

CASE REPORT

Air-collection behind the ear: a rare complication in cochlear implant surgery

Raccolta aerea retroauricolare: una rara complicanza nell'implantologia cocleare

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SUMMARY

A rare case of cochlear implant surgery complication is described: air collection behind the ear. A 61-year-old male with a 20-year history of progressive bilateral profound sensorineural hearing loss underwent cochlear implant surgery on the left ear with Clarion Hi-Res 90K (Advanced Bionics, Sylmar, CA, USA). Ten days after surgery, the patient presented visible tumefaction behind the ear corresponding to the receiver-stimulator. Ultrasonography, with a probe of 30 MHz, of the surface behind the ear showed formation of probable liquid content but aspiration with a 20-gauge needle yielded 30 cm³ of air without blood or pus. An unusual case is described of a minor complication occurring in an adult cochlear implant patient presenting a swelling behind the ear that was found to be collected air. Although ultrasonography can be useful to evaluate localization of swelling behind the ear and to differentiate between liquid and solid collection, it is not useful for identification of air collection. The Eustachian tube test can show an abnormally patent tube and prevent this complication.

KEY WORDS: Cochlear implant • Surgery • Minor complications • Air collection

RIASSUNTO

Riportiamo un raro caso di complicanza nella chirurgia dell'impianto cocleare: una raccolta d'aria in regione retroauricolare. Un paziente di 61 anni affetto da sordità profonda neurosensoriale bilaterale progressiva è stato sottoposto ad intervento chirurgico di impianto cocleare nell'orecchio sinistro con un dispositivo Clarion Hi-Res 90K (Advanced Bionics, Sylmar, CA, USA). Dieci giorni dopo l'intervento, il paziente presentava una tumefazione retroauricolare sinistra in corrispondenza del ricevitore stimolatore. Per tale motivo, il paziente veniva sottoposto ad ecografia con sonda di superficie di 30 MHz dell'area retroauricolare che mostrava una formazione di probabile contenuto liquido, l'aspirazione con ago di 20 gauge ha messo in evidenza 30 cm³ di aria in assenza di sangue e pus. In conclusione, presentiamo un caso non frequente di complicanza minore riscontrata in un paziente impiantato adulto che mostrava una tumefazione retroauricolare di contenuto aereo. Sebbene l'esame ecografico può essere utile per valutare la precisa localizzazione della tumefazione retroauricolare e la differenza tra una raccolta liquida e solida non è stata utile nel nostro caso per identificare una raccolta aerea. Il test di funzionalità tubarica può mostrare una pervietà tubarica anormale e prevenire questa complicanza.

PAROLE CHIAVE: Impianto cocleare • Complicanze minori • Chirurgia • Raccolta aerea

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Introduction

Today, cochlear implantation is universally accepted as the treatment of choice for bilateral severe to profound hearing loss. The development of technology and evolution of surgical techniques have led to a progressive reduction of major and minor complications as reported in the literature by various Authors. The mean incidence of major complications is 3.2% and include flap breakdown and device failure; minor complications occur in 18% of cases and include wound infection, non-auditory stimulation and balance problems².

Major complications, in our experience, have been electrode migration and necrosis of surgical flap (1.3%) and meningitis (1.3%). Minor complications include acute otitis media (5.8%), partial insertion of array (1.3%), seroma-haemato-

ma behind the ear (1.3%), balance problems and vertigo (1.9%) and transitory facial nerve palsy (2.2%) for a total of 12.5%. Complications not directly related to the surgical procedure include post-operative tinnitus (2.2%) and device failure (2.5%) for a total of 4.7%³. It is worthwhile stressing that minor complications can be treated with non-invasive techniques, which do not condition the performance of the cochlear implant and the patient's quality of life.

The case is herewith described of a patient examined 10 days after cochlear implant surgery, presenting a fluctuating swelling behind the implanted ear, that was found to be an air collection.

Other Authors have described air collection as a minor complication of cochlear implant surgery⁴ and there are two reports in the literature⁵⁻⁷.

Case report

A 61-year-old male with a 20-year history of progressive bilateral profound sensorineural hearing loss, tinnitus, instability and ataxia from an ischaemic cerebellar lesion was examined in our Clinic. The patient, previously fitted with bilateral hearing aids for about 10 years with very little benefit, underwent cochlear implant surgery on the left ear with Clarion Hi-Res 90K (Advanced Bionics, Sylmar, CA, USA). Surgical access was performed, as routine, from behind the ear via mastoidectomy, posterior tympanotomy and cochleostomy. Correct insertion of the electrode array in the cochlea was evaluated using intra-operative fluoroscopy. Finally, the cochleostomy was sealed with muscle bone pate and gelfoam in the mastoid cavity. The patient had a post-operative compressive bandage for 3 days. There were no post-operative complications. Ten days after surgery, the patient developed visible swelling behind the ear corresponding to the receiver-stimulator. Upon palpation, it showed fluctuation without pain, and ultrasonography, on the retroauricular region with a 30 MHz probe, showed a formation of probable liquid content (Fig. 1). Aspiration with a 20-gauge needle yielded 30 cm³ of air. After aspiration, the patient wore a compressive bandage for seven days. When he was re-examined, it was found that the air-collection had not reformed and, therefore, a tubal function test was carried out with tympanometry after Valsalva manoeuvre, which showed normal results and absence of abnormal patent tube. A post-operative X-ray was performed to check the correct position of the receiver-stimulator and the array inside the *scala tympani*.

Six months after the operation, the patient continues to use the implant with good hearing performance and without other complications.

Discussion

In our experience, the rate of minor complications of cochlear implant surgery was 12.5%; of these, 4 cases (1.3%) had seroma-haematoma and only one case required surgical revision of the flap, while for the other cases, it was sufficient to drain the haematoma and use a compressive dress. In this case, there was a fluctuating swelling behind the ear in the site of the receiver.

Ultrasonographic examination of the region, always performed in similar cases in our clinic, revealed a hypoechogenic layer between the receiver and the muscle-periosteal flap. In our past experience, this method had proven to be useful in differentiating serum/blood collection from simple tissue or oedema. Also in this case, ultrasonography revealed the presence and precise site of the collection, but was not useful to diagnose the type of

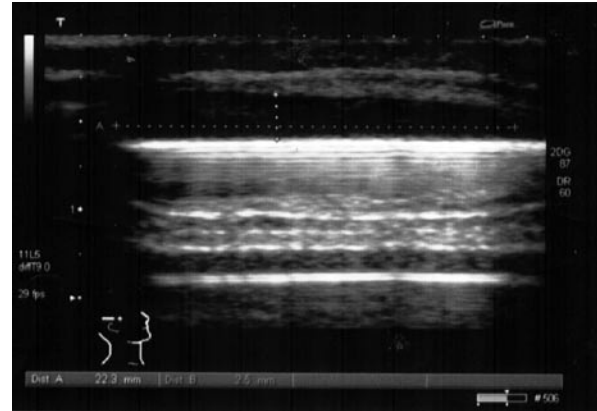


Fig. 1. Ultrasonographic image of retro-auricular air collection. Air layer is indicated by dotted line.

fluid because of the same echogenic aspect of liquid and pneumatic collections. As usual, aspiration and drainage were first attempted with a syringe, although in the presence of blood clots it may be necessary to partially open (5 mm) the surgical wound.

In our case, the amount of air extracted was 30 cm³, much less than the 80-160 cm³ reported in the literature⁴. This fact can be explained by the small incision and minimal elevation of the flaps performed; a further reason could be related to partial detension of the air collection due to an incomplete valve mechanism. Since the origin of the disorder is linked to the passage of air into the surgical cavity, through the Eustachian tube, examination of tubal function is useful in cochlear implant patients mainly in order to verify the absence of abnormal patent tube, in which case air collection would have easily formed.

From these considerations, concerning not only our case, but also those reported in the literature, some points would appear to lead to the following conclusions:

- in cochlear implant, the surgical cavity and elevation of the flaps should be as small as possible, thus providing accurate sealing of the posterior tympanotomy with the use of muscle and bone paté to reduce risks of air collection;
- ultrasonography can be useful in the evaluation and precise localization of swelling behind the ear and to differentiate between liquid and solid collection but not in the identification of an air collection;
- it would be useful to test pre-operative tube function in all cochlear implant candidates to detect higher risk conditions such as abnormal patent tubes. In any case, all patients should be advised not to perform the Valsalva manoeuvre or other activities that can cause increased pressure in air spaces of the middle ear for at least one month post-operatively.

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