Bilateral Simultaneous Cochlear Implantation in Children: Surgical Considerations
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ABSTRACT

INTRODUCTION

Bilateral simultaneous implantation is currently recommended for young children with genetic problems in addition to auditory ones, for patients with bilateral sudden hearing loss with no recovery and for patients with post-meningitis deafness. It has several advantages over unilateral and bilateral staged implantation: (1) the “bilateral window” is automatically resolved. Second, bilateral simultaneous procedure allows the ear with the worst hearing to be used as a “bridge” to the better ear. This is critical in cases of meningitis and Cogan’s syndrome. Third, a single surgery with one-time anesthesia is easier on the child and parents and prevents the risk of complications associated with multiple procedures and hospital stays. The surgeons and the whole CI team. Finally, the increased cost-effectiveness of a single procedure is an appealing advantage. On the downside, bilateral cochlear implants have been associated with the double risk of surgical and medical complications, including the need for removal and reinsertion of the second implant. The benefits of avoiding the risk of damage to the facial nerve and chorda tympani as well as the risk of electrode misplacement have turned the non-mastoidectomy techniques into routine approaches for cochlear implantation in many European centers.

METHODS AND MATERIALS

We used the Suprameatal approach (SMA) for all the BSCIs (1, 2). This technique was developed in our department in 1999, and has been presented at numerous international meetings in addition to being described in detail in the literature. Briefly, rather than performing mastoidectomy, the suprameatal technique involves entering the middle ear by means of retrosigmoid tympanostomy. The skin incision is made along the upper border of the mastoid process. The mastoid air cells are then removed using a rongeur forceps. The skin incision is made along the upper border of the mastoid process. The mastoid air cells are then removed using a rongeur forceps. A middle ear flap is elevated with a long handled retractor. The middle ear cavity is then entered through a horizontal incision in the carotid canal. A tympanomeatal flap is elevated to expose the middle ear cavity. The chorda tympani is retracted anteriorly and the tympanic cavity is entered through a small incision in the tympanic membrane. The sigmoid sinus is then identified and clamped. The facial nerve is then identified and retracted. The chorda tympani is then divided and the cochleostomy is performed. The electrode is then inserted into the cochlea in two patients who had meningitis-related ossification. None of the children had any surgical complications.

RESULTS

Ten children received Med-El and 7 received Nucleus cochlear devices. Twelve children were congenitally deaf, 3 children had post-meningitis deafness and 2 children had congenital cytomegalovirus-related deafness. The overall time of surgery was approximately 3 hours. This includes anesthesia in all the cases and drilling out the bony tunnels in the cochlea in two patients who had meningitis-related ossification. In addition, the issue of a possible alteration of the vestibular systems in both ears is unclear. Precise planning of symmetrical incisions and implant sites for good cosmetic results pose yet another problem of bilateral procedure (Figure 1). In addition to possible binaural cochlear implant problems, BSCI has extended length of surgery and the need to place a patient on the implanted side during a contralateral implantation should be taken into the consideration.

DISCUSSION

Our preoperative counseling for cochlear implant candidates and their relatives usually includes informing them of the decrease in brain plasticity with increasing age. As reported by our colleagues, we also warn our patients about the potential for relatively poorer performance of the second ear when the first implant fails. We also warn them that there are delays between implantations of greater than 1 year. We take pains to reassure our patients that the chance for deterioration in the second ear is low. In view of the significance of the experience, device failure is also toxic to those who had been implanted many years ago and wish to upgrade their devices. Two main problems with the second group are in defining when a second implant is of sufficiently significant benefit and issues involved in upgrading both. This group includes individuals who are blind or have neurological disabilities and those with two implant magnets. In addition, the issue of a possible alteration of the vestibular systems in both ears is unclear. Precise planning of symmetrical incisions and implant sites for good cosmetic results pose yet another problem of bilateral procedure (Figure 1). In addition to possible binaural cochlear implant problems, BSCI has extended length of surgery and the need to place a patient on the implanted side during a contralateral implantation should be taken into the consideration.

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RESULTS

Ten children received Med-El and 7 received Nucleus cochlear devices. Twelve children were congenitally deaf, 3 children had post-meningitis deafness and 2 children had congenital cytomegalovirus-related deafness. The overall time of surgery was approximately 3 hours. This includes anesthesia in all the cases and drilling out the bony tunnels in the cochlea in two patients who had meningitis-related ossification. None of the children had any surgical complications.