Abstract O-017 Table 1

Variable	OR	95% CI	P value
Retreatment interval			
Early (6–12 months)	1.00		0.29
Late (>12 months)	1.62	0.63 – 4.1	0.29
Age, 1-year increments	1.02	0.978–1.06	0.37
Female sex	2.72	0.6 – 8.5	0.22
Maximal diameter, 1-mm increments	0.96	0.89 – 1.02	0.25
Smoking	0.29	0.1 – 0.86	0.026
Family history of aneurysms	0.18	0.04 – 0.78	0.019
Hypertension	3.10	0.98 – 6.3	0.055
Fusiform morphology	7.20	1.97 – 20.8	0.003
Incorporated branch into aneurysm	2.78	0.98 – 6.8	0.054

Abstract O-017 Figure 1

Results Ninety-five patients (median age 57, 81% females) harboring 95 aneurysms underwent 198 treatment procedures. In our cohort, 87.4% of aneurysms were unruptured; 74.7% were saccular and 79% were located in the internal carotid artery (median maximal diameter 9-mm), with 87 patients treated twice and 8 patients treated thrice. Median elapsed-time between first and second treatment was 12.2 months. Last available follow-up was performed at median of 12.8 months after retreatment, and median of 30.6 months after initial treatment, showing complete occlusion in 46.2%, and near-complete occlusion (90–99%) in 20.4% of aneurysms. No difference in ischemic complications following initial treatment and retreatment (4.2% vs 4.2; $p>0.99$). On multivariable logistic regression, fusiform morphology was associated with higher odds of non-occlusion after retreatment (OR 7.2; $p=0.003$), with history of hypertension and incorporated branch into aneurysms trending toward incomplete occlusion ($p=0.055$ and $p=0.054$; respectively). Family history of aneurysms and positive smoking history were associated with higher odds of complete occlusion ($p=0.019$ and $p=0.026$; respectively). Kaplan-Meier curves comparative estimators showed no significant difference in time-to-occlusion between the two groups (log rank test, $p=0.48$).

Conclusion Repeat flow diversion for persistent aneurysms is safe and effective. Fusiform morphology is the strongest predictor of aneurysmal persistence after repeat flow diversion.

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O-018 SEIZURE PROPHYLAXIS IN UNRUPTURED ANEURYSM REPAIR: A RANDOMIZED CONTROLLED TRIAL

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Introduction Prophylactic antiepileptic drugs (AEDs) are often prescribed for seizure prophylaxis in patients undergoing surgical treatment of unruptured intracranial aneurysms (UIAs). We aimed to evaluate the benefit of prophylactic AEDs in patients undergoing surgical repair of UIAs.

Methods We randomly assigned eligible patients undergoing surgical repair of UIAs to receive levetiracetam for seven days post-operatively or standard care alone. The primary outcome was the evaluation of seizures in the perioperative period (within 4 weeks). We also evaluated seizure occurrence throughout follow-up and assessed functional outcomes using the modified Rankin scale score (mRS).

Results 35 patients were randomized to the ‘no levetiracetam’ group and 41 patients were randomized to receive levetiracetam. The two study groups had similar overall baseline characteristics and the surgical complication rate was similar for both groups ($P=0.8$). One patient in the ‘no levetiracetam’ group had a seizure in the perioperative period versus 2 patients in the group randomized to receive levetiracetam (2.9% vs 4.9%, respectively, $P=1.00$). No patients in the ‘no levetiracetam’ group had any additional late seizures (mean follow-up of 20.4 months), but three patients in the levetiracetam group had late seizures during follow-up (mean follow-up of 19.1 months) (0% vs 7.3%, $P=0.2$). mRS score of 0–2 at 90 days and at the latest follow-up were similar between the two groups ($P=1.00$).

Conclusions Perioperative seizure prophylaxis with levetiracetam does not reduce the rate of seizures as compared to controls in patients undergoing surgical repair of UIAs.

Abstract O-018 Table 1 Outcomes

	‘No levetiracetam’	Levetiracetam	P value
Peri-operative seizures (within 4 weeks)	1 (2.9%)	2 (4.9%)	1
Late seizures	0 (0%)	3 (7.3%)	0.2
Any seizure	1 (2.9%)	5 (12.2%)	0.2
Median mRS at 90 days	0	1	0.3
Median mRS at the latest follow-up	0	1	0.15
mRS 0–2 at 90 days	96%	96%	1
mRS 0–2 at latest follow-up	97%	94.3%	1

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O-019

SAFETY AND EFFICACY OF CANGRELOR USE IN NEUROVASCULAR INTERVENTION: A MULTICENTER EXPERIENCE

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Introduction/Purpose In patients undergoing acute neurointervention, thromboembolic complications are the most common procedure related morbidity, in special when endoluminal prosthesis (stents/flow diverters) are needed. Dual-antiplatelet therapy (DAPT) has been used in order to prevent these events. Cangrelor is a potent, intravenous, P2Y₁₂-receptor antagonist presented as an alternative to oral antiplatelet agents, with a rapid onset and offset. We aimed to evaluate the safety and effectiveness of cangrelor in patients with acute neurologic ischemic disease and intracranial aneurysms that underwent endovascular intervention.

Materials and Methods We conducted a multicenter retrospective review of patients who underwent acute neurological intervention and had cangrelor as part of their optimal treatment. Patients from four comprehensive interventional neurovascular centers were included and allocated into two groups: (1) Acute ischemic (acute stroke and/or symptomatic atherosclerotic disease) and Aneurysms (ruptured and unruptured). Clinical presentation, laboratorial data, and outcomes were analyzed with an emphasis on periprocedural thromboembolic and hemorrhagic complications.

Results A total of 66 patients were included, 42 of whom were allocated in the ischemic group and 24 in the aneurysm group. In the acute ischemic group, median NIHSS was 15.5 (IQR, 8.25–21], and the majority of patients underwent mechanical thrombectomy (73%) associated with either rescue intracranial stenting (61.3%) or carotid stenting (35.4%). The overall periprocedural complication in this group was 9.5%, corresponding to 3 (7.1%) postoperative symptomatic intracranial hemorrhages (sICH) and 1 (2.3%) intraoperative thromboembolic event. At discharge, a favorable outcome (mRS 0–2) was noted in 47.6%, and 1 (2.4%) patient died after the progression of a sizeable infarct. In the aneurysm group, 66.7% were ruptured, and the most common treatment modality was flow diverter (66.7%). Although overall periprocedural complication was noted in 3 cases (12.5%), only one complication (4.2%) had occurred during or after cangrelor infusion. It consisted of a sICH in previously ruptured aneurysm. The other two complications occurred before cangrelor infusion, being 1 sICH and 1 thromboembolic event. At discharge, a favorable outcome (mRS 0–2) was seen in 66.7%, and mortality was 8.3%, related to the ruptured aneurysms that progressed with sICH. When both groups were divided according to cangrelor infusion duration, there was no significant difference in the number of complications in patients

receiving either short (median of 2h hours) or prolonged (median of 24 hours) infusion.

Conclusion Cangrelor is a safe alternative in patients requiring immediate intervention with the use of stents and flow diverters. Cangrelor was not associated with increased rates of hemorrhagic complications and also allowed the possibility for a secure transition to long-term DAPT and progression to surgery in the setting of unexpected complications. Ideally, prospective studies with larger samples and comparison with a standard antiplatelet regimen are required to clarify the best protocol, safety profile, and effectiveness of cangrelor in neurologic endovascular interventions, unlikely to happen on our field.

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O-020

ENDOLUMINAL BIOPSY FOR MOLECULAR CLASSIFICATION OF HUMAN BRAIN ARTERIOVENOUS MALFORMATIONS

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Introduction Brain arteriovenous malformations (bAVMs) are dysplastic tangles of blood vessels with direct arterial-venous shunting. Evidence has suggested that bAVMs may arise from different somatic or germ-line mutations. However, there are no methodologies to molecularly characterize bAVMs without open surgery. Whether different molecular subgroups may explain divergent natural histories remains unknown. We describe a novel endovascular biopsy (EB) technique to permit comprehensive genome-wide transcriptomic classification of bAVMs without need for open surgery in living patients.

Methods EB and computational fluid dynamic modeling (CFD) was performed during preoperative embolization. Cells were obtained from a bAVM juxta-nidal feeding artery and systemic iliac artery (control) with a platinum detachable coil and 0.035-inch wire, respectively. Endothelial cells (ECs) were isolated with fluorescence assisted cell sorting (FACS) and sequenced on an Illumina HiSeq 4000 sequencer. Differential gene expression and gene ontology analyses were performed.

Results EB was successful in 4 patients without complication. FACS sorting detected viable ECs (CD31-positive, DAPI-negative) in each patient. EB yielded 269.0 ± 79.9 cells per biopsy (control: 309.2 ± 86.6 cells; bAVM: 228.8 ± 133.4). Differential gene expression analysis demonstrated 106 differentially expressed genes in bAVM ECs (FDR < 0.05) (figure 1A), and clear separation of bAVMs and patient-matched controls on principal component and heatmap analyses (figure 1B). Differentially expressed genes were enriched for bAVM-related Ras-MAPK signaling and angiogenic cell motility pathways ($p < 0.05$) (figure 1C). When compared to open surgery, EB detected 83.3% of genes and genome-wide expression strongly correlated with ECs from open surgery ($R^2 = 0.8$). CFD modeling of blood