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ORIGINAL ARTICLE

Management of Cerebrospinal Fluid Otorrhea☆

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KEYWORDS
Cerebrospinal fluid leak from ear;
Otoliquorrhea;
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Abstract
Introduction: Cerebrospinal fluid otorrhea results from an abnormal communication between the subarachnoid space and tympanomastoid compartment; most of them are of traumatic aetiology. They have clinical interest due to the potential risk of meningitis, directly related to the aetiology. Our aim was to show our experience in the management of this process.
Methods: A total of 17 patients were diagnosed and treated for cerebrospinal fluid otorrhea from 2003 to 2011.
Results: In our study, the highest percentage of cases was spontaneous cerebrospinal fluid otorrhea, with a wide clinical presentation. The diagnosis was based on the determination of beta-2-transferrin and radiological studies, especially important for its locator value. The treatment of choice was surgery.
Conclusions: Cerebrospinal fluid otorrhea is a rare entity in otorhinolaryngological pathology. Its diagnosis is suspected through otorrhea, hearing loss and aural fullness, while computed tomography and magnetic resonance help us to locate the defect. Surgery is the preferred technique, and its success is based on multilayer technology with 2 or more support materials.

PALABRAS CLAVE
Fístulas de líquido cefalorraquídeo en oído;
Otolicuorrea;
Mastoidectomía;
Antrotomía;
Meningitis

Manejo de las otolicuorreas

Resumen
Introducción: Las fístulas de líquido cefalorraquídeo en el oído derivan de una comunicación anormal entre el espacio subaracnoideo y el timpanomastoideo, la mayoría de etiología traumática. Tienen gran interés desde el punto de vista clínico por el potencial riesgo de meningitis, directamente relacionado con la etiología. Nuestro objetivo es mostrar nuestra experiencia en el manejo de dicho proceso.

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Métodos: Presentamos un total de 17 pacientes diagnosticados y tratados de fístulas de líquido cefalorraquídeo en el oído desde el año 2003 hasta el 2011.
Resultados: En nuestro estudio el mayor porcentaje de casos correspondían a otolicuorreas de tipo espontáneo, con una presentación clínica variada. El diagnóstico se basó en la determinación de la beta-2-transferrina y en estudios de imagen, especialmente importantes por su valour localizador del defecto. El tratamiento quirúrgico fue el de elección.
Conclusiones: Las fístulas de líquido cefalorraquídeo en el oído constituyen una entidad rara en la patología otorrinolaringológica. Su diagnóstico se sospecha por signos característicos como la otolicuorrea, pérdida auditiva y sensación de plenitud ótica, mientras que la tomografía computarizada y la resonancia magnética nos ayudan a su localización. La cirugía es la técnica de elección, y su éxito se basa en la técnica multicapas con 2 o más materiales de soporte.

Introduction

Otoliquorrhea is defined as the outpouring of cerebrospinal fluid through the limits of the temporal bone. Cerebrospinal fluid fistulas (or CSF otorrheas/leaks) in the ear are the result of an abnormal communication between the subarachnoid and tympanomastoid compartments. They are often the result of another pathological process. The majority appear following head trauma, but they can also have an iatrogenic, neoplastic or congenital origin, and can even be due to a cholesteatoma, following otological or middle cranial fossa surgery. Spontaneous otoliquorrhea is much less common.

There are 2 population groups which are more frequently affected by this sign: children, in whom congenital malformations represent the most common cause, and adults, in whom middle age, female gender and excessive weight or obesity are usually considered as risk factors for spontaneous otoliquorrheas.

The clinical symptoms associated with these fistulas include the presence of otitis media with effusion (or serous otitis media) and/or watery otorrhea, conductive hearing loss, aural fullness sensation and recurrent episodes of meningitis.

The tentative diagnosis of this type of fistula can be obtained by performing a measurement of the levels of beta-2-transferrin, which is a highly sensitive and specific test. However, imaging tests (computed tomography [CT] and magnetic resonance imaging [MRI]) offer more information, especially through their ability to locate the defect causing the abnormal outpour of cerebrospinal fluid to the temporal bone.

The most significant complication resulting from cerebrospinal fluid fistulas in the ear is meningitis. A definitive repair of the temporal bone defect is critical to prevent this complication. The most commonly used surgical approaches are the transmastoid and through the middle fossa, or a combination of both. However, the key to the success of the surgical procedure lies in the use of a multilayer technique with 2 or more support materials, as it has a success rate close to 100% when artificial materials are combined with multiple layers of autologous tissue.

Methods

We present a retrospective study of the management of cerebrospinal fluid otorrheas, with a total of 17 patients diagnosed with otoliquorrhea between 2003 and 2011. This diagnosis was mainly based on the anamnesis and physical examination, and was confirmed by laboratory and imaging tests. Detection of beta-2-transferrin in the otic exudate and, especially, suggestive computed tomography and/or magnetic resonance imaging scans represented the essential diagnostic criteria.

The following variables were recorded: age, gender, affected ear, triggering cause, clinical presentation, results of the determination of beta-2-transferrin and MRI and CT scans, surgical approach and repair methods employed in each patient, and postoperative evolution with a follow-up of all patients until May 2012.

Results

The ages ranged between 15 and 74 years, with a mean value of 55 years. Regarding gender, 10 of the 17 patients were males and the remaining 7 were females. In total, 54% presented involvement of the right ear, whilst the remaining 46% presented involvement of the left ear. As for their history, the causes most frequently observed were temporal bone fracture in 4 cases (25%), cholesteatoma in 3 cases (18%), and chronic ear infection and iatrogenic origin in 2 cases each (13%). However, spontaneous fistulas were the ones affecting the majority of patients, with 5 cases (31%). No congenital anomalies which justified otoliquorrhea were detected (Fig. 1).

Fig. 2 shows the signs and symptoms which could be observed in our sample. A total of 9 patients presented watery otorrhea with a long evolution, 6 reported hearing loss, 4 patients suffered meningitis, 2 acute otitis media with a torpid evolution despite conventional treatment, and only 1 patient in each case developed vertigo symptoms and facial paralysis.

The beta-2-transferrin test was positive in 13 patients. However, this does not mean that the remaining 4 patients obtained a negative result, but rather that they did not undergo this test.

All patients underwent radiological tests. Specifically, there were 12 (60%) patients who underwent a CT scan and 2 (10%) who underwent an MRI. The remaining 3 cases (15%) underwent both imaging studies (Fig. 3). Through the imaging tests, as shown in Fig. 4, it could be concluded that 9 patients suffered the defect responsible for the fistula at the level of the *tegmen tympani*, 7 presented it in the *tegmen mastoideum*, 3 in the bony portion of the internal auditory