overall recurrence and retreatment. Based on these findings, we conclude hydrogel coils to be more efficacious than their bare metal counterparts in treating AComm aneurysms.

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E-021 IN VITRO NEUROVASCULAR MODEL DEVELOPMENT FOR LIQUID EMBOLIC IMPLANT SIMULATION

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Introduction Although current microcatheter technologies have advanced in recent years, corresponding endovascular devices still lag behind. Animal models are unable to replicate consistent large and wide neck bifurcation aneurysms with sufficient neurovascular feeder vessels. Testing methods must accurately model vessel tortuosity and flow patterns. Models must detect downstream migration of neurovascular embolic devices. This paper focuses on the development and utilization of an in vitro flow model to test short- and long-term stability of a novel polymer biomaterial (PPODA-QT) for aneurysm occlusion.

Materials and methods This research project includes development of innovative in vitro aneurysm vessel model with complex side branching. This project will bring together clinical, biological, and engineering expertise. A full Circle of Willis (CW) in vitro vessel model will be fabricated into vessel analogs. This model will be constructed using a PolyJet® (UV cured) 3D printing process. UV curing creates a model with accurate anatomy and tortuosity. Typical aneurysm positions, verified by our collaborating neuro-interventional surgeon, will be 3D-printed at the basilar bifurcation, the posterior communicating (PCA) branch, and at the anterior communicating (ACA) bifurcation. Flow is regulated through the use of a Super Pump AR (ViVitro Labs). This 3D printed model will be implemented in an in vitro flow model that enables systemic data collection. A data acquisition system (DAQ) integrated with LabVIEW® software will record real time particulation images, pressure drops across the model, and flowrates through each inlet and outlet of the model.

Results and discussion The in vitro model is used to simulate and quantify short-and long-term viability of new biomaterials for brain aneurysm embolization. Delivery and balloon microcatheters access the aneurysm model from the introducer at the inlet flow-stream. Inline holography imaging quantifies the number and size of particulate in accordance with (USP) XXV<788>). The PolyJet® 3D printed model has a luminal friction 5x lower than the standard silicone vessel models. Low luminal friction improves endovascular device tracking, providing a realistic feel for surgical simulation.

Conclusions This in vitro aneurysm flow model utilizes a UV cured 3D printing technique to emulate device delivery and wear. This model provides a realistic simulation of neurovascular device delivery. Additionally, development of new biomaterials for aneurysm treatment requires models capable of replicating tortuosity and friction characteristics. Traditional additives (used to reduce wall friction) can interfere with deployment and assessment of embolics.

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E-022 SEX DIFFERENCES IN ANEURYSM MORPHOLOGY AND LOCATION

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Background and Purpose Risk factors for formation and rupture of intracranial aneurysms (IAs) have been extensively investigated, and it is apparent that IAs and subarachnoid hemorrhage (SAH) are more common in females than males. Much is unknown about why IAs occur more frequently in females, but previous investigators have implicated hormonal and flow geometry variations in the development of compromised vessel wall integrity. The purpose of this study was to evaluate morphological characteristics of aneurysms within our population and differences in morphology and/or anatomic locations between males and females.

Methods A retrospective review was performed of patients undergoing 3D angiograms for intracranial aneurysms at a comprehensive stroke center between January 1, 2012 and January 1, 2018. Data collected included patient demographic information, comorbidities and aneurysm characteristics evaluated by 3D angiogram. All statistical analyses were completed in SAS 9.4.

Results 276 patients (203 female, 73 male) with 404 aneurysms were included. Of the 276 patients, 113 (81 female, 32 male) presented with ruptured IAs. On univariate analysis, female patients had significantly greater odds of having a posterior circulation aneurysm than males ($p = 0.0073$; OR, 4.30; 95% CI 1.48 to 12.48). For males and females, the most frequent locations were the anterior communicating artery and internal carotid artery, respectively. No statistically significant differences were observed in neck diameter, dome to neck ratio, or presence of secondary aneurysmal sacs.

Conclusion The sex differences in aneurysm morphology and location require further investigation. Aneurysms found in male and female patients had different anatomic distributions; the most frequent location was the anterior communicating artery for men and the internal carotid artery for women. No statistically significant differences were discovered in the studied morphological parameters. Sex differences in IA characteristics may reveal unknown information about the pathophysiology of formation of IAs and possible disparities in