEURYSMS IN THE TRAUMA POPULATION


Background: Trauma patients are at increased risk for subarachnoid hemorrhage (SAH) compared to the general population. Unruptured intracranial aneurysms (UIA) may be more prevalent in this population due to increased overall atherosclerotic burden.

Purpose: We aim to determine the prevalence of UIA in a consecutive series of trauma patients and evaluate their clinical and radiologic outcome.

Methods: Between 2015-2019, we prospectively identified 114 trauma patients stenciled for CT angiography. All CT angiographic examinations were reviewed by an experienced neuroradiologist for UIA. UIA were defined as saccular aneurysms > 5 mm located within the intracranial arteries. Results were compared to a retrospective series of 200 UIA from our institution.

Results: Of the 114 trauma patients, 20 (17%) had UIA. Of these, 12 (60%) were symptomatic and 8 (40%) were asymptomatic. The most common location was the anterior communicating artery (60%), followed by the middle cerebral artery (30%) and the posterior communicating artery (10%). The median size of UIA in the trauma group was 10 mm (range 5-20 mm). The median Hunt-Hess score was 1 (range 0-3). Of the 20 trauma patients with UIA, 14 (70%) were successfully treated with endovascular therapy. The median follow-up was 1 year (range 6 months-5 years). The rate of rerupture was 14% (2/14). One patient had a clinical deterioration classified as Hunt-Hess 3, which resolved after endovascular coiling. The other patient had a rebleed and underwent emergency clipping.

Conclusions: Trauma patients with UIA have a high prevalence of symptomatic aneurysms and a good outcome with endovascular treatment. Further research is needed to determine the long-term outcomes and the impact of UIA on patient outcomes.
Background Much of the data on the prevalence of unruptured intracranial aneurysms (UIAs) varies significantly by study modality and suffers from under or overestimation due to selection bias or methodological flaws. Autopsy studies have shown rates ranging from 0.2–9% and angiographic studies have demonstrated rates ranging from 1–5%. Non-invasive imaging studies have shown UIA rates ranging from 1.4–8.4%. When different methodologies show UIA prevalence rates that vary by a factor of 5 or more, it is reasonable to conclude that certain techniques are yielding erroneous prevalence rates. Although some prior studies have attempted to address this statistically, this may not be possible. This study aimed to determine the incidental aneurysm prevalence in the trauma population. We hypothesize that although the trauma population may be younger than the general population, it may be more representative of the general population and therefore yield a more accurate estimate of aneurysm prevalence.

Methods We performed a retrospective review of patients in a prospectively maintained trauma database at a Level 1 Trauma Center from 2019–2020. CT angiograms with radiology reads were assessed for the presence of an intracranial aneurysm. Demographic and follow-up data were collected from patients who were found to have an intracranial aneurysm.

Results 5978 out of 8999 patients (66.4%) had CTA studies performed. The average age of a patient with a CTA performed was 44.6 years. 54 patients with aneurysms were identified for an overall rate of 0.90%. The average age of a patient with an aneurysm was 64.2 years. The highest aneurysm rate per age group was 3.13% in 80 to 89-year-olds. The aneurysm rate was 1.04% in females and 0.83% in males. African Americans had the lowest rate of aneurysms at 0.77%, while Asians were the highest at 6.67%. 74.1% of aneurysms were anterior circulation (average largest diameter 3.4 mm), 13.8% posterior circulation (4.4 mm), and 12.1% cavernous (3.3 mm). 75.9% of patients with aneurysms did not follow up at the trauma center, 1.85% (one ACOMAcomm) was ruptured and treated with coiling, 9.26% died due to traumatic injuries or other reasons unrelated to aneurysmal rupture, and 12.96% were followed up conservatively with outpatient imaging.

Conclusions The aneurysm prevalence rate in the trauma population is lower than that described in many previous UIA prevalence studies. This population may be more representative of the general population than what has been used in prior studies. Further, compared to angiography and autopsy, CTA is a more pragmatic way to assess for incidental aneurysm prevalence given that the majority of UIAs are found on CTA or MRA – which is a substantially similar technology. This has significant ramifications for the treatment of unruptured intracranial aneurysms.