Arachnoid bands in hemifacial spasm: an overlooked etiology? Illustrative case

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BACKGROUND
Primary hemifacial spasm (HFS) is usually caused by arterial compression of the facial nerve at the root exit zone at the brainstem. Rarely, a purely venous compression is seen. However, arachnoid bands strangulating the facial nerve have not been recognized as a cause of hemifacial spasm.

OBSERVATIONS
The authors present a case of a 24-year-old female who had experienced HFS for 9 years. Endoscopic inspection of the root exit zone revealed no vascular compression but an arachnoid band strangulating the facial nerve. After cutting the band, the lateral spread response disappeared, and the patient was immediately spasm free after the surgery. Two years later, she was still doing well without any spasms.

LESSONS
This is the third patient in the authors’ series of 535 patients who had no vascular conflict but rather a strangulation of the nerve by arachnoid bands. All patients have remained spasm free. To the authors’ knowledge, no other group has reported arachnoid bands as an etiological factor of HFS so far.

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KEYWORDS
case report; hemifacial spasm; arachnoid band; endoscope-assisted microvascular decompression; microvascular decompression; etiology

Hemifacial spasm (HFS) is characterized by progressive, involuntary, irregular, clonic, and/or tonic movements of the muscles innervated by the facial nerve.1,2 In most cases, the spasm is caused by an arterial, rarely a venous, compression at the root exit zone of the facial nerve.1,3 Other etiologies include space-occupying lesions in the cerebellopontine angle or brainstem lesions such as gliomas, demyelinating neurological disorders, or brainstem infarction.4–7 However, even in large surgical series, arachnoid bands have not been described as an etiological factor.8–11 We present a case of a patient with typical HFS caused by an arachnoid band strangulating the nerve at the root exit zone.

Illustrative Case
A 24-year-old female had been complaining of HFS for 9 years. Clinically, she presented with a typical HFS. Magnetic resonance imaging (MRI) with constructive interference in steady state sequences did not show vascular compression (Fig. 1). Nevertheless, because of the typical symptoms, an operative inspection of the facial root exit zone was recommended. The facial nerve was exposed via a lower retrosigmoid craniotomy. The endoscopic inspection did not reveal a vascular compression (Fig. 2A). One small anterior inferior cerebellar artery (AICA) branch, which was close to the nerve

FIG. 1. Axial constructive interference in steady state MRI sequences did not show vascular compression at the facial nerve root exit zone (arrows).
but not compressing it, was cushioned with a small piece of shredded Teflon (Fig. 2B). However, the lateral spread response (LSR) remained unchanged (Fig. 3A). Closer endoscopic inspection with a 45° endoscope revealed a fibrous arachnoid band strangulating the nerve at the brainstem (Fig. 2C). The band was mobilized with a sharp hook (Fig. 2D) and cut with scissors (Fig. 2E). The final endoscopic inspection showed the released nerve and the edge of the transected band (arrows).

**FIG. 2. A:** Endoscopic view showing the facial nerve (between the arrows) without compression by the neighboring AICA branches. **B:** The AICA branch medial to the facial nerve is cushioned with shredded Teflon. **C:** Endoscopic inspection shows an arachnoid band (arrows) crossing the facial nerve, where it turns into the cisternal segment. **D:** Elevation of the band with a sharp hook. **E:** Transection of the ligament with scissors. **F:** The final endoscopic inspection shows the released nerve and the edge of the transected band (arrows).

**Patient Informed Consent**

The necessary patient informed consent was obtained in this study.

**Discussion**

Arachnoid bands strangulating the facial nerve have not been recognized as a cause of HFS. We present a case of a 24-year-old female who had had HFS for 9 years. Endoscopic inspection of the root exit zone revealed an arachnoid band strangulating the facial nerve. To our knowledge, no other group has reported arachnoid bands as an etiological factor of HFS.

**Observations**

Although vascular compression is the predominant cause of HFS during microvascular decompression, additional factors may contribute to nerve irritation.12 Although tumors such as epidermoid tumors, meningiomas, and acoustic neuramias, as well as cysts and aneurysms, have been associated with HFS, they are less frequently observed.13-15 Yang et al.16 reported cases of HFS secondary to arachnoiditis caused by neurocysticercosis. Surprisingly, arachnoid bands have not previously been reported as a primary cause of HFS without any vessel involvement.11,17 The etiology of these bands remains uncertain, although they appear to be found incidentally, as evidenced by their presence in our three cases without a history of infection, intracranial lesions, cranial surgeries, or trauma. Furthermore, despite the existence of much larger patient cohorts, arachnoid or fibrous bands have not been reported, possibly because the endoscope was not used.18 The tangential view of the microscope makes the identification of a band difficult compared with an endoscope, which offers a circumferential view of the nerve, facilitating the identification of such bands in the cerebellopontine angle and potentially improving outcomes in microvascular decompression procedures.19 In our case, the band could not be identified under the microscope. Only the 45° endoscope showed the band clearly.

**Lessons**

Even when MRI is not showing a cause for the HFS, surgical exploration should be recommended. Possible compression of the facial nerve by an arachnoid band should be considered.

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**References**


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