distribution of means, and a one-way ANOVA comparison of means per imaging modality using Tukey’s honest significant test for subgroup comparison.

**Results** A total of 20 articles were included with 37 different cohorts measuring 3,560 M1 vessels from a variety of patient populations, including healthy patients (n=12 studies), patients with large vessel occlusions (n=6 studies), or patients with specific neurovascular pathologies (n=2 studies). Distribution of the means was not normal (Anderson-Darling test for normality, p<0.005). A histogram showed a bimodal distribution with 2 peaks. The peak with highest number of cohorts occurred at 2.4mm (equivalent to 0.094” or 7.2F), while the other peak was at 3.0mm (equivalent to 0.118” or 9.0F). The lowest mean was reported as 2.1mm (equivalent to 0.083” or 6.3F) with an interquartile range of 1.9 to 2.3mm, and the highest at 3.42mm (0.135” or 10.2F) with a range of 2.98 to 3.68mm. Subgroup comparison of imaging modalities was not significant (p>0.05) for MRA (μ=2.68 ± 0.41mm from 23 cohorts), CTA (μ=2.56 ± 0.40mm from 4 cohorts), DSA (μ=2.47 ± 0.48mm from 6 cohorts), and combination of MRA & CTA (μ=2.75 ± 0.21mm from 2 cohorts). Only MRI T2 Blood (μ=3.16± 0.11mm from 2 cohorts) reported a larger mean compared to all other imaging modalities (p<0.05). Since only the means of cohorts were analyzed, individual arteries were reported smaller than the smallest mean, and larger than the largest mean.

**Conclusions** There is a wide variation of M1 sizes and imaging modalities reported in the literature from healthy and stroke patients. As catheter sizes increase beyond 6F, their outer diameters may become oversized to the M1 internal diameter.

**Disclosures** M. Mirza: 5; C; Cerenovus. R. McCarthy: 5; C; Cerenovus. M. Gilvarry: 5; C; Cerenovus.

---

**E-279 ULTRASOUND GUIDED DIRECT ACCESS TO EMBOLIZE LINGUAL ARTERY PSEUDOANEURYSM FOR OROPHARYNGEAL BLEEDING**

J Bravo, B Hirschman, A Walli, A Khalesi, J Pannell. Neurological Surgery, UC San Diego, SAN DIEGO, CA

10.1136/neurintsurg-2022-SNIS.390

**Abstract E-279**

**Introduction** Tumors of the head and neck can be challenging to manage and have a predisposition to hemorrhage in many cases. Transfemoral and transradial arterial embolization of head and neck tumors can be effective at mitigating bleeding risk. However, direct percutaneous access to the cervical vasculature may be necessary if proximal vessels are ligated or occluded. We performed a retrospective review of cases requiring embolization of external carotid artery (ECA) branch vessels and identified one case requiring percutaneous embolization for visualization and embolization.

**Methods** A retrospective review of all cases of embolization of ECA branches for tumor-related hemorrhage from January 1st, 2020 to January 1st 2022 at our institution was performed.

**Results** We identified one out of sixty-two embolization procedures of the extracranial circulation that required direct percutaneous ECA access due to hemorrhage related to a lingual artery pseudoaneurysm on CTA (Figure 1). Ultrasound guided access to the left lingual artery was achieved with a 22-spinal needle, a percutaneous angiogram was performed, and n-BCA 3:1 glue was utilized to occlude the proximal lingual artery occluding the associated pseudoaneurysm (Figure 2). The patient was asymptomatic at discharge with no further hemorrhage and suffered no complications. This case reflects our

**Figure 1:** Helical CT-Angiogram imagines demonstrate a proximal left lingual pseudoaneurysm measuring 6 x 5 mm.

**Abstract E-279 Figure 1** Helical CT-angiogram imagines demonstrate a proximal left lingual pseudo-aneurysm measuring 6 X 5 mm

![Helical CT-Angiogram imagines demonstrate a proximal left lingual pseudoaneurysm measuring 6 x 5 mm.](https://example.com/image1)

**Figure 2:** Left: Oblique PA digital subtraction angiogram of the left lingual artery performed by direct percutaneous access demonstrating a lingual artery pseudoaneurysm. Right: Oblique PA head facility demonstrating an n-BCA liquid embolic cast within the pseudoaneurysm consistent with successful embolization.

**Abstract E-279 Figure 2** Left: oblique PA digital subtraction angiogram of the left lingual artery performed by direct percutaneous access demonstrating a lingual artery pseudoaneurysm. Right: Oblique PA radiograph demonstrating an n-BCA liquid embolic cast within the pseudoaneurysm consistent with successful embolization.
findings in the literature, which state that this technique is effective and safe and part of the arsenal of the neurovascular surgeon.

Conclusion Percutaneous access of extracranial vessels is a useful technique as an alternative to transfemoral and transradial access in certain cases. Being familiar with various catheterization techniques regarding the extracranial circulation is an important skill for the endovascular neurosurgeon since the ECA is a frequent target in neuroendovascular procedures. The successful case presented here serves as an example and guide for endovascular neurosurgeons in the future.


---

**E-280** TECHNICAL EVALUATION OF BEVELED TIP ASPIRATION COMPARED TO FLAT TIP ASPIRATION FOR ACUTE ISCHEMIC STROKE TREATMENT

1H Berns, 2M Alyami, 1S Schwartz, 1J Vigil, 1W Merritt, 1A Ducruet, 1T Becker. 1Northern Arizona University, Flagstaff, AZ; 2Aneuvas Technologies Inc (ATI), Flagstaff, AZ; 3Barrow Neurological Institute, Phoenix, AZ

10.1136/neurintsurg-2022-SNIS.391

Introduction/Purpose Zoom Aspiration Catheters (Imperative Care, Campbell, CA) have a unique beveled TRX Tip intended to improve clot digestion rates. The TRX Tip is angled 60-degrees, resulting in an approximate increase in surface area of 15%. Therefore, the Zoom 71 TRX Tip (0.071 inch ID) has the equivalent surface area of 0.076", greater than current conventional catheter tip diameters (0.064–0.074"). However, there still remains insufficient scientific rationale why and how a 60-degree beveled tip enhances clot ingestion compared to conventional flat tip aspiration.

Materials and Methods To understand the impact of the bevel tip shape compared to the common flat-tip shape, benchtop testing was performed to analyze the mechanical properties and actions of clot ingestion using a beveled-tip aspiration catheter compared to a flat-tip aspiration catheter. Test articles were assessed with the Bioengineering Devices Laboratory (BDL) benchtop flow model at Northern Arizona University (NAU). The model consists of a programmable, hydraulic pulsatile pump system (SuperPump AR, ViVitro Labs) that simulates physiological neurovascular flows and pressures. The benchtop accommodates swappable 3D-printed circle of Willis (CW) flow models made from UV cured and acrylic-based co-polymers, which can replicate the mechanical properties of human vessels. The model also incorporates a novel and stable blood analog to mimic the viscosity and shear-thinning of blood, allowing real-time pressure and flow measurements at each CW branch. Two published synthetic blood clot analogs (soft and hard clots) was used to simulate clot aspiration.

Results To confirm aspiration effectiveness, the test articles (Zoom 88 (Z88), Zoom 71 (Z71), NeuroMax (NM), Ballast (Ball), Walrus (W-BGC), Flowgate (F-BGC), and React (R68)) were advanced to the MCA and used to remove soft and hard clot analogs. Various properties were evaluated during clot ingestion – tip geometry, catheter-to-vessel ratio (CVR), real-time pressure measurements corresponding to aspiration force, clot integration imaging, clot digestion rate into the vacuum pump, and first-pass efficiency (FPE) determined by real-time branch flow measurements.

Conclusion Preliminary data from aspiration force suggest that the beveled tip devices corresponded to greater clot integration and faster digestion rates while requiring less aspiration force. Larger-bore TRX Tip catheters, with greater CVR can also enhance clot integration and digestion rates. Therefore, improved clot integration provided by the beveled tip, can be associated with the enhanced rates of FPE, reduced procedure duration, and improved recanalization rates, compared to conventional aspiration catheters, as assessed in the benchtop flow model.

Disclosures H. Berns: 5; C; Northern Arizona University. M. Alyami: 5; C; Aneuvas Technologies Inc (ATI); S. Schwartz: 5; C; Northern Arizona University. J. Vigil: 5; C; Northern Arizona University. W. Merritt: 4; C; Aneuvas Technologies Inc (ATI); 5; C; Northern Arizona University. A. Ducruet: 2; C; Medtronic, Stryker, Penumbra, Oculis, Koswire, Cerenovus. 4; C; Aneuvas Technologies Inc (ATI). 5; C; Barrow Neurological Institute. T. Becker: 4; C; Aneuvas Technologies Inc (ATI). 5; C; Northern Arizona University. 6; C; Imperative Care.

---

**E-281** A MULTICENTER STUDY EVALUATING ACCESS SITE AND BAD SCORE CATEGORIZATION IN REPERFUSION TIMING AND OUTCOMES IN ANTERIOR CIRCULATION ACUTE ISCHEMIC LARGE VESSEL OCCLUSIONS UNDERGOING MECHANICAL THROMBECTOMY


10.1136/neurintsurg-2022-SNIS.392

Introduction Given the multifactorial nature of stroke outcomes, recent efforts have been made to better predict time to reperfusion and improved patient outcomes. In previous studies, the B.A.D. score - consisting of bovine arch, aortic...