

E-032

PREOPERATIVE EMBOLIZATION OF SPETZLER MARTIN GRADE 3 ARTERIOVENOUS MALFORMATIONS: A MULTI-CENTER PROPENSITY ADJUSTED ANALYSIS

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10.1136/neurintsurg-2020-SNIS.68

Background Spetzler Martin (SM) grade 3 arteriovenous malformations (AVMs) are challenging lesions, often treated with preoperative embolization before definitive microsurgical resection. However, no significant difference in outcomes has been reported in patients with preoperative embolization for these lesions.

Objective To compare neurological outcomes of microsurgically treated SM grade 3 AVMs with vs without preoperative resection.

Methods A retrospective analysis of prospectively collected AVM databases from two large tertiary centers for all microsurgically treated SM grade 3 AVMs during 2011–2018 was performed. Comparison of neurological outcome (modified Rankin Scale score [mRS] >2 and change in mRS on last follow-up) between patients with vs without preoperative embolization was performed.

Results Of 102 patients with microsurgically treated SM grade 3 AVMs, 57 (56%) underwent preoperative embolization. Significant differences between patients with vs without embolization were found for eloquence (75% vs 93%, $p=0.02$), diameter ≥ 3 cm (53% vs 27%, $p=0.01$), diffuseness (7% vs 22%, $p=0.04$), and mean follow-up mRS (1.1 vs 2.0, $p=0.005$). A higher percentage of patients without embolization (38%) than with embolization (7%) had an mRS >2 on follow-up ($p<0.001$). A propensity-adjusted analysis matching for age, supplemental grade, hemorrhage, diffuseness, deep drainage, diameter, eloquence, and location was performed, and no embolization (odds ratio, 4.2; 95% confidence interval, 1.1–16; $p=0.03$) was a risk factor for an mRS score >2.

Conclusion Lack of preoperative embolization in SM grade 3 AVMs may be associated with increased risk of poor outcome following microsurgical resection. Hence, evaluation for preoperative embolization is essential for all intermediate-grade lesions.

Disclosures J. Catapano: None. F. Frisoli: None. C. Nguyen: None. D. Wilkinson: None. N. Majmundar: None. T. Cole: None. J. Baranoski: None. A. Whiting: None. H. Kim: None. R. Spetzler: None. A. Ducruet: None. F. Albuquerque: None. M. Lawton: None.

E-033

TRANSVENOUS EMBOLIZATION FOR VEIN OF GALEN MALFORMATION USING THE PRESSURE COOKER TECHNIQUE

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10.1136/neurintsurg-2020-SNIS.69

Background There are various procedural techniques described in the literature to treat VGAM, including transarterial embolization via a transfemoral or transumbilical approach, transfemoral or transtorcular venous coiling, and

the combined transarterial and transvenous ‘trapping’ of the fistula. The transarterial technique has permitted us to get a total or near total obliteration in close to 80% of cases. However, there is a group of patients in whom the residual arterial supply is through small perforators and in whom transvenous embolization (TVE) is attractive, but safety is unclear. Here, we report the first two VGAM patients treated using the Chapot ‘pressure cooker’ technique (CHPC).

Materials and Methods Two patients, one 5 year old and one 7 year old, were treated beginning in the newborn period with multiple, staged, transarterial embolizations for a choroidal type VGAM using transarterial embolization with NBCA. Initial indication was congestive heart failure, and the goal was progressive reduction in shunting and flow with the ultimate goal of complete closure of the malformation. Both patients progressed to having a small residual with numerous, small perforator feeders. Therefore the decision was made to perform transvenous embolization using the CHPC. In this technique, a guiding catheter is placed transjugular into the straight sinus. 1 or 2 detachable tip microcatheters are advanced into the remaining vein to its origin. Another microcatheter is advanced and the tip placed between the distal marker and the detachment zone of the first. Coils, and if needed NBCA are used to prevent reflux of Onyx, and force the Onyx to occlude the vein, and the most distal segment of the arteries. Results: Both patients had complete occlusion of the malformation after CHPC.

Discussion There has not been any report before, about the TVE to cure the vein of Galen malformation after multiple sessions of TAE. In this study, two issues can be brought up. One, there is a chance to close the fistula completely or incompletely only using coils, even fiber coils. In addition there is the concern of impairing drainage of the normal brain. To improve these two issues, complete closure of the fistula using the Chapot ‘Pressure cooker’ technique with liquid embolic material in TVE, to close the residual vein, and to force the DMSO liquid embolic to close the incoming arterial supply, preventing delayed bleeding.

Conclusion In endovascular treatment of the vein of Galen malformation, TVE is feasible option, once the dilated vein of Galen becomes small enough. To prevent incomplete occlusion or post procedural hemorrhagic complication, the use of the Chapot ‘Pressure cooker’ technique using DMSO liquid embolic material is considered to be necessary.

Disclosures T. Shigematsu: None. R. Chapot: None. A. Berenstein: None.

E-034

HIGH-RESOLUTION CONTRAST-ENHANCED CONE BEAM CT IN PLANNING OF ENDOVASCULAR TREATMENT FOR COMPLEX DURAL ARTERIOVENOUS FISTULAE

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10.1136/neurintsurg-2020-SNIS.70

Purpose Treatment of dural arteriovenous fistulae (DAVFs) is based on obliteration of the fistula via trans-arterial/transvenous approaches or a combination thereof. In complex cases it can be difficult to determine the fistulous point, and large segments of normal vascular structures are sacrificed to cure