



Hemifacial Spasm Associated with Bilateral Vertebral Arteries Compression

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Abstract

Microvascular decompression (MVD) is a fundamental treatment and standard procedure for hemifacial spasm (HFS). However, it is difficult to perform when the compressing vessel is the vertebral artery (VA). In addition, cases involving the bilateral VAs are rare, meaning that such surgeries lack precedent; thereby making them difficult. In this report, we describe the successful results of MVD for HFS involving bilateral VAs.

The patient was a 57-year-old man with left-sided HFS. He visited the hospital for surgery because he had developed the disease 10 years prior, and it had gradually worsened. Preoperative 3D magnetic resonance cisternogram/magnetic resonance cisternogram/angiogram fusion images showed that the left VA severely compressed the root exit zone of the facial nerve, while the right VA compressed it further from behind. Surgery was performed using the conventional retrosigmoid approach. The transposition and interposition were performed on the right and left VA, respectively, and favorable decompression of the facial nerve was achieved. The postoperative course was excellent, the HFS disappeared, and the patient was discharged without any complications.

MVD for HFS involving the bilateral VAs is challenging, and to avoid complications, a combination of other procedures should be considered in addition to transposition.

Keywords: Hemifacial Spasm; Bilateral Vertebral Artery; Microvascular Decompression

Abbreviations

HFS: Hemifacial Spasm; MVD: Microvascular Decompression; VA: Vertebral Artery; 3D-MRC/MRA: 3D Magnetic Resonance Cisternogram/Magnetic Resonance Angiogram

Introduction

Microvascular decompression (MVD) is the gold standard surgery for hemifacial spasm (HFS) throughout the world [1,2]. MVD decompresses the facial nerve by moving the blood vessel

responsible for nerve compression; however, in HFS cases, wherein the vertebral artery (VA) is responsible, moving it is challenging and requires ingenuity [3-6]. Furthermore, while the compressing vessel is commonly the unilateral VA, compression by either bilateral VA is rare, making the procedure even more challenging. In this report, we describe a surgical procedure for HFS involving bilateral VAs with favorable results and discuss the surgical techniques.

Case Presentation

The patient was a 57-year-old male. The spasm appeared around the left periocular eyelid 10 years prior and gradually spread to the corners of the mouth. The patient had been treated with Botox at another clinic but was referred to our department because of his desire for surgery. medical history included hypertension and hyperlipidemia. The patient’s family history was unremarkable. A 3D magnetic resonance cisternogram/magnetic resonance angiogram (3D-MRC/MRA) fusion image (Figure 1) showed that the left VA directly compressed the root exit zone of the facial nerve and the right VA lined it from behind. MVD was performed with the patient in the right lower lateral recumbent position using continuous intraoperative ABR monitoring and a conventional retrosigmoid approach. The arachnoid around the lower cranial nerve was incised and dissected and the facial nerve was observed. The facial nerve was highly compressed by the left VA, and further compressed posteriorly by the right VA, resulting in facial nerve deformation (Figure 2A). First, the right VA was moved by adhering it to the pyramidal dura mater with a TachoSil® (human thrombin/fibrinogen) (Figure 2B). The nerve was slightly decompressed, and the deformity showed signs of improvement; however, a Teflon felt was inserted between the left VA and the facial nerve to decompress the facial nerve (Figure 2C). The patient was discharged from the hospital on the 7th day after the surgery with no adverse events. The postoperative 3D-MRC/MRA fusion image (Figure 3) showed favorable decompression of the facial nerve. Two years after the surgery, there has been no apparent recurrence.



Figure 1: Preoperative 3D magnetic resonance cisternogram/magnetic resonance angiogram fusion image. The left vertebral artery (double arrows) directly compresses the root exit zone of the facial nerve, while the right vertebral artery (arrow) compresses it posteriorly. Arrowhead: facial nerve.

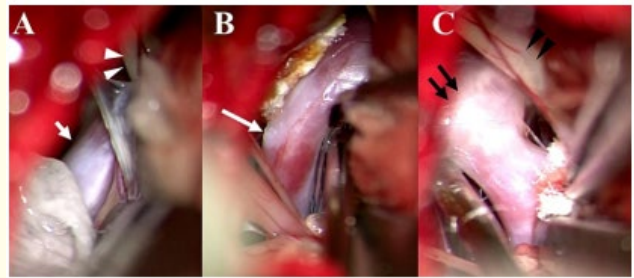


Figure 2: Surgical views. A: After reaching the left facial nerve, compression of the right vertebral artery (arrow) against the facial nerve was visible. Double arrow heads: Seventh and eighth cranial nerve complexes B: Transposition is performed by adhering the right vertebral artery (arrow) to the vertebral bone dura mater. C: Next, a Teflon felt was inserted between the left vertebral artery (double arrow) and facial nerve for interposition.

Double arrow heads: Seventh and eighth cranial nerve complexes.

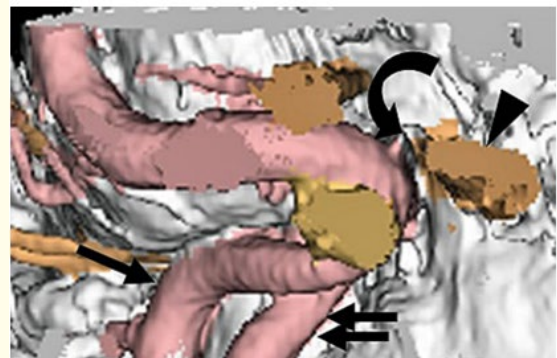


Figure 3: Postoperative 3D magnetic resonance cisternogram/magnetic resonance angiogram fusion image. The left (double arrows) and right (arrow) vertebral arteries moved, indicating a gap (curved arrow) between the facial nerves. Arrowhead: facial nerve.

Discussion

Over the two and a half years, 115 patients underwent surgery for HFS at our clinic, excluding recurrent cases. Of these, 32 (27.8%) had HFS involving the VA and one (0.9%) had bilateral VAs involvement. Four of the 131 HFS cases (3.1%) reported

by Shimano et al. involved the bilateral VAs [7]. Facial spasms involving nerve compression by the bilateral VAs are rare, and few reports have been published.

Facial nerve decompression can be achieved by the interposition of a Teflon felt between the facial nerve and the responsible vessel [5] or by transposition to move the responsible vessel [6]. Transposition reportedly results in better surgical outcomes and lower recurrence rates [2,6]. However, some studies have reported that moving a large VA is difficult, and good results have been obtained with interposition [3,5]. In the present case, the right VA was transpositioned and decompressed to an extent, and an interposition of Teflon felt between the left vertebral artery and facial nerve was added, with good results. HFS involving the VA is associated with poorer surgical results and a higher recurrence rate than other vessels, such as the anterior inferior or posterior inferior cerebellar artery [4]. Furthermore, the complication rate of surgery for HFS involving the VA is high mandating careful manipulation [4,5]. In the case of HFS, where both VAs are involved in nerve compression, both must be moved, which is a significantly challenging procedure with less space available to move in to compared to moving only one bilateral VA. To obtain good results safely and without complications, it may be important to perform multiple procedures in each case, incorporating both interposition and transposition techniques.

We previously reported the usefulness of 3D-MRC/MRA fusion images as a preoperative examination for MVD, which can visualize the anatomical structures of the responsible vessels and facial nerves in three dimensions [9,10]. In this case, a detailed radiological evaluation of the relationship between the bilateral VAs and facial nerves is useful for surgical simulation. Further advances in examination techniques are required to obtain more accurate and detailed preoperative data.

Conclusion

MVD for HFS with bilateral VAs as the responsible vessels is challenging, and to avoid complications, a combination of other procedures should be considered in addition to transposition.

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Conflict of Interest

The authors declare that they have no conflicts of interest related to the publication of this study.

Ethical Approval

The Ethical Committee of the International University of Health and Welfare approved all procedures used in this study. Submission Statement This original manuscript has not been submitted elsewhere in part or whole.

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