Recurrence Trigeminal Neuralgia at 20 Years After Surgery  
—Case Report—

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Abstract

Microvascular decompression (MVD) is now the most feasible method of treatment for trigeminal neuralgia (TN). The recurrence of symptoms is rarely encountered postoperatively. A female patient with typical right V3 distribution TN had been successfully treated by MVD at age 56 years by transposing the offending superior cerebellar artery, and she became completely pain-free postoperatively without sequelae. Twenty years after the first MVD, pain recurred on the right V2 distribution at age 76 years and she was operated on a second time to resolve the pain. Re-exploration surgery revealed that the trigeminal nerve was compressed mediocranially by the anterior inferior and posterior inferior cerebellar artery complex, which had not been close to the neural structure during the first surgery. The artery complex was successfully transpositioned to decompress the root exit zone (REZ) of the nerve and she became pain-free again. Although various causal factors likely contribute to recurrence of TN, the present case of recompression of a REZ occurred due to a newly developed offending artery which caused TN a long time after the first surgery.

Key words: microvascular decompression, new artery, recurrence, repeat operation, trigeminal neuralgia

Introduction

Microvascular decompression (MVD) surgery is a well-established cure for trigeminal neuralgia (TN). Immediate postoperative pain relief is reportedly obtained in up to 98.5% of cases after MVD. However, the rate of recurrence of symptoms was 6% to 30% in follow-up studies with the annual rate of recurrence between 1% and 3.5%. Here, we report an unusual case of recurrence in a female patient whose symptoms of TN recurred 20 years after the first MVD.

Case Report

A 79-year-old woman had undergone MVD for treatment of TN of the right V3 distribution when she was 56 years old. The trigeminal nerve was compressed by the right superior cerebellar artery (SCA), but no other arteries were found close to the root exit zone (REZ). Immediately after the surgery, her pain was completely relieved and the postoperative course was uneventful for 20 years without sequelae. Typical TN recurred on the distribution of the right V2 branch at age 76 years. Her TN gradually became aggravated and refractory to medication. The patient chose to undergo re-exploration surgery to relieve her pain at age 79 years, while she was otherwise healthy and had no physical problems. Preoperative magnetic resonance (MR) imaging revealed that a loop of the posterior inferior cerebellar artery (PICA) and anterior inferior cerebellar artery (AICA) complex was compressing the trigeminal nerve (arrow). MVD was undertaken using a right lateral suboccipital approach, as in the previous surgery. The SCA, which had compressed the REZ of the nerve prior to the first MVD, had remained completely transpositioned to the tentorium (Fig. 2A). The right trigeminal nerve was found to be compressed mediocranially, making an indentation at the REZ, and its axis was tilted by a loop of the PICA-AICA complex (Fig. 2B). These findings corresponded to the preoperative MR imaging findings. The compressing artery was successfully transpositioned and fixed to the dura of the nearby petrous bone. The axis of a nerve tilted by compression was straightened by cutting...
Fig. 2  Intraoperative photographs.  A: Superior cerebellar artery (arrow), which had compressed the root entry zone of the right trigeminal nerve (CN 5) before the previous microvascular decompression, remained completely transpositioned to the tentorium.  B: Right trigeminal nerve (CN 5) was compressed and tilted by a loop of the posterior inferior and anterior inferior cerebellar artery complex (arrow) and an indentation (asterisk) was found at its root entry zone.  C: Compressing artery was successfully transpositioned and the axis of a nerve tilted by compression was straightened by cutting the arachnoid membrane around the nerve.

Discussion

Recurrence of symptoms after MVD may occur in some cases but the reported rate varies widely. The rate of recurrence was 14% (53/376) for a mean follow-up period of 6.3 years, and 17.1% (14/82) for a mean follow-up period of 5.4 years. The recurrence rate in a large MVD series was elevated to 30% after a median follow-up period of 6.2 years. The postoperative recurrence of symptoms develops mostly within the first 2 years after surgery and later, around 10 years after the procedure, the annual rate of recurrence is less than 1%. Differences in reported rates of recurrence may depend on variation in surgical techniques between institutes, the timing of diagnosis of recurrent pain, and the duration of the follow-up period. However, the definition of recurrence of TN has not been well explained.

During MVD for TN, the trigeminal nerve may be manipulated and this procedure might mask TN for some time postoperatively even if the surgery was not appropriately performed. In such a case, patients do not complain of pain for a while, possibly several months after MVD. Therefore, we believe that a postoperative period of at least 12 months should be allowed before recurrence is officially noted. The reason for this is that cranial nerve function would regain its original activity by approximately 12 months after surgical trauma, judging from our daily clinical experience.

The likelihood of recurrence of symptoms is variable and many causal factors might promote recurrence. The most frequent causes of recurrence of symptoms are incomplete decompression, recompression of the REZ by migration of an inserted prosthesis, adhesion or fibrosis between the offending artery and the REZ because of an inappropriately inserted prosthesis, and retilted axis of the nerve by postoperative arachnoid adhesion. Tactics for prevention are as follows: first, the offending artery is preferably transpositioned and fixed to the nearby dura mater; and second, insertion of a prosthesis between the offending artery and the REZ should be avoided to prevent recompensation of neural structures. If short perforators interfere with safe transposition of the conflicting artery, a prosthesis should be inserted between the artery and the brain stem. Third, the axis of the nerve tilted by a compression should be straightened by cutting the arachnoid membrane around the nerve. The recurrence rate after MVD for TN decreased markedly from 10.2% (13/127) to 6.5% (10/154) for long-term follow-up periods after adopting a transposition method.

In the present case, the SCA, which had compressed the REZ during the previous MVD, remained completely detached from the REZ without compromising the neural structure. On the other hand, the other aspect of the REZ of the nerve was compressed medially by an ascending branch of the PICA-AICA complex. The loop of this artery had been remote from the REZ of the 5th cranial nerve at the previous MVD.

Previous reports have described the recurrence of TN caused by a newly developed second offending artery. Two of 31 patients re-operated for recurrent TN after a pain-free period of 6–18 months exhibited a new offending artery (6.5%, 2/31), but which artery was a new source of compression at the REZ was not described precisely. Six patients were re-operated for recurrent TN in whom the REZ was compressed by the SCA before the first MVD. Compression by newly developed offending arteries, such as the AICA in 2 patients and the basilar artery in 1, were noted at re-operation after an average of 42 pain-free...
months. In the present case, neural compression by the PICA-AICA complex was identified by MR imaging and this artery was assumed to be responsible for causing the recurrent symptoms and subsequently leading to re-MVD. The interval between the first MVD and the recurrence of pain followed by the second MVD was very long at 20 years. Presumably, the newly developed PICA-AICA complex, which had not been close to the REZ during the first MVD procedure, gradually became arteriosclerotic with aging and elongated cranially to finally compress the REZ, resulting in recurrence of TN. The period before the artery compressed the REZ was unusually long, possibly because this patient was not hypertensive.

The present case of TN recurrence 20 years after the first MVD surgery demonstrates that recurrence of symptoms can develop a long time after MVD due to compression by a new artery, which had not been identified near the REZ during the previous surgery.

Conflicts of Interest Disclosure

The authors have no personal financial or institutional interest in any of the drugs, materials, or devices in the article. All authors who are members of The Japan Neurosurgical Society (JNS) have registered online Self-reported COI Disclosure Statement Forms through the website for JNS members.

References


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