

Research Article

Cochlear Implant the Potent Hearing Implant

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Abstract

Introduction

Cochlear implants are very potent hearing implants that have been used successfully for 40 years. Although the overall hearing gain is very good, there are patients who reject the hearing implant for subjective reasons.

Methods

Of all patients who were explanted in a CI treatment centre, those who rejected the implant for subjective reasons were examined more closely.

Results

Of 42 explantations, 39 were explantations for purely subjective reasons. Symptoms of general discomfort, a feeling of pressure and pain are the most common reasons, of which psychological complaints with rejection and aversion have the most serious effects.

Keywords: Cochlear Implant; Explanations; Foreign Body Rejection; Psychiatric Diseases

Introduction

Cochlear implantations have increased dramatically over the last 40 years. In particular, the consideration of each individual ear separately and the resulting bilateral implantation has led to an increase. However, significantly gentler surgical procedures and the increasing number of positive experiences with no age limit up to old age are also increasing the number. Despite demonstrably good hearing gains,

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patients are opting for explantation. In some cases, subjective reasons override the audiometric benefit.

Methods

A retrospective analysis of CI explantations at a CI-Clinic between 2003 and 2023 was carried out using a questionnaire to analyse the reasons for explantation. In addition, the period between implantation and explantation as well as the hearing and speech comprehension achieved were analysed.

Results

A total of 986 patients were included in the study, 904 of whom underwent surgery at CIVE. 42 CI explantations were performed in the period 2003-2023. 3 (15%) explantations were definitive in the absence of electrical stimulation of the auditory nerve and the resulting lack of hearing gain. Of the 39 (3.96%) remaining patients considered here in particular, the request for explantation was due to discomfort (3.96%), pain (1.98%) and a feeling of pressure (1.98%) at the implant site and dizziness (0.51%). After explantation and MRI of the skull, one patient was found to have a vestibular schwannoma, which was not visible in the preoperative neuroradiological MRI diagnostics (Tables 1&2). However, patients with psychiatric disorders were particularly noticeable. Many of the patients with psychiatric disorders benefit very well from a cochlear implant (Schumpa 2015, Issing, Baumann et al. 2019, Rosner 2020, Richter 2021, Schubert 2021, Pfluger 2022) and in many cases the symptoms are reduced. However, patients were detected here who were very focussed on their CI after implantation and whose only goal was to remove the implant.

Cohort	986		
Explantations	42		
Company	22 Medel	18 Cochlear	2 Advanced bionics
Page reference	17right	25left	Bds 0
Gender	15male	27 female	

Table 1: Analysis of the questionnaires.

Cohort	986		
Explantations without medical indication	39		
	Male	Female	Total
Discomfort/rejection of the implant	18	21	39 (3,96%)
Pain	6	13	19 (1,98%)
Feeling of pressure	8	13	19 (1,98%)
Dizziness	2	3	5 (0,51%)
Subjectively no hearing gain in everyday life	5	4	9 (0,91%)
Pre-existing psychiatric conditions	3	5	8 (0,81%)

Table 2: Reasons for explantation after evaluation of the questionnaires.

The average interval between implantation and explantation was 37.8 months, with a very wide range among our patients. Some patients were unable to tolerate the implant immediately after implantation. Despite good persuasion, some attempted to remove the implant immediately postoperatively while the wound was still healing (Figures 1&2). In the case shown, the process was influenced by delirious states. The implant should be removed immediately. However, the operation could only be performed after 2 months because the operation date was either not kept or the patient had not remained sober immediately before the operation. On the other hand, there were patients with very long wearing periods of up to 38 months. However, these were often patients who had not worn their implant for months and had delayed their decision to undergo explantation.



Figure 1: Leaked reference electrode with stripped metal end.



Figure 3: Electrode exit from the ear canal after manipulation.



Figure 2: Most of the implant has emerged from the implant pocket.

In another case, residual hearing was found after 12 ear operations for cholesteatoma with the creation of a modified radical cavity. A cochlear implant was implanted for hearing rehabilitation and simultaneous ear canal obliteration with abdominal fat was performed. Although this was discussed in detail beforehand, the patient was unable to bear the thought of a foreign body in her body postoperatively, despite the very good hearing gain. Although she appreciated the hearing gain very much, she would prefer to cut out the implant herself, as she said several times during rehabilitation. Permanent manipulation of the auditory canal ultimately led to the electrode exiting the auditory canal after 2 years in the absence of a protective posterior auditory canal wall (Figure 3), so that the patient's wish was finally granted and the CI was finally explanted.

The hearing results were good in the patients examined and showed very large hearing improvements in the examination situation compared to the preoperative findings (Figure 4). Patients without hearing improvement who reject the implant, on the other hand, often become non-users without accepting further surgery. They are therefore less likely to be explanted.

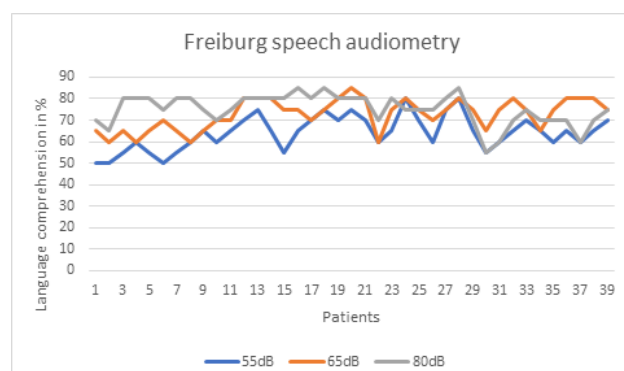


Figure 4: Speech audiometry (Freiburger) of the explanted patients.

Discussion

For 40 years, cochlear implants have been very potent implants for restoring hearing and protecting against diseases caused or exacerbated by social withdrawal and loneliness [1-4]. They are therefore also indicated for patients with pre-existing psychiatric conditions in particular. Reasons for the final explantation of CIs are usually insufficient hearing gain. In 7.14% of cases there was no hearing gain. The desire for explantation is therefore understandable. However, special attention needs to be paid to patients who show no abnormalities in our physical examinations and who have a subjective hearing gain in the audiometric diagnostics available to us today. In patients who have been deaf on one side for a long time, it has been shown that the subjective hearing gain noticeable in everyday life is low, despite good objective examination results [5-7]. There is ample evidence that cochlear implants are also effective for unilateral deafness [8,9]. It has also been described that the duration of deafness before implantation plays a decisive role [5-7]. However, little or no hearing gain is detectable in these patients. The duration of deafness correlates with a lack of subjective audiometric benefit [5]. In our study, however, patients were selected who insisted on explantation, although they would not have been selected for this in a therapeutic manner. The benefits, especially for people with mental illness, have been proven [10,11]. Nevertheless, it has been shown that some implant recipients are unable to accept their implant. This has also been observed with other implants in the body [11-14].

Conclusion

The implantation of cochlear implants is a success. The high standards and selection criteria are sensible. Nevertheless, implantation cannot be simulated, and acceptance cannot be predicted with certainty despite detailed information. The number of explantations is low. The number of explantations with good hearing gain is even lower. For this reason, patients with previous psychiatric illnesses should be informed about the foreign body and presented for a psychological assessment in the event of unclear aversions and anxiety. Nevertheless, it is highly likely that explantations will continue to occur, but efforts should be made to keep the number as low as possible.

Conflicts of interest

The Author declares that there are no conflicts of interest. They assure that they have observed and complied with the data protection regulations and the requirements of the Declaration of Helsinki.

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