ing creating a radical mastoid cavity, obliteration of the eustachian tube,obliteration of the mastoid cavity with free abdominal fat, and permanent closure of the external ear canal. This technique has been evaluated for a period of less than 1 year, but seems to offer a real potential of disease eradication. In addition to this procedure, a device for sealing the cochlea at the point of entry of the electrode to prevent intracochlear spread of infection is another consideration. Such a sealing device has already been suggested for cochlear implantation in young children.1

SUMMARY

We have presented three patients with bilateral CSOM who were otherwise suitable for cochlear implantation. These patients had conventional surgical management of CSOM and were implanted after a period of 6 months through apparently healthy middle ears. However, all three had a recurrence of middle ear disease requiring further surgery, and one had a potentially life-threatening complication necessitating removal of the implant. Before considering cochlear implantation in patients with bilateral CSOM, it is essential to eradicate all disease, and radical mastoidectomy with obliteration may be necessary. The use of a cochlear sealing device may further ensure prevention of infection spreading into the cochlea.

REFERENCES


SURGICAL CONSIDERATIONS FOR THE PLACEMENT OF THE NEW COCHLEAR PTY LIMITED MICRO-MULTIPLE-CHANNEL COCHLEAR IMPLANT FOR RESEARCH STUDIES

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A new micro-receiver-stimulator for research studies on very young children as well as adults has been developed by Cochlear Pty Limited (Figs 1 and 2). The dimensions of the device (Fig 2) are length 58 mm and width at front 18 mm. The width starts to increase 19 mm from the front, and the back section, which has the receiver coil and magnet, has a maximum diameter of 33 mm. The depth or thickness of the front portion of the electronic package is 5.7 mm, and the remainder of the package 4.0 mm. The antenna section is 3.5 mm thick. The other dimensions of the front section of the electronic package are length 9.5 mm and width 13.7 mm. There is an angle of 160° between the titanium electronic package and the receiver coil. The dimensions of the receiver-stimulator were arrived at after anatomic studies on the temporal bones of children ranging in age from 2 to 11 months (Pyman and Clark, this suppl, this section).

The prosthesis has been initially implanted in five adults for research studies (four at the Royal Victorian Eye and Ear Hospital, Melbourne, and one at the Royal Prince Alfred Hospital, Sydney).

As the new micro-implant has a longer and wider receiver

Fig 1. Photographs of new micro-multiple-channel cochlear implant developed by Cochlear Pty Limited. A) Lateral view. B) In place in adult patient prior to placing tie sutures and wound closure.
Fig 2. Diagram of micro-receiver-stimulator with dimensions delineated.

As stated above, it is desirable to place the receiver coil more superiorly than with the mini device. This means drilling over the posterior root of the zygoma and floor of middle fossa. In the adult this step can be made without exposure of dura, but dura would be exposed in young children. The electrode insertion is carried out in the usual way, and the package is placed as shown in Fig 1B prior to inserting sutures over it to hold it in place.

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INVESTIGATIONS ON A CURVED INTRACOCHLEAR ARRAY

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INTRODUCTION

The electrode array of a multiple-channel cochlear implant lies against the outer wall of the scala tympani. From this position electrical current spreads to excite residual neural elements, particularly spiral ganglion cells within the modiolus. It is not clear whether the spread of current from the outer wall is optimal for multiple-channel speech processing, but placement closer to the target nerves could result in lower thresholds. This could have benefits through the use of shorter pulse durations and extended battery life. Computer modeling studies and animal experiments have suggested that for localized current the optimal electrode position is adjacent to the modiolus.

At the University of Melbourne it was felt that an electrode with a curve matching the internal cochlear spiral would remain close to the modiolus after insertion. A curved electrode was developed and an inserting tool was designed and produced (Treaba et al, this suppl, this section). Preliminary studies suggested that the electrode array did indeed remain close to the modiolus. Before further development of this type of electrode design, it was necessary to determine whether modifications to the surgical technique for its insertion were required. It was also important to ensure that the curved electrode fabricated for clinical trial would lie closer to the modiolus than to the outer wall of the scala tympani. This study was undertaken to examine these issues.

METHODS

Five human cadaver temporal bones were implanted with the curved electrode within 16 hours of death, by means of the inserting tool designed specifically for the purpose (Fig 1). The same surgeon, with experience in cochlear implantation,
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