or thrombus only at one of the four locations as compared to PED (OR 0.10 95% CI 0.02–0.56, p = 0.01). There was no difference in thrombus at the four locations as a function of DAPT (p > 0.05). There was no dependence on aneurysm occlusion on the device used or PRU value; however, achieving complete or near complete occlusion was negatively and marginally correlated with the aneurysm neck size (Spearman's rho = 0.314; p = 0.049).

Conclusion The hypothesis that Shield technology reduces acute thrombus formation regardless of DAPT has been confirmed in vivo using OCT.

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Disclosures M. Marosfoi: None. **E. Langan:** None. **S. Vedantham:** None. **F. Clarençon:** None. **R. King:** None. **J. Wainwright:** 5; C; Medtronic Neurovascular. **M. Gounis:** 1; C; Medtronic Neurovascular. **A. Puri:** 1; C; Medtronic Neurovascular. 2; C; Medtronic Neurovascular.

O-030 CHANGES IN CONTRAST TRANSIT TIMES ON DIGITAL SUBTRACTION ANGIOGRAPHY POST PIPELINE EMBOLIZATION DEVICE DEPLOYMENT

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10.1136/neurintsurg-2016-012589.30

Introduction Pipeline Embolization Devices (PED) has been introduced as a new method to treat aneurysms that are otherwise difficult to treat surgically or with endovascular means. It is postulated that hemodynamic changes occur post deployment which affect the distal vascular bed. In this paper we evaluated changes in the contrast transit times on angiography post PED implementations.

Methods Medical charts and digital subtraction angiographic (DSA) films for patients treated with PED were included. Only anterior circulations, un-ruptured aneurysms, located proximal to the internal carotid artery terminus were included. DSA images were analyzed using custom made software for the time-density relationship at baseline and compared to post PED implementation. All analysis was done over region of interest over the middle cerebral artery (M1 segment). Analysis included $TT_{10\%-100\%}$ (time needed for the contrast to change from 10% image intensity to 100), $TT_{100\%-10\%}$ (time needed for the contrast to change from 100% image intensity to 10%), and $TT_{25\%-25\%}$ (time needed for the contrast to change from 25% image intensity-up slope to 25%-down slope of the curve).

Results A total of 44 patients were included in this study. Analysis over the M1 segment showed a significant decrease in the $TT_{10\%-100\%}$ (2.79 to 2.24 seconds, $P < 0.001$) post PED. There was significant correlation (Pearson's correlation) between the percentage change in $TT_{100\%-10\%}$ and the aneurysm size ($r = 0.34$, $P = 0.02$). There was a significant decrease in the $TT_{25\%-25\%}$ (7.07 to 6.41 seconds, $P = 0.016$) post PED (Figure 1). Moreover, there was significant correlation between the absolute or percent changes in $TT_{25\%-25\%}$ and the aneurysm size ($P = 0.05$; rho = 0.54 and 0.049; rho = 0.29 respectively) (Figure 1).

Conclusion Analysis shows that statistically significant hemodynamic changes do occur post PED deployment, as determined by differences in the contrast transit time post PED in the distal intracranial circulation. These hemodynamic changes might be more pronounced in large and giant aneurysms. The mechanism for this is not clear, yet hemodynamic changes affecting especially the vasculature distal of the PED might shed a light at the patho-physiology of the delayed parenchymal hemorrhage.

Disclosures A. Alaraj: 2; C; Codman. **A. Hussein:** None. **A. Linninger:** None. **F. Charbel:** None. **C. Hsu:** None. **F. Charbel:** None. **V. Aletich:** 2; C; Codman.

O-031 ENDOVASCULAR MANAGEMENT OF INTRACRANIAL ARTERIOVENOUS MALFORMATIONS WITH VARIOUS ANGIOARCHITECTURE FEATURES IN THE PEDIATRIC POPULATION: IS SPETZLER-MARTIN GRADING PREDICTIVE?

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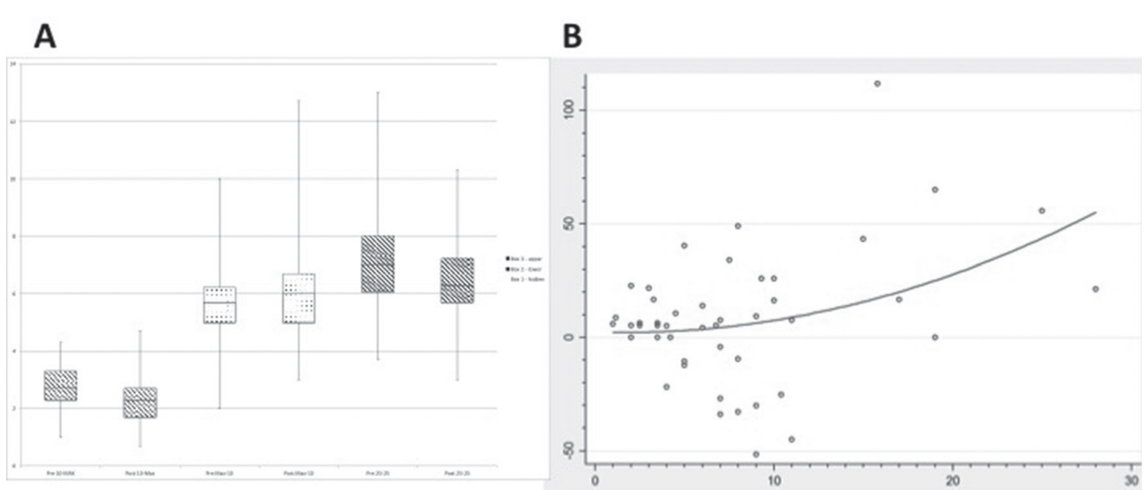
10.1136/neurintsurg-2016-012589.31



Abstract O-030 Figure 1

Purpose We performed this study to investigate the potential predictors of long-term outcome in endovascular management of intracranial arteriovenous malformations (AVMs) with/without surgical resection in the pediatric population.

Materials and methods Consecutive pediatric patients (<18 years) presenting with intracranial AVMs verified by CT/MR/DSA imaging studies were enrolled in the study. Baseline demographics, presenting symptoms, angioarchitecture characteristics [location, compact/diffuse nidus type, maximum nidus diameter, superficial/deep drainage, associated flow-induced aneurysm and/or venous varix/stenosis/ectasia, number of arterial feeders/draining veins, Spetzler-Martin Grading (SMG) scores, and ruptured/unruptured lesions], treatment strategy (endovascular embolization and/or surgical resection versus conservative management), procedural complication, recurrence, and long-term functional outcome were obtained. Ninety days modified Rankin Scale score of ≤2 and achieving developmental milestones were used to determine good functional outcome as appropriate. Independent samples T test, chi square, and logistic regression analyzes were performed for statistical analyzes.

Results Fifty-eight cases (m/f: 38/20; mean age [(range)±SD: 10.99 (0.5–17) ±4.09 years] presented with 29 ruptured versus 29 unruptured AVMs. Presenting symptoms included severe headaches (35.8%), occasional mild-moderate headache (22.6%), incidental finding (22.6%), seizure (9.4%), focal neurological deficits (15.1%), and loss of consciousness 20.8%), respectively. Single or multi-session endovascular embolization was performed either alone or prior to surgical resection while three cases were managed conservatively. Procedural complication and lesion recurrence were encountered in 6.9% and 5.2% of cases, respectively. Good functional outcome was achieved in 49 (84%) of cases. Angioarchitecture features of the lesions are presented in the table. No significant association was observed between SMG and final outcome (P = 0.80). Regression analysis of clinical presentation, lesion characteristics, and treatment-related variables revealed that rupture and severe onset of headache were independent predictors of poor long-term functional outcome (P = 0.006, OR:3.5). Seven out of nine cases with poor clinical outcome presented with ruptured AVMs with unfavorable preprocedural mRS score in eight of them.

Conclusions In our study, size, eloquent location, and complex angioarchitecture of intracranial AVMs were not predictors of outcome while presentation and ruptured/unruptured status of the lesions were significant predictors of long-term clinical outcome in treatment strategy with endovascular approach.

Disclosures **A. Honarmand:** None. **S. Ansari:** None. **M. Hurley:** None. **P. Golnari:** None. **M. Potts:** None. **B. Jahromi:** None. **A. Shaibani:** None.

Nidus Type (n, %)	Compact:52 (89.7%) / Diffuse: 6 (10.3 %)
Nidus Location (n, %)	Eloquent: 33 (56.9%) / Non-Eloquent: 25 (43.1%)
Lesion ≥ 3cm (n, %)	22 (33.9%)
Drainage (n, %)	Superficial: 26 (44.9%) / Deep: 15 (25.8%) / Superficial and Deep : 17 (29.3%)
Lesions with Multiple Arterial Feeders (n, %)	43 (74.1%)
Lesions with Multiple Draining Veins (n, %)	27 (46.6%)
Intranidal Aneurysm (n, %)	15 (25.9%)
Venous Stenosis (n, %)	12 (20.7%)
Venous Varix (n, %)	13 (22.4%)
Venous Ectasia (n, %)	20 (34.5%)

Abstract O-031 Figure 1

O-032 VENOUS BLOOD FLOW VISUALIZATION IN SIGMOID SINUS DIVERTICULUM USING MRI

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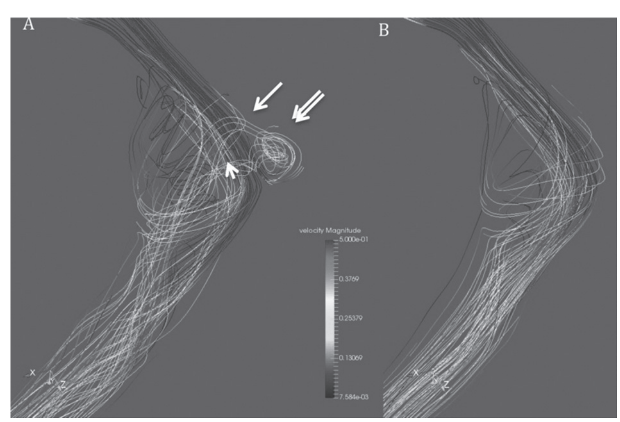
10.1136/neurintsurg-2016-012589.32

Introduction/purpose Sigmoid sinus diverticulum (SSD) is one of the potentially treatable causes of pulsatile tinnitus (PT). How SSD causes PT is unknown, but it is thought to be secondary to aberrant blood flow in the diverticulum or parent sinus. We performed velocity field mapping using MR 4 D Flow (MRV) and computational fluid dynamics (CFD) in cerebral venous sinuses and internal jugular veins (IJV). We aim to determine if a distinct blood flow pattern may be responsible for PT in SSD.

Materials and methods Patients suspected of venous etiology of PT underwent MRI at 3 T, using contrast-enhanced MRA (timed to venous phase), MRV and CFD. SSD was confirmed on MRA. Flow pathlines were evaluated. In patients with confirmed SSD, additional CFD modelling was performed with the SSD excluded from the models.

Results Nineteen patients with suspected venous etiology of PT and 10 controls were evaluated. Six (31.5%) had SSD and five of these had transverse sinus stenosis upstream from the SSD. These five patients also demonstrated a unique pattern of flow not seen in the controls characterized by:



Abstract O-032 Figure 1 Townes projection CFD analysis of a patient with a left SSD and an upstream stenosis in the transverse sinus. The pretreatment analysis (A) shows a jet of flow from the stenosis into the SSD (arrow), vortex of flow in the SSD (double arrow), and a vortex component of flow in the sigmoid sinus down-stream from the SSD (arrow head). The post-treatment model (B) shows absence of the flow in the SSD as well as decreased vortex component of flow in down-stream sigmoid sinus