Operative Complications of Microvascular Decompression for Hemifacial Spasm: Experience of 1548 Cases

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BACKGROUND: **Although microvascular decompression (MVD) surgery is considered the gold standard treatment for hemifacial spasm, there are some MVD-related complications.**

METHODS: **We retrospectively reviewed 1548 patients with hemifacial spasm who underwent retromastoid suboccipital craniectomy with MVD from January 2009 to June 2013. All patients were followed for >2 years.**

RESULTS: **Excellent and good results were 92.5% and 4.2%, respectively. Postoperative complications were recorded in 16.09% ($n = 249$). There was no MVD-related mortality. After MVD surgery, the most frequent complications were occipital sensory disturbance (7.3%), facial nerve palsy (9.7%), and hearing impairment (3.5%). Other complications were as follows: cerebrospinal fluid leakage ($n = 24$), poor healing wound ($n = 14$), lower cranial nerve palsy ($n = 12$), wound infection ($n = 4$), and hemorrhage ($n = 2$).**

CONCLUSIONS: **MVD operation is a safe treatment for hemifacial spasm. Facial nerve palsy is the most common MVD-related complication; preservation of the lesser occipital nerve during MVD surgery can decrease the rate of occipital sensory disturbance. Permanent or serious complications are comparatively rare in MVD surgery.**

INTRODUCTION

Hemifacial spasm (HFS) is a neuromuscular movement disorder characterized by unilateral, involuntary, infrequent, hyperactive contractions.[1] It is commonly believed that HFS results from vascular compression in the root exit zone of the facial nerve.[2] Some authors suggest that neurovascular compression can be noted anywhere throughout the whole intracranial facial nerve root.[3] Microvascular decompression (MVD) is considered an effective and safe treatment for HFS. According to the literature, immediate cure rates of MVD for HFS are 50%–98%.[4] However, complications can occur in MVD surgery, including facial nerve palsy (FNP), hearing damage, sensory disturbance, intracranial hemorrhage, meningitis, abducens nerve palsy, epidural hematoma, wound infection, and cerebrospinal fluid (CSF) leakage.[5] There are studies that address the nature of the possible complications of MVD. In the present study, we retrospectively analyzed MVD-related complications and the number of occurrences of each complication.

MATERIALS AND METHODS

Patient Population

This study was approved by the ethics committee of XinHua Hospital Affiliated to Shanghai Jiao Tong University School of Medicine. Between January 2009 and June 2013, 1724 patients with typical primary unilateral HFS were treated with MVD at Xin Hua Hospital Affiliated to Shanghai Jiao Tong University School of Medicine. We retrospectively reviewed 1548 cases with follow-up for >2 years. Patients with HFS that was due to tumors, vascular malformation, or Chiari malformation were excluded from this study.

Surgical Procedure

All MVD surgeries were performed by the senior neurosurgeon (Dr. Li) in the Department of Neurosurgery. Thus, bias associated with the surgeon's experience and skills was eliminated. A standard retromastoid suboccipital craniectomy surgical procedure

Key words
- Complications
- Hemifacial spasm
- Microvascular decompression

Abbreviations and Acronyms
BAEP: Brainstem auditory evoked potential
CSF: Cerebrospinal fluid
FNP: Facial nerve palsy
HFS: Hemifacial spasm
LON: Lesser occipital nerve
MVD: Microvascular decompression
PTA: Pure tone audiometry

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was carried out. After the dura mater was opened, we retracted the cerebellum to expose the entire course of the facial nerve from zone 1 and then moved to zones 2, 3, and 4 so that we could find all offending vessels.[4] After the culprit vessels were moved away from the facial nerve, pieces of polytetrafluoroethylene (Teflon) felt were placed between facial nerve and culprit vessel. If a mastoid air cell was opened, it was carefully closed with bone wax. The dura mater was sutured closed. Intraoperative neurophysiologic monitoring included brainstem auditory evoked potential (BAEP) and electromyography.

Follow-Up and Clinical Assessment

The outcome was divided into the following 4 grades: 1) excellent (HFS was absent); 2) good (HFS was improved markedly; HFS was >90% resolved); 3) fair (HFS was >50% resolved); and 4) poor (HFS was <50% resolved or no relief). We defined postoperative FNP as up to grade II according to the House-Brackmann scale. Hearing impairment was classified into the following 4 grades: 1) mild (pure tone audiometry [PTA] is 26–40 dB); 2) moderate (PTA is 41–70 dB); 3) severe (PTA is 71–90 dB); and 4) deafness (PTA is >91 dB). Follow-up PTA and physical examination were performed 2–5 days after surgery. Follow-up of patients was by personal interview or clinic interview. Cranial nerve deficits that occurred within 48 hours were defined as "immediate."

Statistical Analyses

All data were analyzed using IBM SPSS Version 18.0 (IBM Corp., Armonk, New York, USA). Categorical variables were presented as frequency (percentage). Continuous variables were presented as mean ± SD. The level of statistical significance was set at $P < 0.05$.

RESULTS

Patients included 1006 women and 542 men with a mean age of 52.8 years (range, 28–78 years). The left side–to–right side ratio was 1.5. The median duration of HFS was 5.8 years (range, 1.0–24 years). Excellent and good results were 92.5% and 4.2%, respectively. Table 1 presents the demographic and clinical characteristics of patients. Occipital sensory disturbance and FNP were the 2 most common MVD-related complications. Postoperative complications were recorded in 16.09% of patients ($n = 249$). There was no MVD-related mortality. Table 2 summarizes the postoperative complications of patients underwent MVD for HFS.

Facial Nerve Palsy

FNP developed in 150 patients after surgery. Of 150 cases of FNP, 7 developed immediately after surgery (group A). Delayed FNP (group B) developed in 143 cases. The onset of delayed FNP was 3–15 days after MVD surgery (Figure 1). Among patients with delayed FNP, 134 (94%) experienced a complete recovery (range, 10–94 days), and most patients were completely recovered by 2–3 months after the operation. At the end of the 2-year follow-up period, 2 patients (28.6%) in group A and 4 patients (2.8%) in group B still had FNP.

Table 1. Demographic and Clinical Characteristics of Patients

Characteristic	Number (%)
Sex	
Male	1006 (65%)
Female	542 (35%)
Side	
Left	925 (59.8%)
Right	623 (40.2%)
Duration of symptoms, years	
≤5	746 (48.2%)
5–10	529 (34.2%)
≥10	273 (17.6%)

Hearing Impairment

Hearing impairment occurred in 55 patients (3.5%). Immediate hearing impairment was identified in 42 patients (2.70%), and delayed hearing impairment was noted in 13 subjects (0.08%). To exclude temporary conduction hearing impairment related to middle ear fluid, PTA was performed for all patients who presented with a hearing deficit after surgery. Permanent hearing impairment was identified in 11 patients (0.7%) within 48 hours after MVD. Three patients (0.2%) presented with permanent hearing impairment ≥48 hours after MVD. There was a significant difference between these 2 groups ($P < 0.05$).

Occipital Sensory Disturbance

Since 2009, we have attempted to preserve the lesser occipital nerve (LON) in MVD surgery (Figure 2). Since 2009, 113 patients (7.3%) have presented with postoperative sensation in the occipital region. However, before 2009, the percentage of patients with postoperative sensation in the occipital region was 11.2%. There was a significant difference between these 2 time periods ($P = 0.02$). Among the 113 cases, the LON was identified and preserved in 88 patients (group C) but could not preserved in 12 patients (group D). In 13 patients, the LON could not be identified (group E). In group C, 68 patients in whom the LON had been completely preserved did not experience occipital sensory disturbance. The remaining 20 patients presented with mild disturbance. In group D, the 5 patients in whom the LON was sacrificed experienced occipital sensory disturbance, and the incidence of occipital sensory disturbance showed statistical difference compared with group C. In group E, 8 patients reported intact sensation.

Lower Cranial Nerve Palsy

Hoarseness occurred in 12 patients. Of these patients, 9 experienced a complete recovery within 3 months (range, 0.5–3 months), and the remaining 3 patients had a mild permanent palsy. Dysgeusia developed in 9 patients; complete recovery occurred in 88.8% ($n = 8$). One patient had mild permanent dysgeusia.