monitoring was negative for seizures. Transcranial doppler monitoring over the next few days demonstrated worsening velocities, with a repeat angiogram confirming severe focal segmental irregularities isolated to the right anterior territory. The surgical and stenting site remained widely patent. Her vasospasm was successfully treated with intra-arterial verapamil with improvement in vessel caliber and clinical symptoms.

Conclusions Post carotid revascularization cerebral vasoconstriction may be an unusual cause of clinical worsening after revascularization for chronic carotid stenosis or occlusion. Intra-arterial treatment with verapamil can be a safe and effective mode of therapy.

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E-087

HYBRID OPEN AND ENDOVASCULAR APPROACH FOR OCCIPITAL ARTERIOVENOUS FISTULA WITH COMPLETE OBLITERATION: TECHNICAL NOTE

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Background Dural arteriovenous fistulas (DAVFs) are acquired abnormal shunting connexions between the meningeal arteries and dural sinus or cortical veins and are an important cause of intracranial hemorrhage. Lesions with retrograde cortical venous reflux carry a higher risk of bleeding and endovascular embolization is currently the first-line treatment for these lesions. We present a case of DAVF with cortical venous reflux not amenable to conventional transarterial or transvenous endovascular embolization treated with direct surgical access to the occipital artery and Onyx embolization.

Method A 67-year-old man with a history of seizure disorder who presented with a tonic-clonic seizure one month after stopping his antiepileptics. Neurologic examination was unremarkable aside from diminished hearing on the right. The patient presented for neurosurgical evaluation due to imaging findings performed for work-up of his most recent seizure. Non-contrast head CT was unremarkable. CT and MR angiogram were performed, demonstrating prominent cortical veins overlying the right temporal convexity, suspicious for dural AV fistula or arteriovenous malformation. Digital subtraction angiography confirmed a dural AV fistula with arterial supply from the right occipital and middle meningeal arteries and shunting to the transverse sinus with multiple dilated cortical veins, compatible with a Borden 3, Cognard 4 lesion. In addition, there was a type 3 aortic arch with an extremely tortuous right common carotid artery, precluding selective access to the external carotid artery by either transfemoral or transradial approach. Due to the inability to access the right external carotid artery via conventional endovascular approaches, we elected to perform a hybrid procedure with surgical cutdown for direct access to the right occipital artery for Onyx embolization.

Result Using ultrasound guidance, the right occipital artery was tracked over the posterior nuchal line. A linear incision was designed over it and the artery was exposed and catheterized with a short 5F sheath. Vessels loops were used to secure the sheath to the artery. An onyx compatible microcatheter was used to access the nidus of the fistula and under direct fluoroscopy the fistula was embolized. A Post-embolization

angiogram from the right occipital artery demonstrated no residual filling of the fistula. The postoperative was unremarkable and follow up angiogram at 6 months shows complete obliteration.

Conclusion A variety of hybrid open and endovascular approaches have been described and the majority describes approaches involve a combination of a craniotomy followed by Onyx or NBCA embolization after direct cannulation of the artery or vein. In this case, we report a combined surgical and endovascular approach for Borden III DAVF that was inaccessible to standard endovascular approaches due to tortuous carotid anatomy via a direct cut-down. Direct cannulation of the occipital artery provided an elegant access to the fistula distal to the tortuous carotid anatomy with minimally invasive surgery without requiring a craniotomy, and a large volume of Onyx was able to be injected via the prominent occipital artery. Direct cannulation of feeding vessels to dural AVF represent a treatment option in patients that are not good candidates for conventional endovascular or open approaches.

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E-088

PSYCHOLOGICAL IMPACT OF PULSATILE TINNITUS IN THE US POPULATION

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Introduction/Purpose Pulsatile tinnitus (PT) is the auditory perception of a rhythmic, cardiac-synchronized, 'whooshing' type of sound in the absence of an external source that affects 3–5 million Americans. In addition, several of the anomalies that cause PT can have serious sequelae such as ischemic stroke, blindness, or intracranial hemorrhage. In addition, it is common for patients to describe an inability to continue to function in their families and in society due to the psychological impact of PT (which may be depression, anxiety, or a combination). In our experience, treating the underlying cause of PT not only mitigates the risks of the vascular anomaly, but also the patients' psychiatric illness. However, the prevalence of depression and anxiety in the PT population is unknown. The purpose of this study was to quantify the prevalence of depression and anxiety in the United States PT population, as well as identify relationships between patient characteristics, effects of PT on various aspects of life, depression, and anxiety.

Materials and methods Local IRB approval was obtained to survey the pulsatile tinnitus community. The survey used the validated Tinnitus Functional Index (TFI) to determine the severity of the PT condition (intrusive, sense of control, cognitive, sleep, auditory, relaxation, quality of life, emotional). In addition, the PHQ-9 and GAD-7 was used to obtain the prevalence of concurrent depression and anxiety, respectively. Logistic multiple regression analysis was performed for determining the associations of clinical and demographic variables with TFI total score. Additionally, PHQ9 and GAD7 scores (binarized to indicate depression/anxiety) were modeled with TFI total score as the main exposure