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Acute Glaucoma Attack Following Microvascular Decompression Surgery for Trigeminal Neuralgia

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Abstract

Microvascular decompression (MVD) is widely accepted as an effective surgical method to treat trigeminal neuralgia (TN), but the risks of morbidity and mortality must be considered. We experienced a case of acute angle-closure glaucoma attack following MVD for TN in an elderly patient, considered to be caused by lateral positioning during and after the surgery. A 79-year-old female underwent MVD for right TN in the left lateral decubitus position, and TN disappeared after the surgery. Postoperatively, the patient tended to maintain the left lateral decubitus position to prevent wound contact with the pillow, even after ambulation. Two days after the surgery, she complained of persistent left ocular pain with visual disturbance. The left pupil was dilated with only light perception, and the intraocular pressure (IOP) was 44 mmHg. Acute angle-closure glaucoma attack was diagnosed. After drip infusion of mannitol, emergent laser iridotomy was performed. The corrected visual acuity recovered with normalization of IOP (14 mmHg). The subsequent clinical course was uneventful and she was discharged from our hospital. The left lateral positioning during and after the surgery was considered to have contributed to increase IOP of the eye on the dependent side, which resulted in acute angle-closure glaucoma attack. The potential pathology is difficult to assess preoperatively, but patient management should always consider the increased possibility of this condition with age.

Key words: trigeminal neuralgia, microvascular decompression, glaucoma, lateral decubitus position, complication

Introduction

Microvascular decompression (MVD) is widely accepted as an effective method to treat trigeminal neuralgia (TN),[1)] but the morbidity and mortality must be minimized because TN is not life-threatening. Unfortunately, serious events have occurred in some patients.[1,2)] Complications include neurological disorders directly related to the surgical procedure, whereas complications related to the lateral positioning of the patient are rare. We report a case of acute angle-closure glaucoma attack following MVD for TN in an elderly patient, considered to result from the lateral positioning during and after the surgery.

Case Report

A 79-year-old female underwent MVD surgery for right TN. She had been treated with oral administration of carbamazepine for 5 years, but the pain became uncontrollable. Preoperative magnetic resonance imaging confirmed vascular conflict of the right trigeminal nerve and anterior inferior cerebellar artery (AICA) (Fig. 1). MVD was performed in the left lateral decubitus position with three-point fixation under general anesthesia after obtaining informed consent. Decompression of the AICA was completed (Fig. 2) and the patient awakened from anesthesia uneventfully. Duration of the surgery was 150 min. TN disappeared and no new neurological symptom occurred after the surgery. She maintained the left lateral position to prevent wound contact with the pillow until next morning when ambulation was completed safely. Even after ambulation, she tended to adopt the same position except for excretion and eating because of postoperative general deconditioning. She complained of frontal headache, but postoperative computed tomography showed no new intracranial pathology on that day. Two days after the surgery, her headache worsened and she complained of persistent left ocular pain with visual disturbance. The left pupil was

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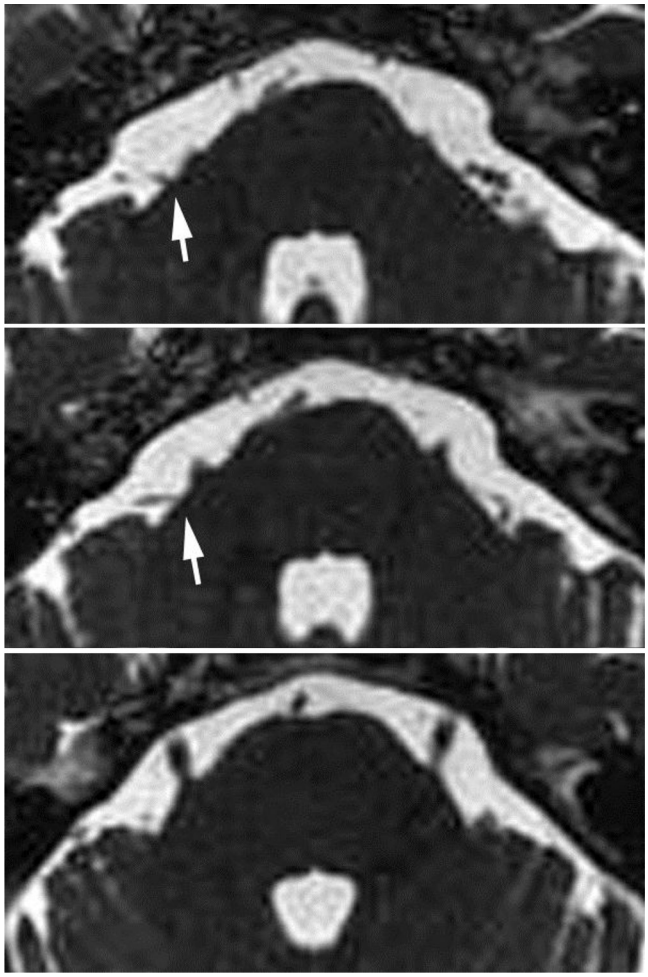

Fig. 1 Preoperative consecutive gradient echo magnetic resonance images suggesting contact between the anterior inferior cerebellar artery and the proximal root of the right trigeminal nerve (*arrows* in upper and middle).

dilated with only light perception. Ophthalmological examination revealed that corrected visual acuity was 0.2 with intraocular pressure (IOP) of 44 mmHg in the left eye and 1.2 with 13 mmHg in the right eye. The affected left eye was remarkably edematous, with very shallow anterior chamber of both eyes (Fig. 3). Acute angle-closure glaucoma attack of the left eye was diagnosed. Mannitol was administered by venous drip infusion, but was not effective. Therefore, emergent laser iridotomy was performed. After the treatment, the corrected visual acuity of the left eye recovered to 0.7 with IOP of 14 mmHg. Thereafter, the clinical course was uneventful and she was discharged from our hospital. For complete avoidance of further angle-closure glaucoma attack, the patient underwent implantation of intraocular lenses in both eyes 1 month later (Fig. 4).

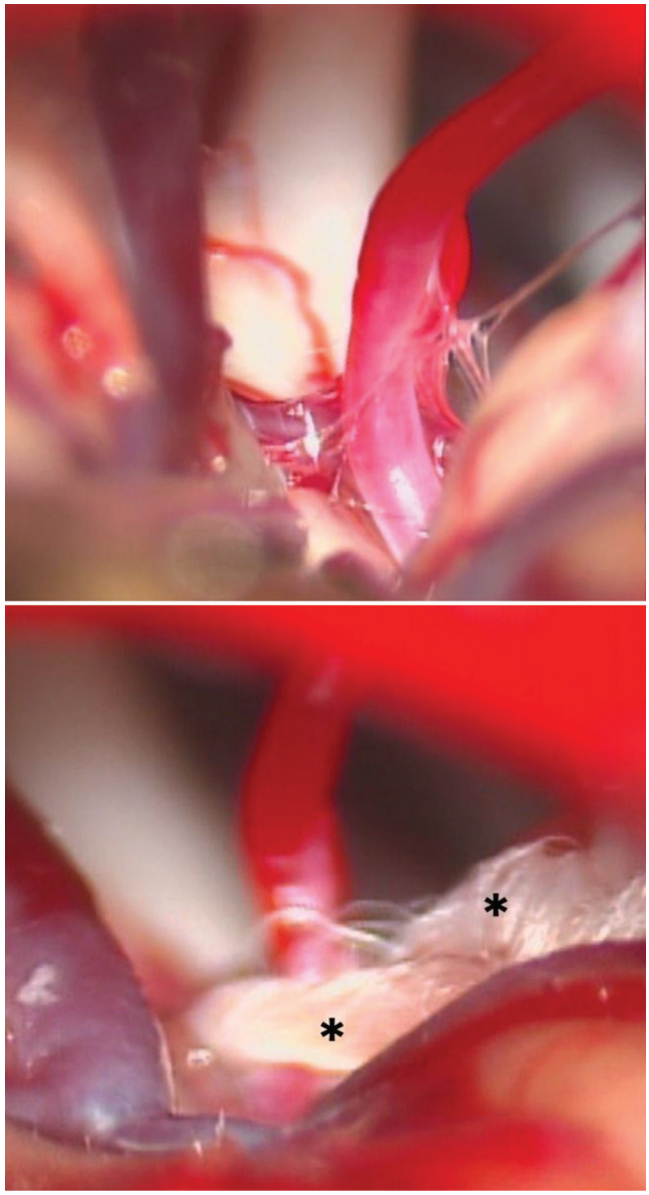

Fig. 2 Intraoperative photographs. Upper: The anterior inferior cerebellar artery is compressing the root of the right trigeminal nerve. Lower: The artery was transposed to the cerebellar surface direction with a Teflon sling (*asterisks*).

Discussion

Microvascular decompression is the only curative treatment for TN.[1] However, MVD is the most invasive treatment option compared to other surgical procedures including radiofrequency or glycerol rhizotomy, balloon compression, and radiosurgery.[3–5] Besides the neurological complications directly related to the MVD procedure, other minor adverse events not directly related to the surgical manipulations have been observed in daily neurosurgical

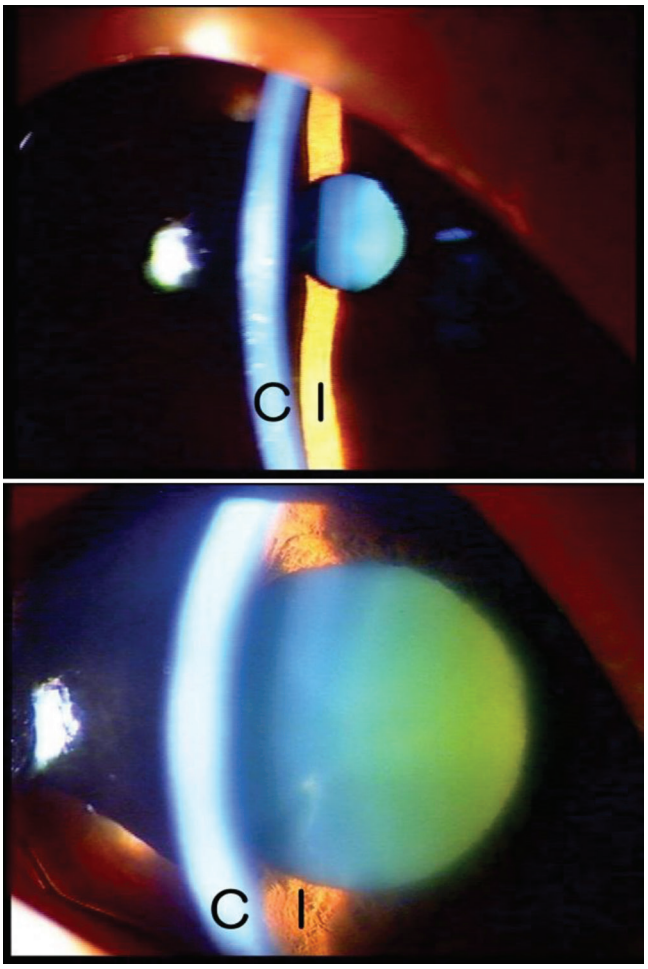

Fig. 3 Slit photographs of the anterior segment of the eyes at the onset of angle-closure glaucoma. Upper: Right eye; very narrow space between the cornea and iris suggesting shallow anterior chamber. Lower: Left eye; dilated pupil with corneal edema. C: cornea, I: iris.

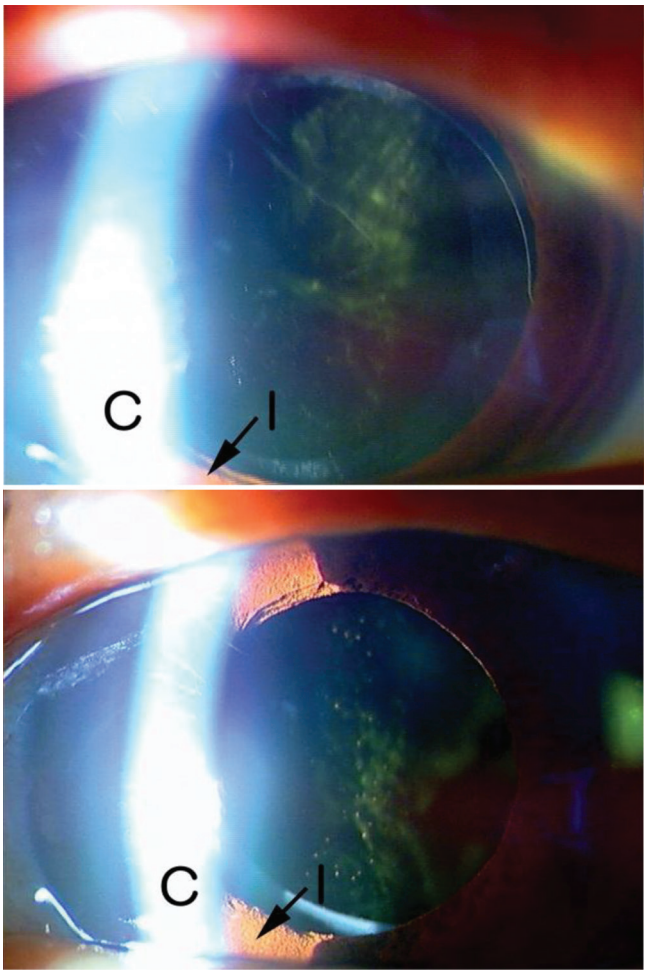

Fig. 4 Slit photographs of the anterior segment of the eyes after application of mydriatic eye drops following implantation of intraocular lens showing improvement of visualization of the anterior chamber in both eyes. C: cornea, I: iris.

practice, but can usually be controlled by correct postoperative management. Acute glaucoma attack is an extremely rare complication following MVD, with apparently no previous reports.

Angle-closure glaucoma attack occurs for various reasons. Use of atropine is well known to disturb the aqueous humor pathway through its anticholinergic effect and precedes the glaucoma attack, but other perioperative agents may also contribute to the pathologic condition. However, in our case, no atropine was used during the surgery. Other commonly used perioperative agents include rocuronium bromide, fentanyl, sugammadex sodium, remifentanil hydrochloride, ephedrine hydrochloride, phenylephrine hydrochloride, sevoflurane, propofol, cefazolin sodium, and ranitidine hydrochloride. Among those agents, ephedrine hydrochloride and phenylephrine hydrochloride for maintaining intraoperative blood pressure can cause elevation of IOP, but the minimum dosage was used so that the effect on the IOP was doubtful. Furthermore, ophthalmological examination revealed that the anterior chamber was very shallow on both sides, so involvement of a drug in the angle-closure should have affected the other eye as well.

Intraocular pressure is greatly affected by postural change. IOP rises after changing from the sitting or upright to the supine position, and the increase seems to be greater in patients with glaucoma.[6,7] Furthermore, IOP can elevate in the prone position,[8] and visual disturbance after adopting the prone position is one of the warnings in anesthetized patients.[9] In our case, MVD was performed in the lateral decubitus position, so the risk from the prone position did not occur. However, recent studies have shown that IOP was elevated on the

dependent side in the lateral decubitus position, in both healthy and glaucoma patients.[10–12] Reviewing the surgical and postoperative courses in our case, the left eye was placed on the dependent side of the lateral decubitus position not only during but also after the surgery. In consequence, the left eye was kept on the dependent side for a long time. Based on these arguments, left lateral positioning during and after the surgery contributed to the increase in IOP of the eye on the dependent side, which resulted in acute angle-closure glaucoma attack.

Prevalence of angle-closure glaucoma increases with age.[13] However, the potential pathology is difficult to assess preoperatively as long as the condition remains clinically silent. Despite the successful treatment, in this case, we should remember that this incident occurred in an elderly patient, and patient management should always consider the increased possibility of angle-closure glaucoma with age. Authors do not insist that this surgery always requires an ophthalmologist standby, however, it may be ideal to be ready for referral.

Conflicts of Interest Disclosure

The authors report on conflict of interest concerning the materials or methods used in this study or findings specific to the article. All authors who are members of The Japan Neurosurgery Society (JNS) have registered online self-reported COI disclosure statement forms through the website for JNS members.

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