Chapter 7
Endoscopic-Assisted Microvascular Decompression

M. Yashar S. Kalani
Barrow Neurological Institute, USA

Michael R. Levitt
Barrow Neurological Institute, USA

Celene B. Mulholland
Barrow Neurological Institute, USA

Charles Teo
Prince of Wales Private Hospital, Australia

Peter Nakaji
Barrow Neurological Institute, USA

ABSTRACT
Diseases of ephaptic transmission are commonly caused by vascular compression of cranial nerves. The advent of microvascular decompression has allowed for surgical intervention for this patient population. This chapter highlights the technique of endoscopic-assisted microvascular decompression for trigeminal neuralgia and hemifacial spasm. Endoscopy and keyhole techniques have resulted in a minimally invasive and effective treatment of symptoms for patients with neuralgia.

BACKGROUND
Diseases of ephaptic transmission are most frequently caused by contact between a cerebral blood vessel and an adjacent cranial nerve; this contact allows repetitive blood vessel pulsations to stimulate and demyelinate the nerve. In trigeminal neuralgia, abnormal stimulation of the fifth cranial nerve (CN V) results in unilateral pain.

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paroxysmal, lancinating pain, commonly in the second or third division. Similarly, glossopharyngeal neuralgia is characterized by paroxysmal tongue, palate, and throat pain from stimulation of CN IX. In hemifacial spasm, unilateral spasm of the facial muscles is caused by repetitive stimulation of the facial nerve. Rare disorders of ephaptic transmission include geniculate neuralgia (episodic ear pain due to compression of the nervus intermedius) and combination disorders such as *tic convulsif* (vascular compression of CNs V and VII, resulting in both trigeminal neuralgia and hemifacial spasm). Long-standing hypertension is thought to contribute to the formation of redundant cerebrovascular loops or vascular ectasia that cause cranial nerve compression and result in ephaptic transmission and its associated symptoms.

Cranial nerve compression syndromes have a debilitating effect on a patient’s quality of life. Treatment options include medical management (typically with anticonvulsant medications), percutaneous procedures (chemical or electrical rhizotomy, peripheral neurotomy, and radiofrequency ablation), stereotactic radiosurgery, and microvascular decompression (Henson, Goldman et al. 2005, Linskey, Ratanatharathorn et al. 2008, Toda 2008, Dhople, Adams et al. 2009, Dvorak, Finn et al. 2009). Microvascular decompression, in which the vessel causing cranial nerve compression is surgically separated from the nerve using a pledget, is the most effective and durable method of treatment (Fujimaki, Fukushima et al. 1990, Sindou, Leston et al. 2006, Tatli, Satici et al. 2008, Sekula, Frederickson et al. 2011). In this chapter, we review the technique of endoscopic-assisted microvascular decompression.

**MAIN FOCUS OF THE CHAPTER**

**Diagnostic Evaluation**

Vascular compression syndromes are best diagnosed by careful history-taking and physical examination. High-resolution magnetic resonance imaging (MRI) with thin-slice T2-weighted sequences (Figure 1A-C), fast imaging employing steady-state acquisition (FIESTA), or constructive interference in steady-state (CISS) techniques may assist in the diagnosis by visualizing vascular compression in the cerebellopontine angle (CPA), but should only be used as an adjunct to clinical suspicion and to rule out uncommon etiologies such as tumors, multiple sclerosis, and arteriovenous malformations.
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