Craniocervical junction dural arteriovenous fistula

Reviews

Dural arteriovenous fistulas (DAVFs) located at the craniocervical junction are rare vascular malformations with distinctive features, and their natural history and the optimal treatment strategy remain unclear. We retrospectively reviewed eight patients with craniocervical junction DAVF who were evaluated at our institution between 2009 and 2012. Wang et al. also conducted a MEDLINE search for all reports of craniocervical junction DAVF between 1970 and 2013 and reviewed 119 patients from 56 studies. From a total of 127 patients, 46 (37.1%) presented with myelopathy, 53 (43.1%) with subarachnoid hemorrhage (SAH), and four (3.3%) with brainstem dysfunction. SAH was typically mild, most often Hunt and Hess Grade I or II (83.3%), and associated with ascending venous drainage via the intracranial veins ($p<0.001$). Higher rates of obliteration were observed after microsurgery compared to embolization. Overall, younger age (odds ratio [OR] 1.07; 95% confidence interval [CI] 1.01-1.12; $p=0.011$), hemorrhagic presentation (OR 0.17; 95% CI 0.06-0.50; $p=0.001$), and microsurgery (OR 0.23; 95% CI 0.08-0.6; $p=0.004$) were independently predictive of good outcome at the last follow-up. Microsurgery was the only independent predictor of overall improvement at the last follow-up (OR 4.35; 95% CI 1.44-13.2; $p=0.009$). Prompt diagnosis and microsurgical management, offering a greater chance of immediate obliteration, may optimize the outcomes for patients with craniocervical junction DAVF. Endovascular treatment is often not feasible due to lesion angioarchitecture and is associated with a higher risk of lesion recanalization or recurrence. However, long-term studies with newer embolic agents such as Onyx (ev3 Endovascular, Plymouth, MN, USA) are yet to be performed [1)].

Case reports

An 84-year-old man presented with motor weakness and sensory disturbance of the lower extremities. Edematous changes in the medulla oblongata and cervical spinal cord were observed on magnetic resonance imaging. Cerebral angiography revealed a DAVF fed by a branch of the vertebral artery, with a shunting point located in the dura of the right condyle; the main drain was the anterior spinal vein. The DAVF drain was surgically obliterated to prevent hemorrhagic events and improve neurological symptoms. Intraoperatively, an artery branching from the feeder of the DAVF was identified and preserved. The patient had a good postoperative course, and the neurological symptoms were ameliorated. Follow-up cerebral angiography revealed proximal branching of the lateral spinal artery from the feeding artery of the DAVF.

A lateral spinal artery was identified intraoperatively while a DAVF at the craniocervical junction was obliterated. This suggests that preoperative imaging should be carefully reviewed, and endovascular procedures should consider such possibilities to avoid adverse ischemic outcomes [2)].

Two patients with craniocervical junction DAVF whose venous drainage involved the cervical spinal

cord. Both cases presented with progressive quadriparesis and parenchymal magnetic resonance signal abnormality of the cervical spinal cord. Both patients improved following embolization of the fistulas. AVF of the craniocervical junction is an uncommon, but important cause of treatable neurological deficits referable to this region of the nervous system [3].

1)

Wang JY, Molenda J, Bydon A, Colby GP, Coon AL, Tamargo RJ, Huang J. Natural history and treatment of craniocervical junction dural arteriovenous fistulas. J Clin Neurosci. 2015 Nov;22(11):1701-7. doi: 10.1016/j.jocn.2015.05.014. Epub 2015 Jul 17. PMID: 26195333.

2)

Ishibashi R, Maki Y, Ikeda H, Chin M. Intraoperative identification of the lateral spinal artery in a case of craniocervical junction dural arteriovenous fistula surgically obliterated. Neuroradiol J. 2022 Oct 10:19714009221132950. doi: 10.1177/19714009221132950. Epub ahead of print. PMID: 36217723.

3)

Hurst RW, Bagley LJ, Scanlon M, Flamm ES. Dural arteriovenous fistulas of the craniocervical junction. Skull Base Surg. 1999;9(1):1-7. doi: 10.1055/s-2008-1058166. PMID: 17171075; PMCID: PMC1656725.