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CASE REPORT **OPEN ACCESS**

DELAYED FACIAL PALSY: UNCOMMON COMPLICATIONS OF MICROVASCULAR DECOMPRESSION FOR HEMIFACIAL SPASM

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ABSTRACT

Background: Microvascular Decompression (MVD) is considered the most effective treatment for reducing hemifacial spasm (HFS) and achieving long-term resolution. However, in rare cases, this procedure can lead to delayed facial palsy, characterized by facial weakness occurring more than 24 hours after surgery.
Case: A 50-year-old woman complaining of twitching in the right face, from the corner of the eye to the eyebrows and mouth, for 2 years. The Brain MRI-FIESTA examination revealed a neurovascular attachment between the right facial nerve and the right posterior inferior cerebellar artery. Despite receiving medical treatment, the patient experienced dissatisfaction due to incomplete symptom remission and drowsiness caused by drug side effects. After the patient undergoes MVD, the twitches disappeared. However, twelve days later, the patient developed right facial weakness, and after three months of rehabilitation, facial weakness was resolved.
Discussion: HFS is a rare condition characterized by involuntary facial twitches that can significantly disrupt daily activities, despite being painless. Proper management can be provided according to the needs of the patient and the choices of HFS management include medications, botulinum toxin injection, and MVD. The potential side effects of each procedure should be carefully considered when making treatment decisions. It is crucial to thoroughly evaluate and monitor post-surgical conditions.
Conclusion: Delayed facial weakness may be attributed to gradual edema occurring after surgery. The use of Teflon to separate nerve tissue and blood vessels, although beneficial, can sometimes be perceived as a foreign body leading to inflammation. Facial weakness can be managed with facial muscle exercises without requiring special treatment.

Keywords: delayed facial palsy, hemifacial spasm, microvascular decompression

Introduction

Hemifacial spasm (HFS) is facial nerve disorder characterized by involuntary muscle spasm or twitches in the muscles of the face and around the eyes. The prevalence of HFS is about 7.4 – 14.5 per 100,000 with women being more commonly affected. Although it does not cause pain, HFS, if not handled properly, can result in facial asymmetrical, thereby affecting the patient's appearance and social activities, leading to stress and anxiety. The hypothesis underlying the occurrence of HFS compression of facial nerve by blood vessels, damaging the myelin sheath and producing ephaptic transmission, causing uncontrolled facial muscles contraction. Subsequently, old age and hypertension are believed to be the risk factors for developing vessel ectasis and therefore compressing facial nerve. The vessels that may cause HFS are AICA (51,7%), PICA (21,6%), and VA (1,7%) as well as mixed (14%).[1,2,3]

In 90% of HFS, symptoms begin from the upper face or around the eyes, including brief recurrent contractions of the eye muscles, resulting in sudden and uncontrollable blinking. Symptoms appear suddenly at first and then can become chronic and last until they reach the lower half of the face. In secondary FHS, symptoms can usually affect both the upper and lower areas.[4] Although the diagnosis of HFS can be established through the clinical symptom, several

additional methods can be used to help determine the diagnosis, such as Electromyography (EMG) and MRI (Magnetic Resonance Imaging). Subsequently, MRI is a useful modality for distinguishing HFS from other pathological disorders of the brain, for example, tumors. MRI is the gold standard for conflict examination between cranial nerves and blood vessels, especially in fast spin echo and steady-state free procession sequences.[3,5]

Therapeutic options for HFS include drugs, Botulinum Toxin (BTX) injections, and surgery. The drugs used for treatment include the carbamazepine group, clonazepam, and baclofen, as well as new anticonvulsant drugs, such as gabapentin. However, there are no reports of the successful long-term effects of such drugs[3]. BTX is a toxin substance with muscle relaxing effect, this therapy has been used for treatment since 1980. In several trials, it was reported that 84% of HFS patients experienced improved symptoms within 3-6 months. Subsequently, patients with mild-moderate symptoms and considering long-term remission but intolerant to surgical treatment can take BTX injection as a treatment of choice[6]. Microvascular Decompression (MVD) may cure this disorder completely and permanently. With microsurgical techniques, facial nerve and the vascular constriction become visible. Therefore, the pressing part of the blood vessel can be treated with some techniques. The success of surgery for HFS >90%, but this result also depends on the symptoms, severity, and duration.[7,8]

The prognosis varies depending on the severity and response to the therapy administered. Some patients respond well to long-term treatment, but some others need surgery. About 85% of MVD actions resulted in loss of symptoms, 9% reduced spasm, and 7% elicited recurrences[9]. However, some of the side effects of surgery that may occur include the risk of invasive procedures (including postoperative infections and anesthesia complications), hearing loss (7-26%), temporary or permanent paralysis/facial nerve paralysis, and CSF leakage (2-3%).[7,8]

A rare side effect of MVD is delayed facial paralysis, and its occurrence is suspected since the manipulations made during the operation lead to an accumulation of postoperative edema. Although the cause of delayed facial palsy is not known with certainty, about 6.5–14.5% of patients experience delayed facial palsy after MVD.[10,11] Despite the rare occurrence of DFP, it is important to inform the patient about the possibility of DFP after MVD and reassure the patient and family that it can be completely resolved to improve psychological stability. The neurologist needs to assess the patient's condition and properly manage DFP as complications after the surgical treatment. This case report provides successful remission of DFP after medication and rehabilitation treatment.

Case Report

A 50-year-old woman complaining of twitching in the right face, from the corner of the eye to the eyebrows and mouth, for 2 years. The patient also feels a clicking sound and the ears buzzing according to the pulsation of the blood vessels. Neurological examination revealed Babinski-2 marks and synkinesis on the right face. MRI Brain Contrast revealed neurovascular attachment in the root entry zone of the right facial nerve and right posterior inferior cerebellar artery (PICA) (Figure 1). The patient was treated with 2x300 mg carbamazepine but did not feel satisfied with the reduction in symptoms and had unpleasant side effects such as drowsiness. The patient was operated on using a surgical procedure with a retro-mastoid approach with PICA compression in facial nerve and MVD to separate nerve tissue and blood vessels by Teflon insertion. One day after the operation, the twitching complaint disappeared completely. However, 12 days after surgery, right facial weakness was reported on the House-Brackman 3 scale (Figure 2. a). The patient has no history of fever, water spots, or rashes around the ears, and was administered mecobalamin 2x500 mcg and rehabilitation of facial muscle exercises in front of the mirror. On examination of the 11th week, facial weakness disappeared (Figure 2).

Figure 1. Neurovascular attachment (arrow) on brain MRI (FIESTA)

Discussion

MVD is still the *gold standard* in HFS management, which provides long-term satisfactory outcomes. In general, surgery on the brain affects the blood vessels of the brain and cranial nerves, and postoperative complications must be carefully managed. Although

the incidence rate is low, MVD-related defects should be avoided. The most frequent complications of this procedure are leakage of *Cerebrospinal Liquor* (LCS), numbness of the face, weakness of the face, meningitis, and decreased hearing. There is early-onset facial palsy that appears within 24 hours post-surgery and *late-onset/delayed facial palsy*.[12–14] However, *delayed facial palsy* is a rare complications that appears >24 hours post-MVD in HFS cases. The incidence of DFP post-MVD was reported at 2.8-8.3% in various case reports. There are no studies that mention the predilection of a particular sex or age that will be affected, but DFP often appears 7-12 days after MVD.[15–17] In this case, no complications of meningitis, leakage of LCS, numbness of the face, and hearing loss are obtained.

Figure 2. Facial weakness comparison (a) 12 days after surgery and (b) 11 weeks after surgery

In this case, no complications of meningitis, leakage of LCS, numbness of the face, and hearing loss are obtained.[18–20] Gianoli Kim et al reported that the use of Teflon can cause lesions directly on the nerve tissue that has the potential to cause edema.[21] Scheller et al. reported the efficacy of nimodipine administration in DFP, leading to hypothesize vasospasm after *vestibular resection of neurilemmoma*.[22] Atherosclerotic blood vessels that cause FHS increase the risk of complications.[22,23] On the other hand, the cranial nerves does not have an epineurium layer, meaning that without a full basal lamina, the protection against facial nerve is thinner, leaving it open to manipulation or stimulation. The position of the root entry zone is a transition zone between central myelinization (oligodendrocytes) and peripheral myelinization (Schwann cells) which makes it a weak zone against external influences.[3,24]

Several treatments have been proposed to address DFP including steroids, acyclovir, and facial canal decompression.[12,18,20,24] But in most cases spontaneous resolution occurs, and the average duration of improvement is 5.7-9 weeks. Liu et al. improved 15/16 (95%) perfectly with no special management. There is a phenomenon that the sooner DFP appears, the faster the improvement.[11] Likewise found by Rhee et al., and Sekula et al. in these patients, optimal resolution with minimal sequelae is obtained without the administration of special treatment.[22,25] Further examination should be carried out to evaluate the resolution of the optimal resolution point for about 12 months and neurophysiological examinations can be carried out to obtain objective data. The provision of medical rehabilitation provides satisfactory benefits in some cases.[3,21] To minimize postoperative complications, it is essential to ensure comprehensive preoperative imaging, complete decompression of neurovascular conflicts, minimal nerve manipulation, and the use of intraoperative monitoring.[3,10,26]

Conclusion

DFP is uncommon complications that can occur after MVD for HFS. While its occurrence rate is low, patient education regarding this potential complications is crucial. DFP management does not require specific treatment management, but medical rehabilitation is recommended. To minimize postoperative complications, it is essential to ensure comprehensive preoperative imaging, complete decompression of neurovascular conflicts, minimal nerve manipulation, and the use of intraoperative monitoring.

Declaration of Interests

The author declared no conflict of interest in this publication.

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