



ORIGINAL ARTICLE

Comparison of Complications by Technique Used in Cochlear Implants[☆]

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Abstract

Introduction: Complications are very sensitive indicators of the usefulness of a surgical technique. In cochlear implant surgery, there are 3 principal approaches: the classic approach uses the facial recess (FR), the suprameatal approach (SMA) does not require mastoidectomy and uses the creation of a tunnel over the facial nerve to enter the middle ear, and the endomeatal approach (EMA) is based on the completion of a groove in the posterior wall of external auditory canal.

Material and methods: A multicentre review of 208 patients with cochlear implants was performed for comparing the different techniques. The complications were classified into major and minor.

Results: Among the 208 implanted patients, 10.5% (22 of 208) had complications. Of these, 2.88% (6 of 208) were major complications and 7.69% (16 of 208) were minor complications. Comparing the results obtained by the different approaches, the FR technique had the lowest rate of major complications (1.1%), followed by the EMA technique with 2.38% and SMA with 3.75%. As for minor complications, operations in the SMA group had the lowest rate (6.25%), followed by the EMA group (7.14%) and the group operated on using the FR technique presented the highest (10%).

Conclusions: The 3 techniques described show very similar rates of complications. Consequently, we can conclude that they are safe and are alternatives.

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PALABRAS CLAVE

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Técnica endomeatal;
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Comparación de complicaciones según la técnica utilizada en los implantes cocleares**Resumen**

Introducción: Las complicaciones son un indicador muy sensible de la utilidad de una técnica quirúrgica. En cirugía de implante coclear se pueden utilizar 3 abordajes: el abordaje clásico utiliza el receso facial (RF) para el paso del electrodo; el abordaje suprameatal (SMA) no requiere mastoidectomía y utiliza la creación de un túnel que pasa por encima del nervio facial para entrar a la caja del tímpano desde atrás, y el abordaje endomeatal (EMA) que se basa en la realización de un canal en la pared posterior del conducto auditivo externo.

Material y métodos: Estudio multicéntrico de revisión de 208 pacientes, comparando las diferentes técnicas de abordaje descritas. Se clasificaron las complicaciones en mayores y menores.

Resultados: Entre los 208 pacientes implantados el 10,5% (22 de 208) presentó complicaciones, de estas el 2,88% (6 de 208) fueron complicaciones mayores que llevaron a la reimplantación y el 7,69% (16 de 208) fueron complicaciones menores. Comparando los resultados obtenidos por los diferentes grupos, podemos decir que la técnica del RF es la que menos porcentaje de complicaciones mayores tuvo, 1,1% seguida de la técnica EMA con un 2,38% y la SMA con un 3,75%. En cuanto a las complicaciones menores, el grupo operado por SMA tuvo el menor porcentaje presentando el 6,25%, seguido del grupo operado por EMA con el 7,14% y el grupo operado por el RF presentó el 10%.

Conclusiones: Las 3 técnicas quirúrgicas descritas muestran un porcentaje de complicaciones muy similar. Por lo tanto, podemos concluir, que las 3 técnicas son seguras y alternativas unas con otras.

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Introduction

Complications are a very sensitive indicator of the usefulness of a particular surgical technique. Thus, there are many techniques and surgical approaches which, though excellent, are scarcely used or not used at all due to their high rate of complications.

Regarding cochlear implants, a number of approaches were considered from the very beginning. The classical approach, the most widely used and accepted one, uses the facial recess for passage of electrodes from the mastoidectomy into the middle ear. This technique requires a simple mastoidectomy and a posterior tympanotomy. Access to the middle ear is narrow at this point and requires precision and experience on the part of the surgeon, since the presence of the facial nerve requires certain risks to be assumed. Critics of the technique emphasise this point, arguing that this access can be bypassed, thus avoiding the proximity of the facial nerve and its possible complications.

For this reason, alternative routes have been designed over the history of cochlear implant surgery. The suprameatal approach (SMA) does not require an initial mastoidectomy and instead creates a tunnel that passes over the facial nerve to enter the tympanic cavity from behind. This tunnel is drilled from the cribriform area, in parallel to the posterior wall of the external auditory canal, directly towards the long apophysis of the incus, where the drill emerges. Supporters of this technique highlight the fact that there is no risk of facial nerve lesion, since it is anatomically distant from the Fallopian canal.¹

Finally, the endomeatal approach (EMA) is another surgical option for performing a cochlear implant which employs the ear canal as a reference for the introduction of the

electrode into the middle ear. This technique requires a meatotympanal flap to be obtained, similarly to a stapedectomy, and is based on creating a channel in the posterior wall of the external auditory canal, parallel to its axis, through which the electrode enters the middle ear. This channel is formed from an intermediate position between the malleus and incus towards the mastoid in a straight line, leading up to the cribriform area with a depth of approximately 2 mm. Once the electrode is positioned, it should be covered by bone paste and then the skin of the external auditory canal (EAC) covering it should be repositioned. This technique avoids the proximity of the facial nerve, is quick and requires no anthro-mastoidectomy. In children, the sulcus is limited to the inner third of the EAC. In addition, a small mastoid cavity is also created, with a narrow groove that continues the sulcus to the cortical mastoid and communicates the cavity with the EAC. This is done to accommodate the electrode guide within the cavity rather than the sulcus, in order to avoid a possible displacement of the electrodes due to growth of the EAC.²

In this work we will use the classification of complications described in the work of Hoffman and Cohen (1995), who divided them into³:

- (a) Intraoperative (Gusher).
- (b) Immediate postoperative (cerebrospinal fluid [CSF] fistula).
- (c) Late postoperative (extrusion).

This classification uses a division including major complications and minor complications. Major complications are those requiring surgical reoperation to be resolved (incorrect placement of electrodes, extrusion, migration

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