Medial Displacement of Cochlear Implant Magnet Following Trauma

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Objectives

The goals of this case report are to improve knowledge and understanding of the devastating complication of cochlear implant magnet displacement following trauma. Readers will specifically be made aware of the possibility of a very rare medial migration of the magnet. The potential exists for the magnet to be hidden beneath the implant as it occurred in our case and should be kept in mind.

Introduction

Magnet displacement following cochlear implantation is a rare complication that can occur several years after successful use of the device. Magnets incorporated in the receiver-stimulator package were made to be removable in order for the patient to avail of MRI should that become necessary. This design can result in magnet displacement following trauma, which at times can be trivial.

Methods

A five-year-old child sustained minor trauma to the implant site after slipping on the floor. Immediately following the fall her parent observed that the processor magnet would not lock on to the magnet contained in the receiver-stimulator package of her Freedom cochlear implant (Cochlear Corporation). This rendered the device nonfunctional. However integrity testing showed the device to be working within specifications. An X-Ray confirmed that the magnet pocket was empty and the antenna coil was misshaped (Fig.1). Surgical exploration revealed the magnet pouch to be empty and a systematic search failed to reveal a magnet lateral to and around the implant. After re-reviewing the images, the device was gently elevated out of its bed using a Freer elevator. The magnet was discovered hidden from view between the skull and the receiver-stimulator package, and was extracted. During revision surgery, the magnet was found to be lodged behind the cochlear implant and extracted (Fig. 2). The silicone magnet pocket was torn laterally and medially (Fig. 3), but the integrity of rest of the silicone pouch appeared grossly intact. Hence the decision was made not to explant the functional implant. A new magnet was therefore placed in the pocket after the medial tear was repaired with a 5-0 Monocryl stitch. A piece of AlloDerm was then inset lateral to the magnet and slinging stitches were placed across it to secure it within the pocket. 3-0 Monocryl stitch was placed between the temporalis muscle and mastoid periosteum to create a tight pocket.

Results

The cochlear implant magnet pocket was successfully repaired using the aforementioned described method, intra-operative impedance measurements and neural response telemetry were normal and the cochlear implant was successfully activated after 6 weeks. Her performance is at pre-trauma levels. Explant and re-implantation of the device was avoided

Discussion

Cochlear implantation is one of the most common otologic procedures performed today. The complication of magnet migration has been described following Magnetic Resonance Imaging (MRI), and rarely secondary to trauma.[1] In previous reported cases, the magnet migrated anterior or laterally to the implant/ stimulator-receiver; medial migration has not been reported. In our case, minor trauma to the head without a break in soft tissues resulted in medial magnet displacement which was obstructed from view by the implant. Cochlear implant magnet displacement is a rare but potential major complication that renders the individual with a nonfunctional implant. In newer cochlear implants, magnets are designed to be removable temporarily if MRI is needed. They are therefore placed in a small round silicone envelope.[2] With the introduction of removable magnet devices the possibility of magnet displacement or extrusion must be considered after trauma associate with a rapid sudden drop in performance.[3]

Conclusion

It is important for the surgeon to be aware of this complication and methods to repair the silicone magnet pocket to avoid the replacement of the cochlear implant. If the magnet is not found lateral to the receiver stimulator package it is important for the surgeon to look for it medial to the implant.

Reported Cause	Number of Cases
MRI	21
Impact	15
Unknown	13

Table 1: Search of Cochlear database covering the one year period from November 2014-October 2015 yields 49 cases of magnet dislodgement reported to Cochlear for all cochlear implant models

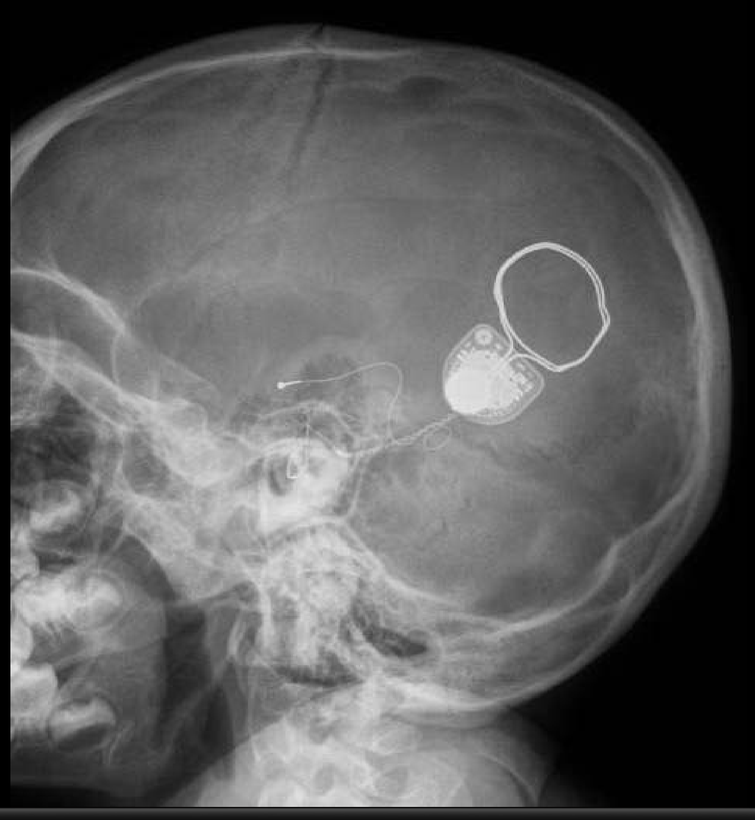

Figure 1: X-ray of cochlear implant with magnet displaced medial to implant

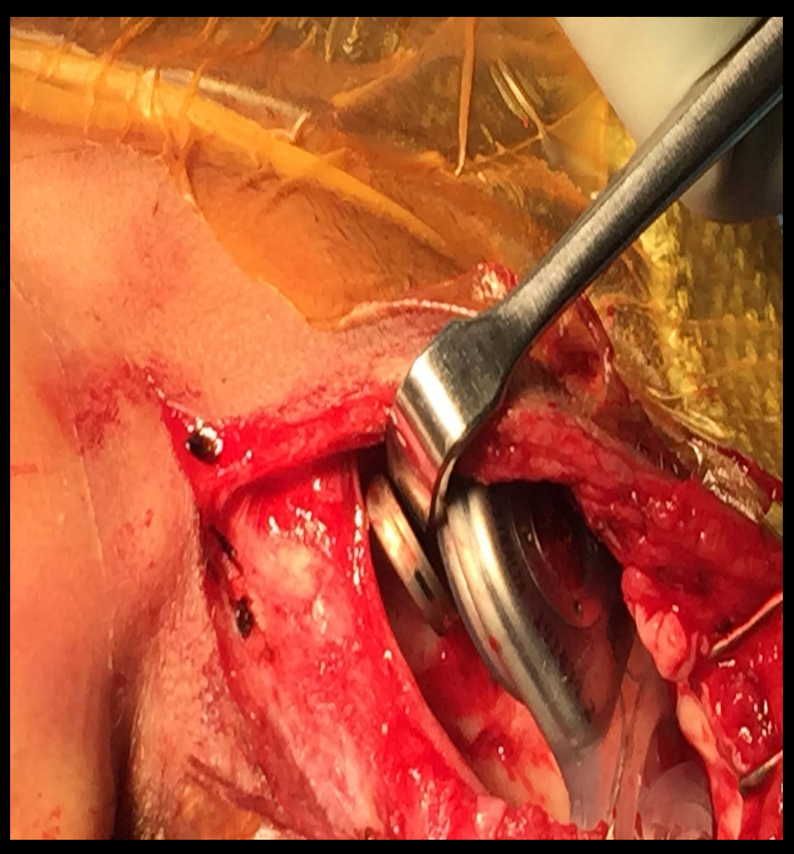

Figure 2: Intraoperative image of cochlear implant magnet displaced medially

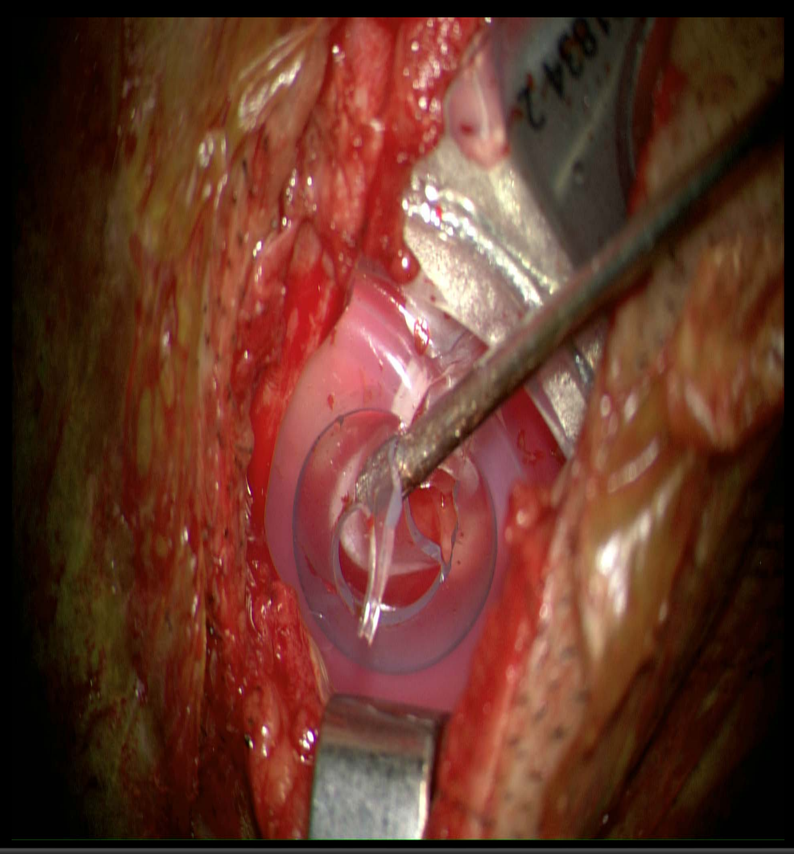

Figure 3: Intraoperative image of torn magnet pocket

References:

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