E-147 COMBINING TIME RESOLVED CONTRAST ENHANCED MR ANGIOGRAPHY WITH VOLUMETRIC HIGH RESOLUTION T2-WEIGHTED IMAGING IS A HIGHLY ACCURATE, NON-INVASIVE METHOD FOR LOCALIZATION OF SPINAL DURAL AV FISTULAS: A CASE SERIES

M Martucci*, A Oppenheimer, M Moogerfeld, M Obrzut. Neurology, Cleveland Clinic, Weston, FL 10.1136/neurintsurg-2020-SNIS.179

Objective To describe a non-invasive method for prospectively localizing Spinal Dural AV Fistulas (SDAVF) with contrast enhanced magnetic resonance imaging prior to spinal angiography and treatment, by combining Time Resolved Contrast Enhanced MR Angiography (TRCE-MRA) with Volumetric High Resolution T2-weighted Imaging (VHR-T2-I) sequences.

Background The gold standard for the localization of SDAVF is spinal angiography. A complete spinal angiogram involves the sampling of all segmental arteries, which can be time consuming and carries the risks of contrast nephropathy and radiation exposure. A non-invasive method of prospectively localizing the SDAVF feeding segmental arteries would be highly beneficial, as it would allow focusing the spinal angiogram to only a few vessels, decreasing procedure time and mitigating these risks. TRCE-MRA has been utilized in the localization of SDAVFs in the past. This method, however, has been limited by the inherent tradeoff that exists between temporal and spatial resolution in MR imaging. Even on advanced 3 Tesla systems, TRCE-MRA of the spine at frame rates higher than 1 per 2 seconds have poor signal-to-noise and anatomical detail, making the identification of the small SDAVF feeding vessels a challenge. VHR-T2-I sequences have very high anatomical detail but cannot assess vessel flow. In this case series, we present a method that co-registers the temporal information from TRCE-MRA and the spatial information from VHR-T2-I to prospectively identify the feeding vessels of SDAVFs with a very high accuracy.

Methods Five consecutive patients with clinical and imaging findings consistent with SDAVF underwent 3 Tesla CE-MRA on a Siemens MAGNETOM Skyra system prior to spinal angiography. For each patient, Siemens Time-resolved angiography With Stochastic Trajectories (TWIST) sequences at frame rates of 1 per 2 seconds have poor signal-to-noise and anatomical detail, making the identification of the small SDAVF feeding vessels a challenge. VHR-T2-I sequences have very high anatomical detail but cannot assess vessel flow. In this case series, we present a method that co-registers the temporal information from TRCE-MRA and the spatial information from VHR-T2-I to prospectively identify the feeding vessels of SDAVFs with a very high accuracy.

Results In all patients in this case series, CE-MRA with TWIST/SPACE co-registration prospectively identified the SDAVF feeding artery. This resulted in a reduction in procedure time, contrast dose and radiation exposure. No procedure complications were encountered. In one patient with advanced atherosclerotic disease, the CE-MRA was critical in identifying the SDAVF feeding artery, as severe stenosis at the origin of the feeding artery made catheterization difficult and the vessel might have been missed if not for the prospective information from the CE-MRA.

Conclusion This case series illustrates how combining TRCE-MRA and VHR-T2-I can prospectively identify the feeding segmental branches of SDAVFs, resulting in reduced procedure time and risks of pre-treatment spinal angiography.

Disclosures M. Martucci: None. A. Oppenheimer: None. M. Moogerfeld: None. M. Obrzut: None.

E-148 PIPELINE EMBOLIZATION DEVICE TREATMENT OF INTRACRANIAL ANEURYSMS IN PEDIATRIC PATIENTS: A PATIENT-LEVEL META-ANALYSIS

N Shlobin*, M Potts. Neurological Surgery, Feinberg School of Medicine, Chicago, IL 10.1136/neurintsurg-2020-SNIS.180

Introduction While the Pipeline Embolization Device (PED, Medtronic) is safe and effective in the treatment of intracranial aneurysms in adults, less is known about its safety and effectiveness in pediatric patients. We aim to report clinical outcomes in patients aged 18 or younger undergoing flow diversion with PED for intracranial aneurysms.

Methods PubMed, Embase, and Scopus were searched for reports of pediatric patients treated with PED. Disaggregated data was available for 44 pediatric patients with 48 aneurysms. Data regarding demographics, aneurysm characteristics, treatment, follow-up, clinical outcomes, and complications were collected.

Results The average age of patients was 10.5 ± 4.3 years, 47.8% of whom were male, while 34.1% were female, and the sex of 18.1% was not reported. A total of 23 aneurysms (52.2%) were in the posterior circulation. Fourteen aneurysms (29.2%) were fusiform, and 12 (25.0%) were dissecting. Fifteen aneurysms (31.3%) were giant, 14 (29.2%) were small, and 9 (18.9%) were large. Fourteen aneurysms (29.2%) presented with mass effect, followed by 11 (22.9%) with subarachnoid hemorrhage, and 6 (12.5%) each with headache and recurrence. The number of PEDs used for an aneurysm was 2.0 ± 1.5, and 10 aneurysms (20.8%) were treated with adjunct coiling. The average imaging and clinical follow-up for the aneurysms were 10.1 ± 7.9 and 10.5 ± 8.1 months, respectively. Thirty-four aneurysms (70.8%) were completely occluded. Four patients (10.0%) experienced complications, including one death, recurrence, brainstem compression, and in-stent stenosis.

Conclusions PED is safe and effective for intracranial aneurysm treatment in pediatric patients. Proper guidelines regarding use of PED in children should be created.

Disclosures N. Shlobin: None. M. Potts: None.

E-149 THE OUTCOME OF TRANSVENOUS EMBOLIZATION FOR VENOUS VEIN OF GALEN MALFORMATION AS A LAST PROCEDURE

T Shigematsu*, A Berenstein. Cerebrovascular Center, Department of Neurosurgery, Mount Sinai Health System, New York, NY 10.1136/neurintsurg-2020-SNIS.181

Background Veins of Galen aneurysmal malformation (VGAM) is a rare congenital vascular malformation representing <1% of all arteriovenous malformations. In the newborn period treatment is done for untreated CHF. There have been reports of transvenous coil embolization either trans-tuquarlar, or tran-femoral, although effective in controlling the high output failure, the results are less than optimal, and has lost...
SAFETY AND EFFICACY OF HIGH DOSE INTRAARTERIAL VASODILATORS FOR VASOSPASM AND THE PREVENTION OF DELAYED CEREBRAL ISCHEMIA: COMPARISON OF NICARDIPINE AND VERAPAMIL


10.1136/neurintsurg-2020-SNIS.182

Introduction Delayed cerebral ischemia (DCI) continues to be a challenging complication of subarachnoid hemorrhage. This study sought to examine the impact of intra-arterial therapy on patients with medically refractory DCI. More specifically, it sought to determine comparative results of nicardipine and verapamil as well as to determine if there was a relationship between IA vasodilator dose and complication rate.

Methods A retrospective chart review of all patients at a single institution undergoing endovascular IA therapy for vasospasm secondary to subarachnoid hemorrhage over a 30-month period was done. In total, 69 patients underwent 126 treatments for cerebral vasospasm in the setting of aneurysmal subarachnoid hemorrhage (SAH). In total, 91% of patients presented with aneurysmal SAH while 9% had angiography-negative SAH. 53.6% of patients had their aneurysm treated endovascularly. Median Hunt Hess grade was 3 and 88% of patients presented with Modified Fischer grade 3 or 4. Formal angiography was done in the setting of clinical vasospasm as determined by patients’ neurologic exams, velocity on transcranial doppler, and other clinical factors. The majority of patients underwent a single treatment (55%) while the most treatments for a single patient was 5 (4%).

Results In total, 98% (123/126) of treatments led to an improved or stable neurological exam post treatment, and 3 patients developed a post-operative procedural neurological decline. Delayed cerebral ischemia, defined as a new neurological deficit, occurred in 55% (38/69) of patients in this cohort; however, the new neurological deficit was permanent in only 14% of patients (10/69). New infarcts were seen on imaging in 19% of patients (13/69) but were clinically silent in 360 patients. Patients with DCI were more likely to undergo multiple treatments of IA therapy (P < 0.05). Average total dose of nicardipine was 11 mg (range 3-40 mg). Average dose of verapamil was 88 mg (range 25-240 mg). There was no relationship between dose and complication rate (P > 0.05).

There was no differential risk of DCI in the nicardipine vs the verapamil group (P > 0.05). Patients undergoing verapamil therapy were more likely to experience complications of IA therapy, 20% vs 5% in the nicardipine group (P < 0.05), however patients classified to have severe vasospasm by the angiographer were more likely to undergo treatment with verapamil (P < 0.05).

Conclusion This report adds to the growing body of literature that endovascular rescue therapy offers a safer and effective option in managing medically refractory vasospasm in order to prevent DCI. Importantly, it also suggests that in select patients high dose therapy can be used for maximal benefit with a reasonable side effect profile. Importantly, this series also demonstrates an initial rate of DCI of 55% in patients with vasospasm undergoing IA therapy with only 14% of patient’s demonstrating permanent neurological deficit suggesting a significant overall benefit of treatment. The results of this initial study mandate further investigation into the safety and efficacy of intrarterial verapamil and nicardipine for the treatment and prevention of DCI. More importantly, it shows that dose optimization needs to be done prior to pursuing further trials.