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Editor: S. Ather Enam, M.D., Ph.D., Aga Khan University, Karachi, Sindh, Pakistan

Case Report

# Prosthetic material degeneration over time as a possible factor in delayed recurrence of hemifacial spasm after successful microvascular decompression

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Received: 28 May 18 Accepted: 09 August 18 Published: 10 September 18

## Abstract

**Background:** The effectiveness of microvascular decompression in treating hemifacial spasm is widely accepted. However, some experience recurrence of hemifacial spasm after successful decompression surgery. Especially, delayed recurrence more than 5 years after surgery is rare and the cause of this phenomenon is unknown.

**Case Description:** A female underwent microvascular decompression to treat her hemifacial spasm 6 years ago. Six years later, her hemifacial spasm recurred and she underwent a second surgery. The second surgery revealed that the sponge had become fragile, losing the ability to absorb the impact of pulsatile compression of the offending artery on the root exit zone of her facial nerve.

**Conclusion:** We report a case in which degeneration of material, a sponge (polyurethane), used in decompression surgery caused delayed recurrence of hemifacial spasm. The selection of appropriate prosthetic materials is essential in such functional surgeries.

**Key Words:** Hemifacial spasm, microvascular decompression, prosthesis

Access this article online
Website: www.surgicalneurologyint.com
DOI: 10.4103/sni.sni_146_18
Quick Response Code:

## INTRODUCTION

One of the standard treatments for hemifacial spasm is microvascular decompression. However, few reports have addressed the mechanism of recurrence after successful decompression surgery. Chang *et al.* concluded that recurrence after more than 5 years of surgery is rare.[2] Furthermore, the cause of delayed recurrence is unclear.

We encountered a case showing recurrence of hemifacial spasm 6 years after successful decompression surgery. Our surgical findings indicated prosthetic material degeneration over time resulting in loss of prosthetic function. We caution that a similar choice of prosthetic material for decompression may cause delayed recurrence of hemifacial spasm after initial success in decompression surgery.



**How to cite this article:** Kondo A, Akiyama O, Suzuki M, Arai H. Prosthetic material degeneration over time as a possible factor in delayed recurrence of hemifacial spasm after successful microvascular decompression. Surg Neurol Int 2018;9:187.
http://surgicalneurologyint.com/Prosthetic-material-degeneration-over-time-as-a-possible-factor-in-delayed-recurrence-of-hemifacial-spasm-after-successful-microvascular-decompression/

## CASE DESCRIPTION

A 48-year-old female had a 2-year history of right hemifacial spasm. She had been treated with clonazepam and other alternative therapies with limited effect. She was admitted to our hospital for microvascular decompression surgery for her hemifacial spasm. Preoperative magnetic resonance imaging (MRI) with T2-based cisternography revealed attachment of her right posterior inferior cerebellar artery (PICA) to her facial nerve exit zone. We carried out microvascular decompression surgery with a lateral suboccipital approach and placed a sponge (polyurethane) between the PICA and the brainstem, fixing them with fibrin glue [Figure 1a]. Her postoperative course was uneventful. Her hemifacial spasm disappeared completely 3 days after the decompression surgery. Postoperative MRI showed a PICA running course without attachment to the brainstem [Figure 2a].

Six years after her surgery, she noticed a mild spasm in her superior orbicularis oculi muscle which spread to her prioral muscles and occasionally sustained a tonic state. She visited our department and underwent a MRI scan. T2-based cisternography showed a closed PICA running course compared with the MRI immediately after her initial surgery [Figure 2b]. At this point, she was eager to undergo decompression surgery again, even if it was only for inspection. We carried out the second surgery with her informed consent.

Using a lateral suboccipital approach through the previous incision and craniotomy, we dissected the arachnoid adhesion and confirmed that the sponge placed in the first surgery between the offending artery and the brainstem was not dislocated. However, the sponge was degenerated. The structure of the sponge was fragile and easy to collapse. The honeycomb structure or bubbles in the sponge were not preserved [Figure 1b]. We attempted to remove the sponge, but its adhesion to the lower cranial nerves was strong. We inserted Teflon between the sponge and the brainstem and moved the distal portion of the PICA to the dura of the petrous surface with Teflon strings. Her facial spasm disappeared immediately after the surgery and she experienced no complications. She has experienced no spasmatic movements on her face during the year after the second surgery.

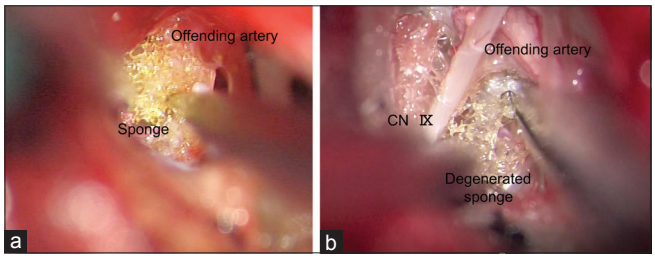


**Figure 1: (a) Operative view of the first surgery. The sponge was flexible and the bubbles in the sponge were large. (b) Operative view of the second surgery. The sponge was fragile and the honeycomb structure was not preserved**

## DISCUSSION

Microvascular decompression as a treatment for hemifacial spasm has been very safe due to the progress in intraoperative monitoring including auditory brainstem response and surgical techniques.[1-3,9] However, a wide variety of materials can be used for decompression, depending on facility standards and surgeon preference. There is no material commonly used worldwide, and treatment results cannot be compared even in cases with identical descriptions of materials such as Teflon or Teflon sponge. In fact, even in our facilities, we have a history of using several materials including sponge, Teflon, polyester fibers, Gore-Tex, and Teflon Paget, preventing analysis of correlations between the materials and long-term results of microvascular decompression. Furthermore, proper amount of material to be used for decompression is still a subject of controversy.[5] As an alternative, the transposition technique, in which the offending artery is moved away from the facial nerve exit zone, has been recommended; however, it is not possible to accomplish this completely.[6] In the present case, we used the transposition technique to achieve permanent decompression, but the presence of short perforators and limited cisternal space for movement may have prevented completion. The interpostion technique, involving the insertion of materials between offending arteries and the root exit zone of facial nerves, is also widely used.[11] For this technique, materials that can be used as permanent prostheses are required.

Contrarily, the cause of delayed recurrence after initially successful decompression surgery has remained unclear. The major reasons proposed for delayed recurrence in previous reports included shift of prosthesis, vascular rerouting due to atherosclerosis, and incomplete

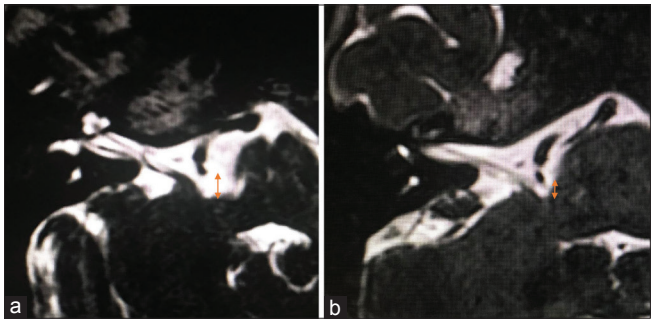


**Figure 2: (a) T2-based cisternography immediately after the first surgery. The PICA was located far from the brainstem. (b) T2-based cisternography at the time of recurrence. The distance from the brainstem of PICA was narrowed when compared with that in Figure 2a**

decompression procedures.[2,3,9,10] Transient facial palsy, a major complication, is a specific reason for delayed recurrence.[8] In our case, because spasm was absent for 6 years, it was clear that decompression of the root exit zone was successful. Our surgical findings showed that there was no other offending artery, that the previous offending artery had moved, and that the sponge was clearly inserted between the offending artery and the root exit zone. However, because the sponge was found to have lost its elasticity, we concluded that material degeneration over time may have been the main reason for recurrence. Unfortunately, the sponge could not be removed because its adhesion to the lower cranial nerves was too strong, and we could not perform histopathological or other analysis of the degeneration of this material.

Sponge can be a good material to use in microvascular decompression.[4] This material can slide over the offending artery and attain its full size during surgery, while delivery is easy because it can be folded and moved in a compressed state. However, this material may not be suitable as a permanent prosthesis, based on our observation that its elasticity deteriorates over time, preventing it from absorbing the impact of arterial pulsations on the facial nerve root exit zone. This was the cause for recurrence of facial spasm in our patient. Our report thus indicates a risk of recurrence due to material degeneration.

Because delayed recurrence of facial spasm is rare, it is challenging to detect and study. A recent report showed that fluoroscope-guided facial nerve block and pulsed radiofrequency treatment might be effective for patients with recurrent facial spasm.[7] Further studies addressing the selection of appropriate prosthetic materials in microvascular decompression are needed, involving multiple centers and long-term observation of patients after initially successful decompression surgeries.

We report a case of delayed recurrence of hemifacial spasm after initial successful decompression surgery due to prosthetic material degeneration over time. Our report indicates that the use of similar materials may cause such delayed spasm recurrence after microvascular decompression surgery and highlights the need for use of appropriate prosthetic materials.

## Acknowledgments
The authors are thankful to the patient for her co-operation. This study was supported by the Juntendo University Research Institute for Diseases of Old Age (Tokyo, Japan).

## Declaration of patient consent
The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

## Financial support and sponsorship
Nil.

## Conflicts of interest
There are no conflicts of interest.

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