

# Microvascular Decompression for Hemifacial Spasm Due to Four Offending Vessels: A Case Report

## *Dört İlgili Damar Nedeniyle Hemifasiyal Spazm için Mikrovasküler Dekompresyon: Bir Olgu Sunumu*

Hyuk Jai CHOI, Seok Keun CHOI, Bong Arm RHEE

*Kyung Hee University, Faculty of Medicine, Department of Neurosurgery, Seoul, Republic of Korea*

Correspondence address: Bong Arm RHEE / E-mail: painsurgery@naver.com

### ABSTRACT

A 65-year-old woman presented with left facial involuntary movement and facial palsy for eight years. Brain magnetic resonance image (MRI) and magnetic resonance angiography (MRA) revealed multiple vascular compression of facial nerve root exit zone (REZ). Standard retromastoid suboccipital craniectomy and arachnoid dissection were performed. Right vertebral artery (VA), left VA, left anterior inferior cerebellar artery (AICA), and left posterior inferior cerebellar artery (PICA) compressed the facial nerve in that order. The offending vessels were dissected away from the facial nerve and transposed sequentially. Teflon was interposed between the arteries and the nerve. Electrophysiological monitoring showed disappearance of the abnormal hemifacial spasm response during the operation. The offending vessels were right VA, left VA, left AICA, and left PICA. Postoperatively, the patient's involuntary movement was completely resolved. We report a rare case of hemifacial spasm caused by four offending vessels that was treated by microvascular decompression (MVD) with wide arachnoid dissection.

**KEYWORDS:** Hemifacial spasm, Microvascular decompression, Multiple offending vessels

### ÖZ

65 yaşında bir kadın sekiz yıldır sol fasiyal istemsiz hareketler ve fasiyal palsi ile geldi. Beyin manyetik rezonans görüntüleme (MRG) ve manyetik rezonans anjiyografi (MRA) fasiyal sinir kökü çıkış bölgesinde (REZ) çoklu vasküler kompresyon gösterdi. Standart retromastoid suboksipital kraniektomi ve araknoid diseksiyon yapıldı. Sağ vertebral arter (VA), sol VA, sol inferior anterior serebellar arter (AICA), ve sol posterior inferior serebellar arter (PICA) fasiyal siniri bu sırayla sıkıştırmaktaydı. İlgili damarlar fasiyal sinirden uzağa diseksiyonla ayrıldı ve arka arkaya transpozisyon yapıldı. Arterler ve sinir arasına teflon kondu. Elektrofizyolojik monitörizasyon ameliyat sırasında anormal hemifasiyal spazm cevabının kaybını gösterdi. İlgili damalar sağ VA, sol VA, sol AICA ve sol PICA şeklindeydi. Postoperatif olarak hastanın istemsiz hareketi tamamen geçti. Mikrovasküler dekompresyon (MVD) ve geniş araknoid diseksiyonla tedavi edilmiş, dört ilgili damar nedeniyle oluşan nadir bir hemifasiyal spazm vakasını sunuyoruz.

**ANAHTAR SÖZCÜKLER:** Hemifasiyal spazm, Mikrovasküler dekompresyon, Çok sayıda ilgili damar

### INTRODUCTION

The cause of hemifacial spasm is the vascular compression by an artery or arteries at the nerve root exit zone (REZ) of the 7<sup>th</sup> nerve in more than 95% of cases (1,2,4-6,8,9,15,20). Microvascular decompression has been established for the treatment of hemifacial spasm (12,15). In most cases, we can obtain satisfactory results by this commonly established method. However, compression caused by any of the dolichoectatic greater vessels such as vertebral artery (VA) and multiple vessels are reported that the cases are rare and have shown a recurrence or lack of relief from the symptoms (2,14,16,18).

We experienced a severe hemifacial spasm by four offending vessels with dolichoectasia, which was treated by microvascular decompression with wide arachnoid dissection.

### CASE REPORT

A 65-year-old woman presented with left facial involuntary movement and facial palsy for eight years. Apart from a history of diabetes mellitus, she had no chronic medical problems. Brain magnetic resonance image (MRI) & magnetic resonance angiography (MRA) revealed indentation of the caudal pons at the REZ of the left 7<sup>th</sup> cranial nerve by enlarged and tortuous (dolichoectatic) both vertebral artery (VA), left anterior inferior cerebellar artery (AICA), and left posterior inferior cerebellar artery (PICA) (Figure 1A, B).

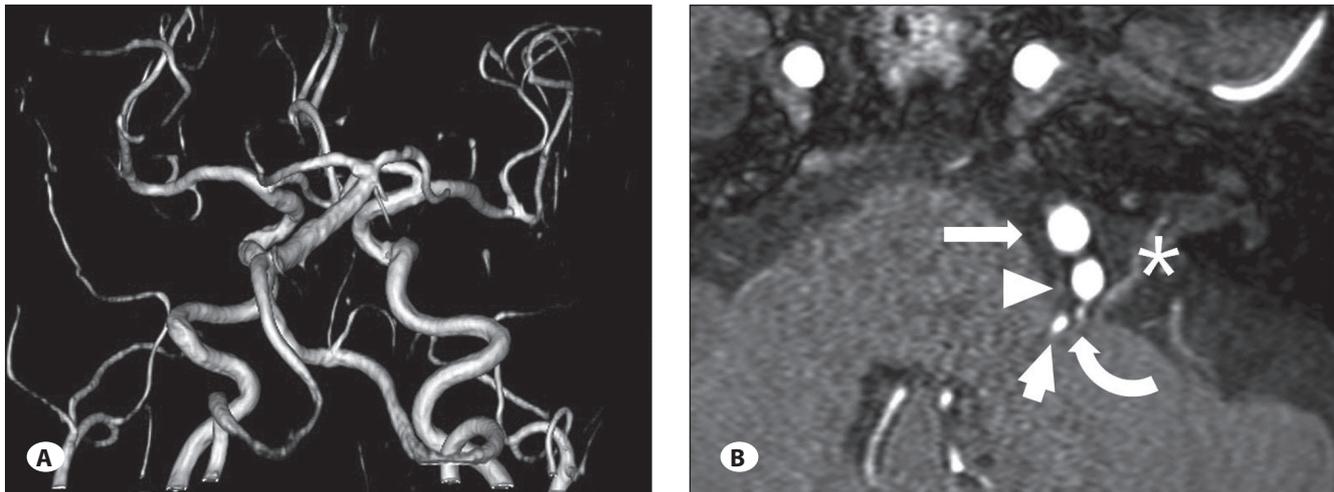
Standard retromastoid suboccipital craniectomy and arachnoid dissection were performed. We could observe that right VA, left VA, left AICA, and left PICA compressed 7<sup>th</sup> cranial nerve in that order (Figure 2A-E). A wide arachnoid dissection was performed to make the offending vessels more movable. The offending vessels were hardly dissected away from the 7<sup>th</sup> cranial nerve and it is difficult to transpose the offenders

sequentially because of these arterial pulsation and pressure. We confirmed that the REZ was compressed by offending vessels. Teflon was interposed between the arteries and the REZ and transposition of the offenders was performed by Teflon (Figure 2F). Electrophysiological monitoring showed disappearance of the abnormal hemifacial spasm response during the operation. At last follow up (3 months later),

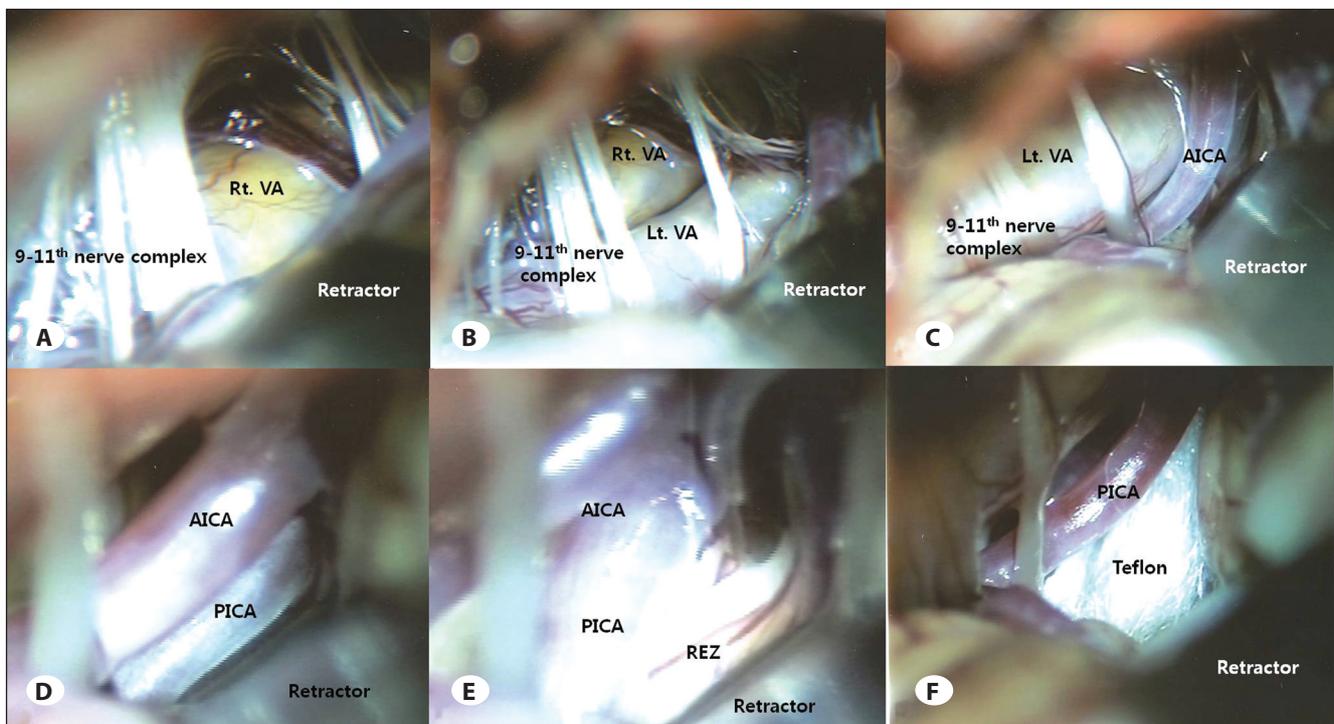
the patient's involuntary facial movement was completely resolved, and mild facial palsy remained.

### DISCUSSION

Hemifacial spasm is generally caused by pulsatile vascular compression on the 7<sup>th</sup> nerve REZ (1, 2, 4-6, 8, 9, 15, 20). Approximately, one-third is caused by the PICA, another one



**Figure 1:** **A)** Magnetic resonance angiography (MRA) showing vertebral artery (VA) and basilar artery with dolichoectasia. **B)** 3D TOF (time of flight) MRA showing multiple vascular compression of left 7-8<sup>th</sup> nerve complex root exit zone (REZ) by right VA, left VA, anterior inferior cerebellar artery (AICA), and posterior inferior cerebellar artery (PICA); seventh-eighth nerve complex- asterix, right VA- white straight long arrow, left VA- white arrow head, left AICA- white curve arrow, left PICA- white straight short arrow.



**Figure 2:** Sequential operative photographs. **(A)** Right vertebral artery (VA) with atherosclerotic change was shown between 9-11<sup>th</sup> nerve complex. **(B)** Left VA was shown under right VA. **(C)** Anterior inferior cerebellar artery (AICA) was revealed under left VA. **(D)** Left AICA and posterior inferior cerebellar artery (PICA) were revealed after transposition of both VA. **(E)** 7-8<sup>th</sup> nerve root exit zone (REZ) was revealed under left PICA. **(F)** Vascular decompression with Teflon was done.

third by AICA, and another one-third by a tortuous VA or a combination of 2 or 3 arteries (5,6,8,15,20). Compression caused by any of the dolichoectatic greater vessels such as VA and multiple vessels are reported and those cases are rare and have shown a recurrence or lack of relief from the symptoms (2,14,16,18). Frazier et al. (7) have reported that atherosclerotic changes are prone to develop in vertebra-basilar artery of the posterior circulation in patients with accompanied hypertension, diabetes, hyperlipidemia or obesity. And, the change of the artery is also developed as a compensation to the hypoperfusion when the brain stem itself developed ischemic changes. In our case, patient had no medical history except diabetes mellitus, and had multiple offending vessels which had atherosclerotic change with dolichoectasia of VA (Figure 1A, 2A, B).

Microvascular decompression has been established for the treatment of hemifacial spasm (15). For the decompression to be successful, the surgery requires focusing on preventing the transmission of the pulsatile signals regardless of their patterns. It is thought that no matter how large or small the blood vessels are, the treatment outcome depends on how effectively the pulsatile signal is blocked during surgery. In most cases, we can obtain a satisfactory cure by this commonly established method. However, a few cases have shown a recurrence or lack of relief from the symptoms. Compression caused by any of the greater vessels such as vertebral and basilar arteries are reported to be responsible for such instances (2,4,216,18). Because The tortuous vertebrobasilar artery is often firm and difficult to move, 1) the insertion of a prosthesis between the artery and the nerve is not easily achieved, 2) the REZ of the facial nerve root receives relatively higher pressure, and 3) despite the same extent of microvascular decompression, the possibility that the pulsatile signal may still be remaining is high. Therefore, many authors suggested various modified methods other than conventional microvascular decompression (3,10,11,13,14,17-19,21-24). The first method is to dislocate or cover the nerve because of the difficulties of dislocating the greater vessels (23,24). In the second, most common method, the greater vessels are dislocated or transposed and finally anchored using vascular tapes, strips, and threads (3,10,14,18,19,21,22). Each method has its own specific advantages and disadvantages. The first type is less desirable because the procedure is performed to the nerve rather than to the offending arteries. The second type is considered reasonably good; however, it requires a wider space (11). In our case, we performed wide and enough arachnoid dissection for increasing movability of the offending vessels, and then the vessels became easily movable state. Although arterial pulsation make difficult to dissect away and to transpose the offenders, microvascular decompression was performed successfully without another modified technique. After decompression, electrophysiological monitoring showed disappearance of the abnormal hemifacial spasm response during the procedure and patient was symptom-free state.

## CONCLUSION

Sequential transposition and microvascular decompression with a wide arachnoid dissection may be a effective surgical method for hemifacial spasm by multiple offending vessels. This case demonstrates that the sequential relief of vascular compression of the 7<sup>th</sup> cranial nerve is sufficient for hemifacial spasm by multiple vessels.

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