Arteriovenous Malformation in the Cerebellopontine Angle Presenting as Hemifacial Spasm

—Case Report—

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Abstract

A 64-year-old female was admitted with a 6-year history of right hemifacial spasm. Neurological examination and precontrast computed tomographic (CT) scanning showed no abnormality. Vertebral angiography disclosed, however, a small arteriovenous malformation (AVM) in the right cerebellopontine angle. A postcontrast CT scan demonstrated a high-density area in the right cerebellomedullary junction which appeared as a flow-void signal on magnetic resonance images. A right retromastoid craniectomy was performed to separate an enlarged and tortuous loop of the right anterior inferior cerebellar artery from the right facial nerve using a Teflon-felt sheet. The AVM was not excised. Postoperatively, she was completely free of hemifacial spasm.

Key words: arteriovenous malformation, cerebellopontine angle, hemifacial spasm, magnetic resonance imaging, angiography

Introduction

Hemifacial spasm is usually caused by vascular compression of the facial nerve. Only infrequently is the cause an organic lesion affecting the facial nerve, such as a tumor, aneurysm, or arteriovenous malformation (AVM). Few instances of AVM causing hemifacial spasm have been reported. Some authors consider that diagnostic studies such as computed tomographic (CT) scanning and angiography are not required in cases of hemifacial spasm unless they manifest neurological deficit. We describe a case of AVM in the cerebellopontine (CP) angle causing hemifacial spasm and discuss the necessity for radiological studies in the diagnosis of hemifacial spasm.

Case Report

A 64-year-old female was admitted to our hospital with a 6-year history of right hemifacial spasm. Initially, the spasm only involved the lower eyelid and occurred several times a month lasting for 10–20 seconds. However, it gradually spread to other right facial muscles and had been occurring almost continuously for the last 2 years. She had no facial pain.

On admission, the right hemifacial spasm was so severe as to involve the platysma (Fig. 1 left) and was sustained continuously. Neurological and otolaryngological examinations including audiometry and auditory brainstem responses showed no abnormality. A precontrast CT scan was negative, but vertebral angiography disclosed a small AVM in the right CP angle (Fig. 2). The AVM was fed by the right anterior inferior (AICA) and posterior inferior cerebellar arteries (PICA) and drained into the right inferior cerebellar hemispheric veins which emptied into the tentorial sinus. The right AICA was unusually enlarged and tortuous. A postcontrast CT scan demonstrated a high-density area in the right...
cerebellomedullary junction appearing as a flow-void signal on a magnetic resonance (MR) image (Fig. 3).

A right retromastoid craniectomy was performed in the left lateral position. An abnormally rich vascular network was disclosed over the right lateral surface of the medulla oblongata just below the right auditory and facial nerves. Presumably the nidus of the AVM was located underneath (Fig. 4). The right AICA was enlarged and tortuous, passing in front of the right auditory and facial nerves, and sending a branch to the cerebellar hemisphere below them. The arterial loop, with arterial pulsations, was in contact with the anterocaudal part of the right facial nerve slightly distal from the root entry zone. The arterial loop was separated from the nerve with a Teflon-felt sheet.

Immediately after the operation, she was completely free of hemifacial spasm (Fig. 1 right) and the auditory and facial nerve functions remained intact.

Discussion

Loeser and Chen7 reviewed 450 operated cases of hemifacial spasm. The facial nerve was compressed by an artery in 400 cases (89%), vein in 16 (4%), aneurysm in two (0.4%), AVM in one (0.2%), and tumor in four (0.9%). Miyazaki and Fukushima9 reported the cause was arterial loop compression in all 425 cases operated on except for single cases of fusiform aneurysm, cavernous angiomia, and epidermoid tumor. Few reports of AVM causing hemifacial spasm have been published.2,11 Gardner and Sava2 reported three cases of CP angle AVM and obtained complete relief of the hemifacial spasm after posterior fossa exploration. Two other cases2,11...
were treated by separating the offending arteries from the facial nerve.

Loeser and Chen\(^7\) concluded that, unless additional neurological deficit is present, radiological studies such as CT scanning and angiography are not required because the pathogenesis of the hemifacial spasm is rarely indicated. However, there were no neurological deficits in two cases due to AVM\(^3,11\) as well as the present one. Also, the cases due to epidermoid tumor\(^9\) and to lipoma\(^6\) were neurologically intact. Further, even the CT scan failed to demonstrate the epidermoid tumor before surgery.\(^9\) The same occurred in patients with trigeminal neuralgia.\(^12\) Several unsuspected tumors have been disclosed during surgery in patients with no neurological deficit and CT feature.

Kondo \textit{et al.}\(^4\) analyzed angiographic and operative findings of the vertebrobasilar artery system from 61 patients with hemifacial spasm. The vertebral artery was always larger in diameter ipsilateral to the hemifacial spasm, and that the tortuous and ectated PICA (or AICA) passed to the ipsilateral internal auditory canal. The angiographic findings of the ipsilateral vertebral artery and AICA in our case corresponded to those findings.\(^13\) The AVM in the cerebellomedullary junction presumably caused hemodynamic stress in these arteries thus developing the facial spasm.

MR imaging is far superior to CT scanning for the diagnosis of posterior fossa lesions since there are no streak artifacts due to bone, the contrast sensitivity is greater, and direct sagittal views are obtained.\(^5,12\) Also, the displacement of normal structures is better defined and lesions with altered signal intensities readily detected. Postcontrast CT scans failed to demonstrate small CP cistern tumors convincingly, but these are identified readily by MR imaging.\(^13,10\)

In our case, the first precontrast CT scan was negative. Without angiography, the AVM would not have been identified. However, postcontrast CT scan should have been performed before angiography. The occult organic lesion in the cerebellomedullary junction would then have been detected. The AVM was demonstrated more clearly on MR images than on postcontrast CT scans.

Therefore, postcontrast CT scanning is essential in patients with hemifacial spasm to detect occult organic lesions in the CP angle. MR imaging and vertebral angiography should follow if an organic lesion is suspected.

References


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