Conclusion Poor cerebral perfusion on the venous microvascular profile predicts ischemic lesion growth and final infarct core volume in AIS-LVO patients treated with thrombectomy.

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O-028 THE INTRASACCULAR SEAL© DEVICE: IMPROVED FLEXIBILITY AND HEALING

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Background The new generation of intrasaccular flow disruptors offers several potential advantages in aneurysm treatment.[1 2] However, questions regarding risks for thromboembolic complications[3 4] and long-term treatment durability remain. We study the safety and effectiveness of three Galaxy Therapeutics Seal© intrasaccular prototypes: A, B, and C (Galaxy Therapeutics LLC, Brookfield, WI).

Methods Aneurysms were created in thirteen rabbits and one of 3 Seal devices were implanted. High frequency optical coherence tomography (HF-OCT) and Digital Subtraction Angiography (DSA) was performed 4- and 12-weeks post-implant. After 12 weeks, the parent vessel and the aneurysm were explanted for histological analysis. One rabbit developed symptoms consistent with a lumbar spine injury and was euthanized and explanted at day 56.

Results 12-week DSA and OCT images demonstrated 8 animals had a satisfactory aneurysm occlusion (group 1: complete blood flow disruption or contrast filling in marker recess) and 4 into group 2 (residual neck or aneurysm). The percentage of neointimal coverage of the device at four-weeks was greater for group 1 (*78±22.6%*) than for group 2 (*37 ±4.7%*) ($p=0.006$) which persisted at 12-weeks (*87.5± 14%* vs. *41 ±3.1%* respectively; $p=0.004$). There was no statistical difference between groups 1 and 2 in either baseline neck gap areas (*0.8±0.64* mm^2 vs. *2.6±1.42* mm^2, respectively; $p=0.808$) nor in baseline neck gap volumes (*26±26* mm^3 vs. *113.11±134.17* mm^3, respectively; $p=0.361$). Representative examples of pathology are shown in the figure 1.

Conclusion Preliminary evidence in this preclinical study highlight advantages of a new generation of intrasaccular aneurysm embolization technology in terms of flexibility and optimization of healing features, particularly in the A and C cohorts.

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O-029 OUTCOMES OF ENDOVASCULAR TREATMENT OF VEIN OF GALEN ANEURYSMAL MALFORMATION IN NEONATES

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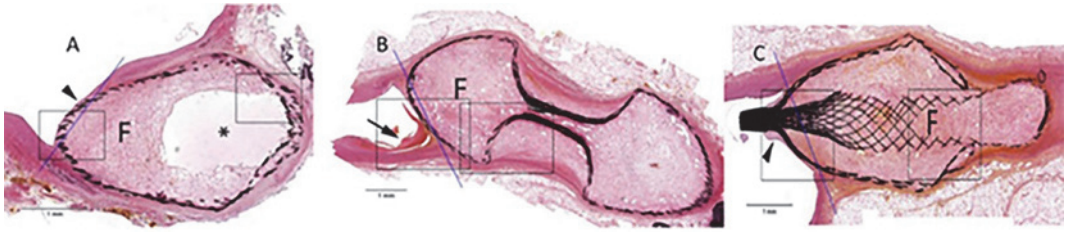
Objective Vein of Galen aneurysmal malformation is a rare congenital cerebrovascular disorder whose natural course has almost no favorable outcomes (<1%). Our objective was to analyze the outcomes of endovascular treatment of patients with vein of Galen aneurysmal malformation (VGM) during the first days of their life.

Materials and Methods During the period between January 2013 and February 2020, 52 patients with vein of Galen malformations were operated on at the National Medical Research Center named after Academician E.A. Meshalkin. Eleven of these patients were younger than 10 days when surgery was performed. Twelve endovascular embolization sessions were conducted via a transarterial approach. Cyanacrylate glue was used in 10 cases (mural VGMs); in one case, Phil 25 non-adhesive liquid embolic system was used and two embolization stages were performed (choroidal VGM). All patients were hospitalized in an intensive care unit having the Bicêtre score of 10–12. Prior to surgery, all patients underwent cardiac ultrasonography (that involved measuring pulmonary artery pressure) and neurosonography that involved measuring the linear blood flow velocity (LBFV) in the vein of Galen and afferent vessels. All patients had pronounced pulmonary hypertension; LBFV in the vein of Galen was $\geq$ 0.6 m/s.



Abstract O-028 Figure 1 H&E stains for the three prototypes (A), (B), and (C) 12-weeks following implant. Solid line=approximate aneurysm neck. Arrowhead = mature and stable neointima covering device; F= fibrovascular tissue partially filling the fundus; A: asterisk = sequestered cystic space within the fundus (not connected to parent vessel). B: arrow=fibrin thrombus in parent artery recess at neck

Results Linear blood flow velocity (LBFV) in the vein of Galen was assessed intraoperatively in all patients. The operative treatment stage was completed when the LBFV in the vein of Galen decreased to 25–50% of the initial value. Echo imaging showed that pulmonary hypertension was significantly reduced in 10 patients during the postoperative period, except in a patient with a choroidal subtype of vein of Galen malformation. Favorable outcomes were observed for eight (72.7%) patients. Two (18.8%) patients developed complications, both being caused by intracranial hemorrhage. Two patients who had been operated on died (16.6%).

Conclusions Endovascular treatment of vein of Galen aneurysmal malformations in neonates with severe pulmonary hypertension is feasible. This technique reduces the severity of pulmonary hypertension, thus lowering the risk for developing critical heart failure or multiple organ failure, and allows patients to cross the critical line on their way to survival. To be treated using endovascular surgery, patients need to undergo meticulous selection, and surgical treatment should be used only if they have the mural subtype of vein of Galen malformations. The initially poor patient's condition (the Bicêtre score <8), the choroidal subtype of malformation, and concurrent cardiac malformations are the factors preventing the favorable outcome of endovascular treatment of vein of Galen malformations in neonates.

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O-030 LONG-TERM CLINICAL AND RADIOGRAPHIC FOLLOW-UP OF PURE ARTERIAL MALFORMATIONS

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Introduction Pure arterial malformations (PAM) are rare vascular lesions characterized by dilated, tortuous arterial loops without venous shunting. The natural history of these lesions remains unclear. We report the long-term clinical and radiological outcomes in the largest series of patients with PAM.

Methods Retrospective review at a tertiary academic referral center for patients with a PAM. Follow-up clinical and radiological data were collected and analyzed for clinical symptoms and radiographic changes.

Results Twenty-five patients met the inclusion criteria. The mean age at presentation was 30.9 ± 14 years. Nineteen (76%) patients were female and six (23.1%) were male. Eleven (44%) patients had ≥1 symptom at presentation, of which, only 3 (12%) could be linked to PAM. The most common symptom was headache (n=8). PAMs involved a single vessel in 16 (64%) cases and ≥2 vessels in 9 cases (36%). Fifteen (60%) lesions were isolated to the anterior circulation compared to 6 (24%) in the posterior circulation. The most frequently involved vessel was the supraclinoid internal cerebral artery (36%). An associated saccular aneurysm was present in 32% of patients. Ten lesions were partially calcified. The mean radiographic and clinical follow-up was 21.4 ± 26.6 months and 44.5 ± 34.8 months, respectively. None of the patients developed new symptoms related to their lesion or radiographic progression over the duration of follow-up.

Conclusion PAMs are rare incidental vascular lesions found most frequently in young, asymptomatic females. PAMs have a benign clinical and radiographic natural history and are best managed conservatively with serial imaging.

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O-031 CEREBRAL ANEURYSM TREATMENT TRENDS IN NATIONAL INPATIENT SAMPLE 2007–2016: ENDOVASCULAR THERAPIES FAVORED OVER SURGERY

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Introduction The neuroendovascular space continues to evolve with innovative devices. Flow diversion is the newest endovascular technique for cerebral aneurysm treatments since Food and Drug Administration (FDA) approval in 2011. We conducted a national database study to investigate any change in clinical practice patterns.

Methods United States National Inpatient Sample (NIS) databases from 2007 to 2016 were queried for hospital discharges with unruptured aneurysm (UA) and/or ruptured aneurysm (RA) patients receiving surgical clipping (SC) and/or endovascular treatments (EVT) using the International Classification of Diseases (ICD) Ninth Revision-Clinical Modification (CM), ICD Tenth Revision-CM, and ICD Tenth Revision-Procedure Coding System. Patient demographics, hospital characteristics and clinical outcomes were reviewed. Sub-group analysis was performed for treatment differences in 2007–2011 versus (vs.) 2012–2016 timeframes.

Results A total of 39,282 hospital discharges were identified with significant increase in EVT (UA: SC n=7,847 vs. EVT n=12,797, p<0.001; RA: SC n=8,108 vs. EVT n=10,530, p<0.001). Hospitals in the South demonstrated the most significant EVT use irregardless of aneurysm status (UA: SC n=258.5 ± 53.6 vs. EVT n=480.7 ± 155.8, p<0.001; RA: SC n=285.6 ± 54.3 vs. EVT n=393.3 ± 102.9, p=0.003). From 2007–2011, there was no significant difference in the mean number of cases for the treatment modalities (UA: SC n=847.4 ± 107.7 vs. EVT n=1,120.4 ± 254.1, p=0.21; RA: SC n=949.4 ± 52.8 vs. EVT n=1,054.4 ± 219.6, p=0.85). The 2012–2016 period demonstrated significant increase in mean number of cases treated endovascularly for both UA and RA (UA: SC n=722.0 ± 43.4 vs. EVT n=1,439.0 ± 419.2, p<0.001; RA: SC n=672.2 ± 61.4 vs. EVT n=1,051.6 ± 330.2, p=0.02).

Conclusions As technological innovations continue to advance the neuroendovascular space, the standard of care for cerebral aneurysm treatments further shift towards endovascular therapies over open surgical approaches in the United States.

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