



## Microvascular Decompression for Trigeminal Neuralgia in Very Elderly Patients

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**DOI:** 10.31080/ASNE.2024.07.0741

**Received:** April 23, 2024

**Published:** May 22, 2024

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### Abstract

**Background:** Trigeminal neuralgia (TN) can trigger symptoms in activities of daily living (ADLs) that significantly limit and impair quality of life. Because eating is a trigger, eating disturbances due to TN can have a life-threatening impact on prognosis. In this study, we report a case of microvascular decompression (MVD) in patients with TN aged > 80 years.

**Materials and Methods:** Eighteen patients aged > 80 years (80-90 years; 14 males and 4 females) underwent MVD for TN over the past two years. Surgery was performed using the retrosigmoid approach with continuous monitoring of the auditory brainstem response. To avoid stretching the eighth cranial nerve, which causes hearing loss, the spinal fluid was not drained too extensively, and decompression was applied after reaching the nerve. Intraoperative determination of the decompression method was performed using either transposition or interposition, with particular attention paid to the vessels responsible for arteriosclerosis.

**Results:** Surgical results were favorable (94.4%), and no complications occurred. The average length of hospital stay was 10.6 days for the very elderly patients.

**Conclusions:** Because of the excellent results obtained, we suggest that surgical treatment of very elderly patients should be aggressively considered after a thorough evaluation of the patient's general condition.

**Keywords:** Microvascular Decompression; Trigeminal Neuralgia; Very Elderly

### Abbreviations

BNI: Barrow Neurological Institute Pain Intensity Scale; SCA: Superior Cerebellar Artery; MRA: Magnetic Resonance Angiogram; MRC: Magnetic Resonance Cisternogram; MVD: Microvascular Decompression; ABR: Auditory Brain Stem Response; TN: Trigeminal Neuralgia

### Introduction

Trigeminal neuralgia (TN) is triggered by daily activities and can cause considerable stress and limitations in daily life. In very elderly patients in particular, the pain may cause eating disorders and weight loss, which may be life-threatening [1-3]. Although many reports have presented excellent results with microvascular decompression (MVD) for the treatment of TN, relatively few have

focused on the elderly population. In this report, we describe TN in very elderly patients over 80 years of age, in whom we performed surgery with excellent results and discuss the points to be considered in the surgery, along with a review of the literature.

**Materials and Methods**

The study population included 18 patients with trigeminal neuralgia aged > 80 years (Table 1), excluding patients with recurrences who had undergone MVD at our department during the last two years. The mean age of the patients was 84.0 years (80-90), 14 were males, and four were females. The affected sides included the right side (four patients) and the left side (14 patients), and the second and third branches were the most commonly affected areas. The mean time from onset to surgery was 6.0 years (1.5-10.0 years), and hypertension was the most common medical condition, followed by hyperlipidemia, diabetes mellitus, and hyperuricemia (Table 2). None of the patients had a relevant medical history. The Barrow Neurological Institute Pain Intensity Scale (BNI) [4] was used to assess pain level, and all patients showed severe symptoms preoperatively, including 11 cases of grade IV and seven of grade V. All patients showed typical TN symptoms, and preoperative 3D MR cisternogram/angiogram fusion images were obtained to identify the responsible vessels [5]. MVD was performed in the lateral recumbent position with a retrosigmoid craniotomy and supracerebellar approach under continuous monitoring of the auditory brainstem response (ABR). Briefly, a linear skin incision (approximately 7 cm) was made in the posterior auricular region, and a craniotomy was performed by exposing the junction of the sigmoid sinus and the transverse sinus. The dura mater was incised, and spinal fluid was aspirated from the cerebellar medullary cistern to slack the cerebellum. First, a horizontal fissure was opened and the arachnoid membrane around the superior petrosal vein was dissected to prepare an adequate manipulation space. After reaching the trigeminal nerve, the responsible vessel was visualized and carefully moved, and the trigeminal nerve was decompressed. To prevent hearing loss as a postoperative complication, the operation was paused when prolongation of the fifth-wave latency of the intraoperative ABR was observed and resumed after waiting for the latency to improve.

**Results**

Fourteen patients underwent transposition and four underwent interposition. Five patients (27.8%) had arteriosclerosis of the

Age (years)	84.0 (80-90)
Sex (male:female)	14:4
Affected side (right:left)	4:14
Affected division	(V2) 7, (V3) 7, (V2+V3) 4
Duration of an illness(years)	6 (1.5-10)
Preoperative BNI	IV11 V7

Table 1 Summary of the cases

V2; Second branch of trigeminal nerve

V3; Third branch of trigeminal nerve

BNI; Barrow Neurological Institute Pain Intensity Scale

Hypertension	14
Hyperlipidemia	8
Hyperuricemia	6
Diabetes mellitus	6
Myocardial infarction	3
Cerebral infarction	3
Renal failure	2
Liver dysfunction	2
Colon cancer	1
Lung cancer	1

Table 2 Medical history of the cases

Surgical time (min.)	88.0 (70-100)
Amount of blood loss (ml)	39 (20-90)
Offending vessel	SCA 15, Vein 2, VA 1
Procedure	Transposition 15, Interposition 3
Surgical results	I 15, II 2, IIIa 1 excellent 83.3%, good 11.1%
Complication	none
Hospital stay (days)	10.6 (9-13)

Table 3 Surgical Results

SCA; superior cerebellar artery

VA; vertebral artery

responsible vessels and careful manipulation was required. The patients who underwent interposition had severe arteriosclerosis in the responsible vessel, and transposition may have caused cerebral infarction. The responsible vessels included 15 superior cerebellar arteries, two veins, and one vertebral artery. Postoperatively, 17 patients showed rapid improvement and resolution of symptoms, and one patient's symptoms were controlled with medication. Postoperative BNI was grade I in 15 patients, grade II in two, and grade IIIa in one. Of these patients, 83.3% were in an excellent condition and 11.1% were in a good condition, indicating very good outcomes. No post-operative complications were observed, and the mean postoperative hospital stay was 10.6 days (9-13 days).

## Discussion

TN treatment includes nerve blocks [6], radiation therapy [7], and MVD, as surgical interventions. Surgery is the fundamental method and the gold standard worldwide [8-10], with many favorable results reported. Surgery is usually considered when side effects occur or the effectiveness of the medication decreases; however, in very elderly patients, whether surgery should be performed is controversial. As was apparent in the current study, the very elderly are at a higher perioperative risk because many individuals have a history of hypertension, stroke, diabetes, and other medical disorders.

Reports have described the usefulness of MVD in elderly patients with trigeminal TN, with favorable surgical outcomes and complication rates compared to younger patients [1-3]. The cerebellum tends to be more atrophic in the elderly than in the young, making it easier to reach the trigeminal nerve, and therefore, easier to perform surgery [2]. However, the superior petrosal vein may be stretched after draining the spinal fluid due to cerebellar atrophy and may be damaged when approaching the trigeminal nerve [2]. Furthermore, the eighth cranial nerve is stretched, which may cause hearing loss as a complication [11]; therefore, extreme caution should be exercised. In several patients in our series, although prolonged intraoperative fifth wave latency were observed during the operation, manipulation was interrupted to allow recovery from the fifth wave of latency to deal with the condition. Very elderly patients may have hearing disorders preoperatively and therefore require even greater intraoperative care than younger patients. It is thus necessary to keep an attention

to the intraoperative ABR and keep it in mind at all times during the operation [11]. In our patients, there were no complications, such as cerebral infarction, infection, spinal fluid leakage, or facial numbness.

MVD is a minimally invasive procedure for very elderly patients that is associated with a short operating time, minimal intraoperative blood loss, a relatively short hospital stay, and few complications. As very good results can be obtained, as shown in this patient series, surgical treatment should be aggressively considered even in very elderly patients. The final decision should be made based on preoperative evaluations of general condition, when medication is no longer effective, or when side effects are observed.

## Conclusions

In patients in whom atherosclerosis is observed in the responsible vessel, careful manipulation is required to avoid complications. In very elderly patients with trigeminal neuralgia (over 80 years of age), aggressive surgical treatment should be considered based on the patient's general condition.

## Acknowledgments

We would like to thank Editage ([www.editage.jp](http://www.editage.jp)) for English language editing.

## Conflict of Interest

The authors declare that they have no conflicts of interest related to the publication of this study.

## Ethical Approval

The Ethical Committee of the International University of Health and Welfare approved all procedures used in this study.

## Submission Statement

This original manuscript has not been submitted elsewhere in part or whole.

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