Superior sagittal sinus dural arteriovenous fistula

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A intracranial dural arteriovenous fistula (dAVF) involving the superior sagittal sinus (SSS) is relatively rare, and its clinical course is usually aggressive. Its concomitance with a tumor has rarely been reported.

Supratentorial dural arteriovenous fistula DVAs mostly drained in the superior sagittal sinus (80%), while all of infratentorial/combined DVAs drained in deep ependymal veins of the 4th ventricle. All the supratentorial dAVFs drained into the superior sagittal sinus, while the infratentorial/combined dAVFs mostly drained in the jugular bulb, Vein of Rosenthal, or transverse-sigmoid sinuses (75%) [1].

Gigliotti et al. reported the first case of a superior sagittal sinus DAVF occurring after surgical resection of a parasagittal meningioma [2].

Literature Review

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Case reports

A case of SSS dAVF due to meningioma invasion, which was treated with sinus reconstruction and

endovascular embolization. A 75-year-old man who had undergone tumor resection for parasagittal meningioma 4 years prior presented with intra-ventricular hemorrhage. Computed tomography angiography and magnetic resonance imaging revealed recurrent tumor invasion into the SSS causing occlusion. Cerebral angiography revealed multiple shunts along the occluded segment of the SSS, diffuse deep venous congestion, and cortical reflux. Borden type 3 SSS dAVF was diagnosed. We first performed direct tumor resection, followed by stenting for the occluded SSS and partial embolization of the shunts. After a 6-month interval, transvenous occlusion of the SSS was performed along the stent, resulting in complete obliteration of the dAVF. Sinus reconstruction therapy was effective in the immediate improvement of venous hypertension, obtaining the access route to the fistulas, and eradicating the shunts [3)]

A 78-year-old man presented after trauma with basal and cortical subarachnoid hemorrhage (SAH). Computed tomography revealed a parietal bone fracture overlying the superior sagittal sinus (SSS). Catheter angiography performed within 24 hours of the injury demonstrated an SSS dAVF supplied by the middle meningeal artery, adjacent to the fracture.

Lessons: The authors present the case of an acute traumatic dAVF adjacent to a calvarial fracture. In this case, the authors proprose that the underlying pathogenesis is suggestive of direct vessel injury rather than the pathway commonly associated with this pathology [4)]

Spontaneous closure of a superior sagittal sinus dural arteriovenous fistula after treatment of subarachnoid hemorrhage and secondary hydrocephalus [5)].

A 61-year-old male with a history of meningioma previously managed with subtotal resection and stereotactic radiosurgery presented with progressive right-sided vision loss and bilateral papilledema. Initial imaging suggested possible sinus occlusion. Catheter angiogram revealed a Borden-Shucart grade III DAVF of the superior sagittal sinus and elevated venous pressures and the patient subsequently underwent endovascular transarterial intervention twice. We report on the first case of a superior sagittal sinus DAVF occurring after surgical resection of a parasagittal meningioma [6)].

A sagittal sinus dural arteriovenous fistula manifesting as dysphonia secondary to vocal cord paresis. The patient presented with a 6-week history of hoarseness. Imaging studies demonstrated findings suggestive of a dural arteriovenous fistula affecting the superior sagittal sinus. Direct laryngoscopy demonstrated paresis of the right vocal fold. We hypothesized that pressure on the vagus nerve from a dilated and arterialized internal jugular vein within the jugular foramen was responsible for the cranial neuropathy. The patient's dysphonia resolved with embolization of the fistula, and repeat laryngoscopy showed resolution of the vocal fold paresis [7)].

Beer-Furlan A, Joshi KC, Dasenbrock HH, Chen M. Endovascular management of complex superior sagittal sinus dural arteriovenous fistula. Neurosurg Focus. 2019 Apr 1;46(Suppl_2):V11. doi:

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Song W, Sun H, Liu J, Liu L, Liu J. Spontaneous Resolution of Venous Aneurysms After Transarterial Embolization of a Variant Superior Sagittal Sinus Dural Arteriovenous Fistula: Case Report and Literature Review. Neurologist. 2017 Sep;22(5):186-195. doi: 10.1097/NRL.0000000000000137. Review. PubMed PMID: 28859024.

A DAVF of the SSS in a patient who presented uniquely with increasing dizziness and disequilibrium who was treated with a single modality, endovascular embolization with ethyl vinyl alcohol co-polymer (Onyx, EV3, Irvine, CA). The patient underwent staged embolization in 2 sessions with no complications. An angiographic cure was achieved and the patient's symptoms were ameliorated. Single modality therapy with endovascular embolization of a SSS DAVF can be achieved. Careful attention to technique during embolization with Onyx is required, but complete obliteration is possible without the need for adjunctive surgical resection [8)]

A 61-year-old man who had been treated with anticoagulation for a known SSS thrombosis presented with a sudden onset of headache. CT scan revealed an intraventricular hemorrhage and cerebral angiography revealed DAVFs involving the SSS which had severe venous congestion and sinus occlusion. We treated this case with a staged endovascular approach which consisted of stent placement for the occluded sinus and transarterial intravenous embolization resulting in complete eradication of DAVFs. Recanalization of an occluded sinus by stent placement can reduce venous congestion and transarterial intravenous embolization can obliterate dural arteriovenous shunts. This staged strategy is feasible and should be considered a first option of treatment, especially for DAVFs which presented with intracranial hemorrhage and aggressive venous hypertension [9)]

A case report and review of the literature of 16 dural arteriovenous fistulas (DAVFs) involving the superior sagittal sinus region are presented. In the case, magnetic resonance angiography detected the DAVF with multiple arterial feeding vessels from both external carotid arteries. The patient was successfully treated endovascularly, with complete occlusion of arterial feeders and a total resolution of symptoms [10)].

References

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