Outcome of Biomedical Glue Sling Technique in Microvascular Decompression for Hemifacial Spasm Involving the Vertebral Artery

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BACKGROUND: **Microvascular decompression (MVD) is the most useful treatment for hemifacial spasm (HFS). In cases of vertebral artery (VA) compression of the facial nerve, MVD is often difficult. In this study, we compared the outcome of the biomedical glue sling technique with the traditional technique in MVD for HFS involving the VA.**

METHODS: **A retrospective study of patients with HFS treated by MVD was conducted between January 2013 and December 2015. A total of 327 patients with VA-associated HFS underwent their first MVD at our institution. Among them, the traditional technique was performed in 153 patients and the biomedical glue sling technique was performed in 174 patients. We measured effectiveness at 1 day, 7 days, 1 month, 3 months, and 1 year after MVD surgery.**

RESULTS: **In the traditional technique group, the effective rates of MVD were 89.54%, 88.89%, 89.40%, 88.44%, and 86.71%, and the incidence rates of complication were 5.23%, 4.58%, 3.97%, 2.72%, and 0.70%. In the biomedical glue sling technique group, the effective rates of operation were 96.55%, 96.55%, 97.66%, 95.86%, and 95.76% ($P < 0.05$), and the incidence rates of complication were 8.62%, 8.62%, 7.60%, 4.73%, and 2.42% ($P > 0.05$).**

CONCLUSION: **When the HFS were associated with the VA, the effective rate of biomedical glue sling technique of MVD was higher than the traditional technique, and there was no statistical difference between the 2 groups about the incidence of complication.**

INTRODUCTION

Hemifacial spasm (HFS) is a chronic facial nerve disorder characterized by unilateral spontaneous repetitive contractions of facial muscles. It is mainly caused by neurovascular compression on the root exit zone (REZ) of the facial nerve by ≥1 adjacent arteries.[1,2] Microvascular decompression (MVD) is an established method for treating hemifacial spasm.[2] The MVD operation can resolve spasms in >90% of cases.[1-3] However, in cases of vertebral artery (VA) compression of the facial nerve (Figure 1), MVD is more difficult and is associated with worse outcomes compared with MVD for HFS cases unrelated to the VA.[4,5]

Several surgical techniques have been introduced for HFS cases associated with VA. These include the traditional technique, the repositioning procedure using a Teflon sling, the biomedical glue sling technique, anchoring with aneurysmal clips, a dural flap method, and the double-stick tape method.[6-9]

However, most of these previous studies have been case reports and no case control study with a large dataset has yet been conducted. Thus we investigated the effect of the biomedical glue sling technique and traditional technique on the VA during MVD and also retrospectively compared the clinical outcomes of these techniques for patients with HFS associated with the VA.

METHODS

Patients

We retrospectively analyzed clinical records, operative findings, and clinical outcome of 327 patients with VA-associated HFS who underwent their first MVD at our institution (Xinhua Hospital) between January 2013 and December 2015. This study and the techniques were approved by Xin Hua Hospital Ethics Institutional

Key words
- Hemifacial spasm
- Sling
- Vertebral artery

Abbreviations and Acronyms
HFS: Hemifacial spasm
MVD: Microvascular decompression
VA: Vertebral artery

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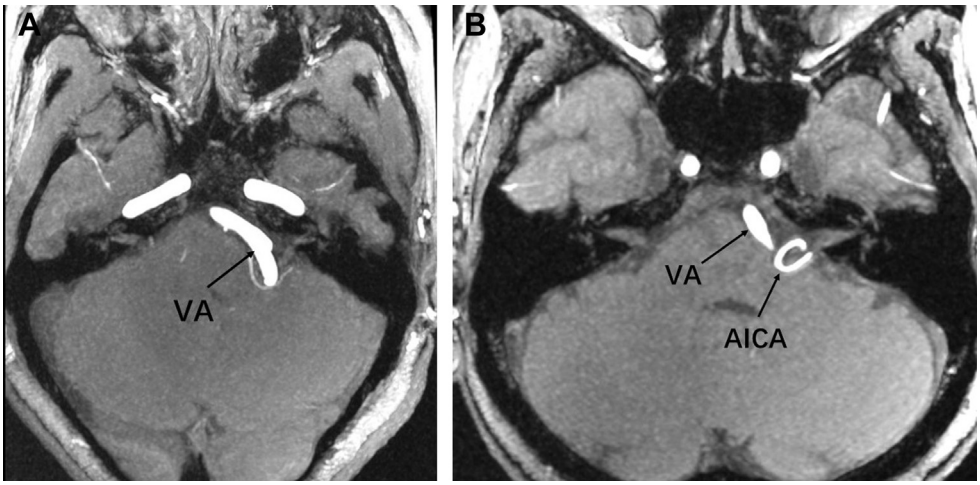

Figure 1. Preoperative magnetic resonance imaging of microvascular decompression in a patient with left-sided hemifacial spasm associated with vertebral artery (VA) (**A**) and VA + anterior inferior cerebellar artery (AICA) (**B**).

Committee. Each patient involved in this study signed an informed consent. All methods were carried out in accordance with approved institutional guidelines and regulations. All the operations were performed by surgeon Dr. Li. The biomedical glue sling technique was performed in 174 patients with HFS between July 2014 and December 2015; the traditional technique was performed in 153 patients between January 2013 and June 2014. Magnetic resonance imaging was performed preoperatively. We compared the surgical outcome of the biomedical glue sling technique and the traditional technique for HFS associated with the VA. Age, sex, and side of lesion were similar in both groups.

Surgery

All patients underwent MVD of the facial nerve in the lateral decubitus position via a standard retrosigmoid craniotomy and an infrafloccular approach. The arachnoid membrane was opened sharply, and the facial nerve was fully exposed. Dissection began from the caudal cranial nerves, and then the arachnoid membranes between the VII and VIII and caudal cranial nerves were opened sharply. The cerebellum and flocculus were raised gradually until the pontomedullary sulcus was exposed. Next, the arachnoid membrane between the acoustic nerve and cerebellum and that rostral to the VII–VIII nerves were dissected. At this stage, the entire arachnoid membrane surrounding VII–VIII and the caudal nerves were opened thoroughly, and zones I–V of the facial nerve were fully exposed to explore the presence of any offending vessels.

Traditional Technique

In cases using the traditional technique, large pieces of Teflon pledget were placed under the VA at its proximal and distal portions to elevate the VA from the REZ (Figure 2).

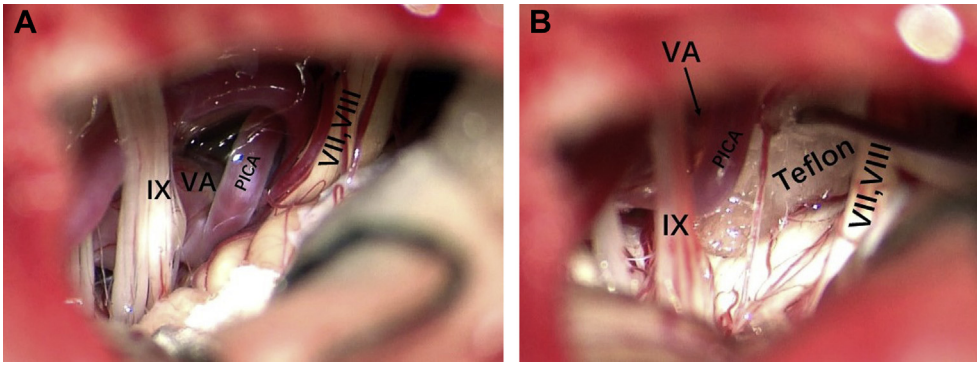

Figure 2. Intraoperative photograph of traditional technical microvascular decompression in a patient with left-sided hemifacial spasm associated with vertebral artery (VA) + posterior inferior cerebellar artery (PICA) (**A**) and Teflon were placed under the VA at its distal portions to elevate the VA and PICA from the root exit zone (**B**).