

Case Report

Silastic Electrode Positioner Extrusion as a Late Complication of Cochlear Implantation Surgery

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Cite this article as: Zarandy MM, Rezaeian S, Motasaddizarandy M. Silastic electrode positioner extrusion as a late complication of cochlear implantation surgery. *J Int Adv Otol*. 2022;18(4):371-373.

It was the aim of this study to report a rare case of electrode positioner extrusion in cochlear-implanted patients as a late complication and introduce safe management. A retrospective case report in a tertiary referral center. Extrusion of Silastic electrode positioner through tympanic membrane occurred 17 years after cochlear implantation surgery. Although electrode positioner cochlear implants are not being used anymore, otologists and surgeons should be aware of their possible related complications and provide a proper management.

KEYWORDS: Cochlear implant, electrode extrusion, electrode positioner

INTRODUCTION

Cochlear implantation surgery is now a safe surgery with low complications. But some of these complications can cause morbidity and even mortality for patients. Therefore otologic surgeons should familiarize themselves with cochlear implantation surgery complications. On the basis of literature, cochlear implant complications have been classified as major or minor and early or late.

One of the late complications is the displacement or extrusion of the cochlear implant electrode. Another probable complication is the electrode positioner extrusion; minor data are available about it in a review of literature.¹⁻³

In 1999 Advanced Bionic (Clarion) Corporation introduced a new electrode with a Silastic electrode positioner that has to be positioned in the cochlea behind the main electrode in order to eliminate space between the main electrode and the modiolus.^{4,5}

In some of the articles, functional electrophysiological effects of electrode positioner have been described along with its advantages in speech perception due to reduced space between the electrode and modiolus.^{6,7}

In 2002, due to reports concerning a higher risk of bacterial meningitis, the manufacturer recalled this type of electrode positioner.⁸

CASE REPORT

The patient is a 24-year-old woman with severe-to-profound bilateral hearing loss due to meningitis when she was 17 months old. She was admitted to our center and underwent cochlear implantation surgery in her left ear with Nucleus 24M prosthesis in September 1998 when she was 4 years old. She had proper post-operation hearing and speech progress. Written informed consent was obtained from the patient who participated in this study.

Unfortunately, 4 years later because of resistant skin infection and extrusion of the receiver, the prosthesis was removed. The second cochlear implantation surgery was performed by Clarion Hifocus/1.2 prosthesis accompanied by a positioner in her right ear in April 2002. Again the patient demonstrated acceptable hearing and speech progression based on periodic mappings. She was monitored for 17 years.



Figure 1. Electrode positioner extrusion through the tympanic membrane.

In December 2019, she came to our center complaining of ear pain and some episodes of otorrhea in her right ear. During examination upon removing cerumen from the canal, we noticed a solid object extruded from the posterior part of the tympanic membrane. After a thorough microscopic examination, we found that it could be the Silastic electrode positioner. The results of functional tests were normal (Figure 1).

For the safety of the patient, we did not manipulate the positioner in the clinic. The patient underwent surgery under general anesthesia. The ear canal was cleansed. About 2 mm of Silastic positioner was extruded from a posterior perforation in tympanic membrane. Other parts of the membrane were normal without any evidence of retraction, effusion, and sclerosis. An incision was made in the canal skin about 8 mm away from the annulus ring. Tympanomeatal flap was elevated and after tympanotomy, the middle ear was opened. To make sure to avoid traumatizing the tympanic membrane, tympanomeatal flap was split. The middle ear showed no evidence of infection. The main electrode was in its right position in the cochleostomy site but the positioner was displaced from the cochleostomy site through the tympanic membrane (Figure 2).

With the cradle of the main electrode, the positioner was removed and the cochleostomy opening was sealed with perichondrium. Then cartilage tympanoplasty with temporalis muscle fascia was performed for repairing the perforated tympanic membrane. Intravenous antibiotics were used only during the perioperative



Figure 2. Electrode positioner extruded from the cochleostomy site.

period. Antibiotics were prescribed for the duration of 1 week post-surgery (Figure 3).

In the later follow-ups, the tympanic membrane demonstrated no perforation. The patient continued using an external device without any hearing problems.

DISCUSSION

Since the introduction of Advanced Bionic Clarion's Electrodes with Silastic positioner in 1999 until its recision in 2002, numerous electrodes had been used in patients candidates for cochlear implant surgery.⁸

Despite early reports that using positioner has affirmative effects on electrode impedance values, these effects have been investigated in later reviews.^{9,10}

This type of electrode positioner was discontinued due to its high risk of post-implantation meningitis, particularly in the first 24 months after surgery. These risks decrease after 96 months.¹¹

Fortunately, in the case we are reporting here, meningitis did not occur during the 17-year period before the follow-up.



Figure 3. Removing the electrode positioner.

MAIN POINTS

- Cochlear implant electrodes provided by Advanced Bionic (Clarion) Corporation from 1999 to 2000 were provided with a Silastic electrode positioner.
- Silastic electrode positioner extrusion is a late complication of cochlear implantation surgery.
- Silastic electrode positioner extrusion can occur through the tympanic membrane.
- Otologic surgeons should be aware of this possible complication and provide a proper management.

Although electrode extrusion as a late complication of cochlear implantation surgery has been explained in the literature and its causes and risk factors were discussed, the complication in this specific patient was electrode positioner extrusion. In the literature review, we found very few similar data.¹²

In 2014, Dhillon and colleagues reported a case of electrode positioner extrusion through the tympanic membrane in a 5-year-old child, 10 years after cochlear implantation. The patient had a history of recurrent infections and pressure equalizing tube placement. The treatment for the patient was to remove the Silastic positioner followed by repairing the perilymph fistula and tympanoplasty the day after.¹³

In our case, to prevent movement or extrusion of the main electrode, we did not remove the positioner through the tympanic membrane. Instead, we took the patient to the operating room, and under the direct inspection of the cochleostomy site and catching on the main electrode to ensure it is not moving out, the positioner was removed gently and cochleostomy site was sealed immediately to minimize the risk of infection.

In 2004, Tahery and colleagues indicated that pain can be a symptom of electrode extrusion via tympanic membrane.¹⁴

Our patient also had some episodes of otorrhea in addition to having pain in her ear. Therefore, attention to the exact history and periodic examinations in cochlear-implanted patients is of great importance. Although cochlear implants with electrode positioner are not being used anymore, electrode positioner-related complications may be seen in patients who underwent cochlear implantation surgery from 1999 to 2002. Especially this is important for new otologists and surgeons that may be less familiar with this type of cochlear implant electrodes.

Informed Consent: Written informed consent was obtained from the patient who participated in this study.

Peer-review: Externally peer-reviewed.

Author Contributions: Concept – M.M.Z., S.R.; Design – S.R., M.M.Z.; Supervision – M.M.Z.; Funding – M.M.Z.; Materials – S.R., M.M.; Data Collection and/or Processing – S.R., M.M.; Analysis and/or Interpretation – S.R., M.M.; Literature Review – S.R., M.M.; Writing Manuscript – S.R., M.M.; Critical Review – M.M.Z.

Declaration of Interests: The authors have no conflict of interest to declare.

Funding: This study was supported by Otorhinolaryngology Research Center, Amir Alam Hospital, Tehran University of Medical Sciences.

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