MedPeer Publishers
Empowering Evidence-Based Medicine Through Peer-Reviewed Excellence

Open Access Original Article DOI : 10.70780/medpeer.000QGM7

Cochlear Implantation in Inner ear Malformations: experience of eighteen years from 2009 to 2020

Author and Affiliation

MAROUANE BALOUKI[1], FOUAD BENARIBA[2], MOHAMED ZALAGH[2], BOUCHAIB HEMMAOUI[2], SALOUA OURAINI[2], NOUREDDINE ERRAMI[2]

[1] ENT département, Military Hospital of Smara,
[2] ENT département, Military Teaching Hospital of Mohammed V –Rabat, Morocco

Corresponding author: MAROUANE BALOUKI

Abstract

We are trying to find out the experience of cochlear implantation in patients who suffer from internal malformations that expose radiological aspects of these malformations, whether it is difficult to know whether chirurgical complications are possible or audited performances that compare with the patients' implants. This is a normal cochle.
Matériel and methods: He s'agit for a prospective study on 319 cases of patients suffering from neurosensory wounds with a prophylaxis or sans a malformation of the internet, colligés au sein du service d'ORL and CCF of the military hospital Mohamed V de Rabat, during the period from 2011 to 2022. For the purpose of recovery from the donnés, epidemiologists, para-clinics, clinics, therapies and developments in the use of the MUSS, MAIS, APECI, CAP, and SIR Tests.
Result: Our children's chanterelles take 4 hours to extend their hair for 1 to 16 hours for normal cockpits and 5 days for internal malformations for 1 to 17 hours. Most of our implant patients have been exposed to infection for 7 years. The dominant sex in the Chantillon is the sex masculin. The operating rooms are normal with a total introduction to the electrolytes of the major patients. In the sense, the patients have malformations in the internet on a significant level of auditory and verbal ammunition, but the patients have a normal skin.
Discussion: The indications for the implant cochléaire were the most common since 1995 and began entering patients with malformations from the internet. Patients with malformations related to minor malformations such as dilatation of the vestibule and the incomplete type II cochlées have the highest performance, tandis that this happens on the common spaces, hypoplasic cochlée and a type I partition with limited amniotic fluid. It is important for the value of saving the internet to determine the problems that can compile the chirurgy and enter the price of the patient's hospital charge as it is important to respect the treatment principle and multidisciplinarity of this long process. Audit rehabilitation.
Conclusion: Patients with internal malformations have long-temperature privileges to have a cochlear implant. Actuellement, hormonal diseases caused by Michel's malformation, these patients were beneficiary of this implantation.

Keywords

Cochlear Implant, Inner ear Malformations, evaluation tests

Open Access Original Article DOI : 10.70780/medpeer.000QGM7

Main Article

Introduction

Cochlear implantation presents several difficulties in patients with inner ear anomalies. This study was carried out to analyze the postoperative results and hearing performance of patients who had inner ear malformations and who were treated with cochlear implants at the Department of Otorhinolaryngology and Head and Neck Surgery within the Mohammed V military training hospital in Rabat by describing the experience of cochlear implantation in these patients while relating the radiological aspects of these malformations, the difficulties as well as possible surgical complications and the hearing and speech production results obtained .

Methods

It was a retrospective analytic study in otorhinolaryngology service Mohammed V military hospital rabat from 2009 to 2020. over the same period, after excluding adult implants and non-usable records, 319 children were implanted, 18 of whom had cochlea-vestibular malformations with a percentage of 5.6%.

Objective :

to compare implantation outcomes between two groups:

- group 1: with malformed cochlea (18 patients)
- group 2: with normal cochlea (18 patients)

the two groups were similar, same age group, and same epidemiological characteristics

Auditory performance, receptive and expressive language skills, and production and use of speech were evaluated preoperatively using a test battery for at least 30 months after implantation.

Results :

the clinical, radiological and operative characteristics of inner ear malformations have been described in the following two first figures(Figure 1, 2).

To compare the hearing performance between the two groups, we used two types of tests

- The audiological performance of the 2 groups was compared by. :
  - **Little EARS**, and
  - The Meaningful Auditory Integration Scale **(MAIS),**
  - **and APECI** tests were administered to assess auditory performance.
- tests were administered to assess production and use of speech.
  - The Meaningful Use of Speech Scale **(MUSS)**
- This tests were applied in the preoperative period, after the 6th, 18th and 30th months.

Results: patients with Internal Ear Anormalities (group 1)

Number	Operation age (years)	Gender	Radiological findings Left	Radiological findings Right	Operation Side	Operation findings
1	3	M	CC	CC	Right	GEYSER (Oozing)
2	4	M	CH	CH	Left	Round window not identified (cochleostomy)
3	2	M	EVA	EVA	Left	No findings
4	4	M	CH	CH	Right	Roud window not identified (cochleostomy)
5	2	M	Mondini IP-II	Mondini IP-II	Left	No findings
6	5	M	Mondini IP-II	Mondini IP-II	Right	GEYSER (Oozing)
7	3	F	CC	CC	Right	GEYSER (Oozing)
8	2	M	CH	CH	Left	Round window not identified (cochleostomy)
9	2	M	IP-I	IP-I	Right	Aberrant placement of the facial nerve
10	5	F	EVA	EVA	Left	No findings
11	4	M	EVA	EVA	Left	No findings
12	4	M	IP-I	IP-I	Right	Gusher
13	3	F	EVA	EVA	Right	GEYSER (Oozing)
14	4	M	CC	CC	Right	GEYSER (Oozing)
15	3	M	CH + hypoplasia of the VIII nerve	CH + hypoplasia of the VIII nerve	Left	No findings
16	4	F	CH	CH	Right	Roud window not identified (cochleostomy)
17	2	M	vestibular cavity aplasia	vestibular cavity aplasia	Left	No findings
18	3	F	IP-I	IP-I	Right	Gusher

Common cavity (CC) , enlarged vestibular aqueduct (EVA), cochlear hypoplasia (CH), vestibular cavity aplasia (VCA), incomplete partition type I (IP-I), incomplete partition type II (IP-II)

Fig 1 : Eitheen child with different inner ear malformations

Malformations	n	%
IP-I	3	16,7
IP-II Mondini	2	11,1
EVA	4	22,2
CC	3	16,7
CH	5	27,8
VCA	1	5,6
Total	18	100

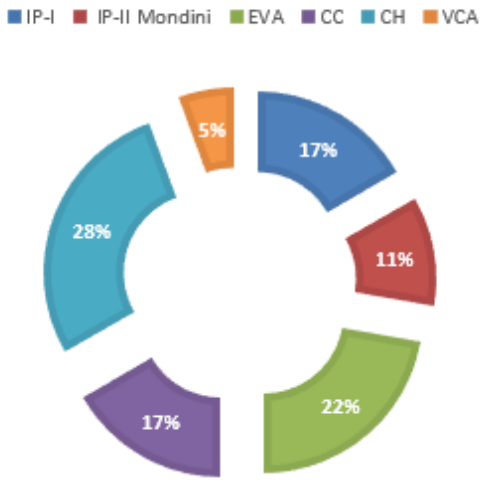
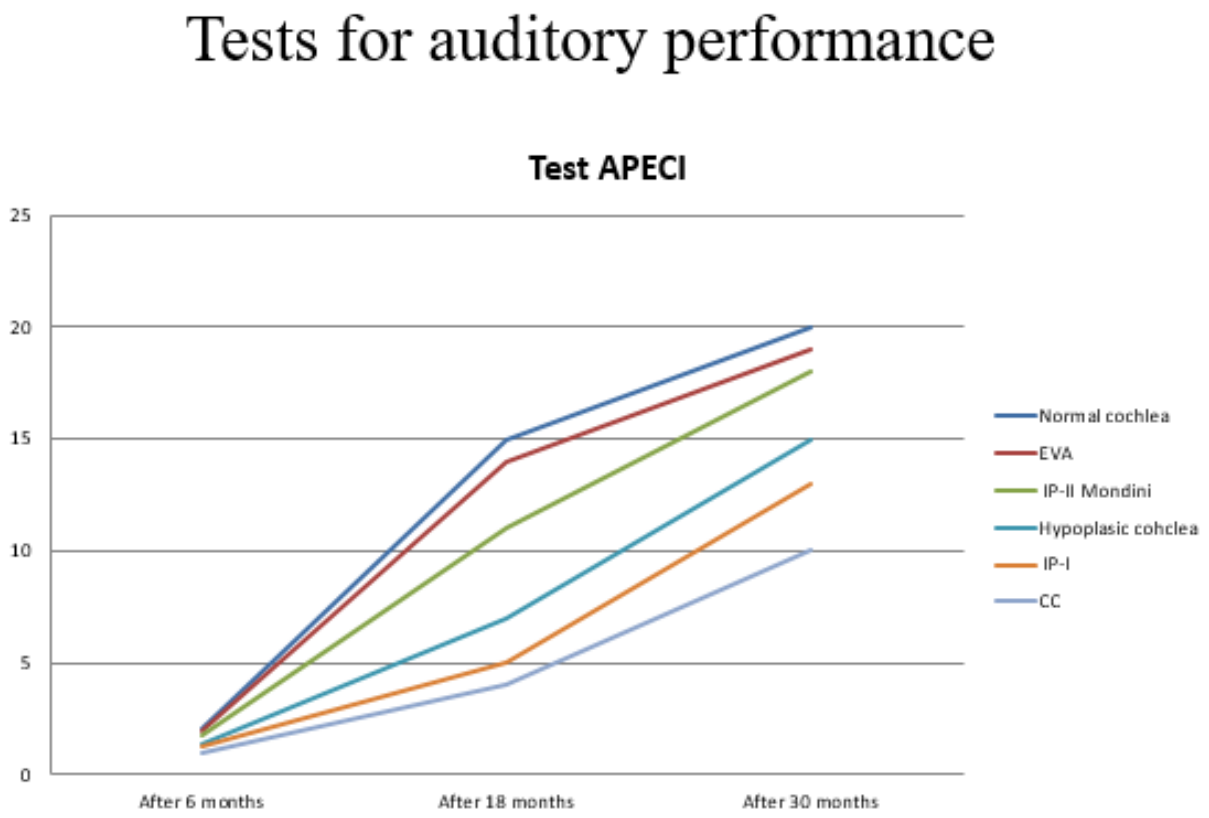
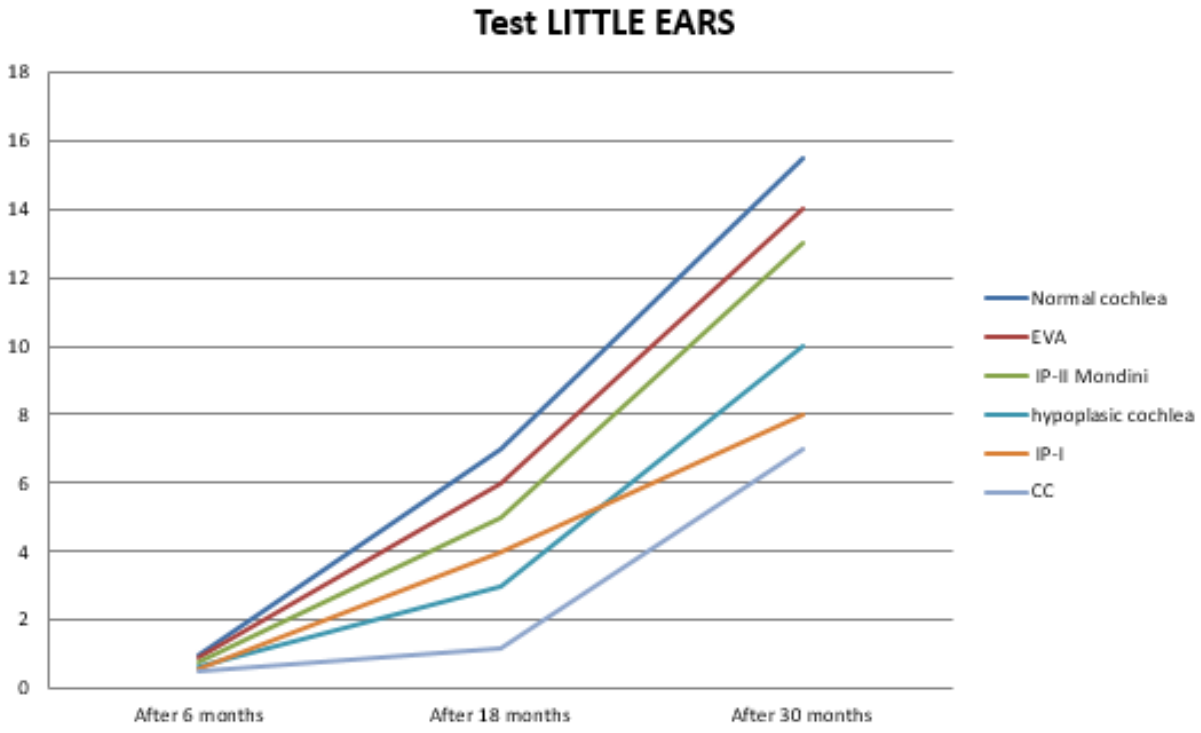


Fig 2 : description of the most inner ear malformations

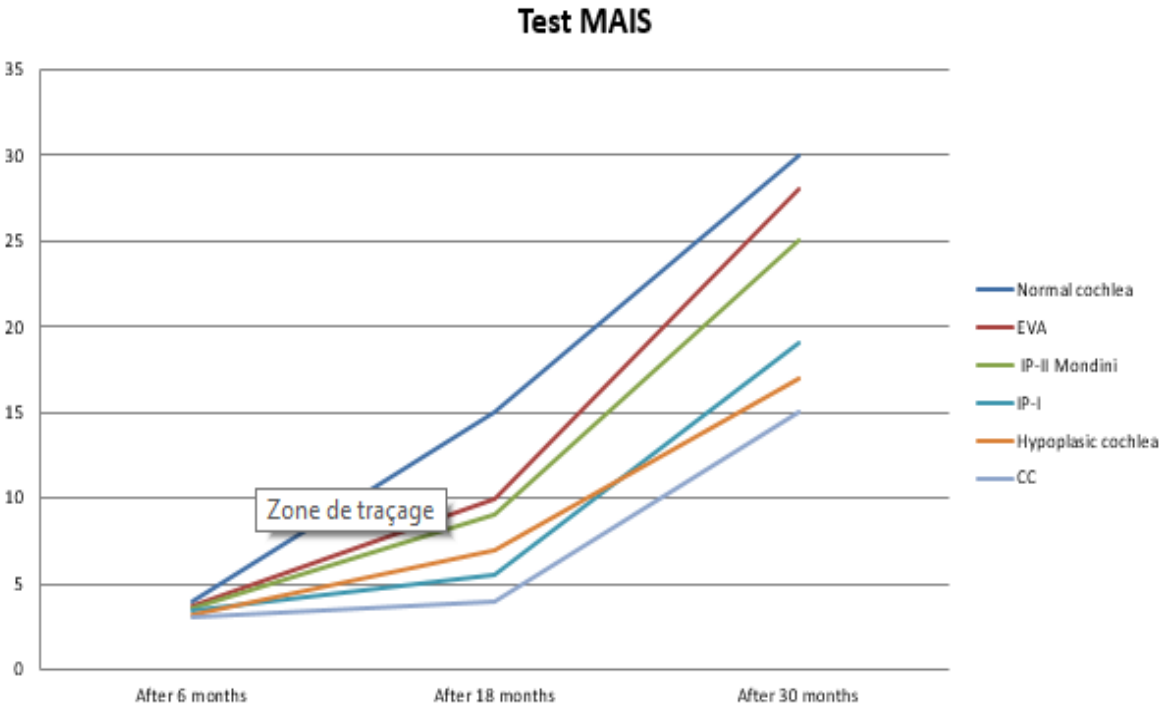


Open Access Original Article DOI : 10.70780/medpeer.000QGM7

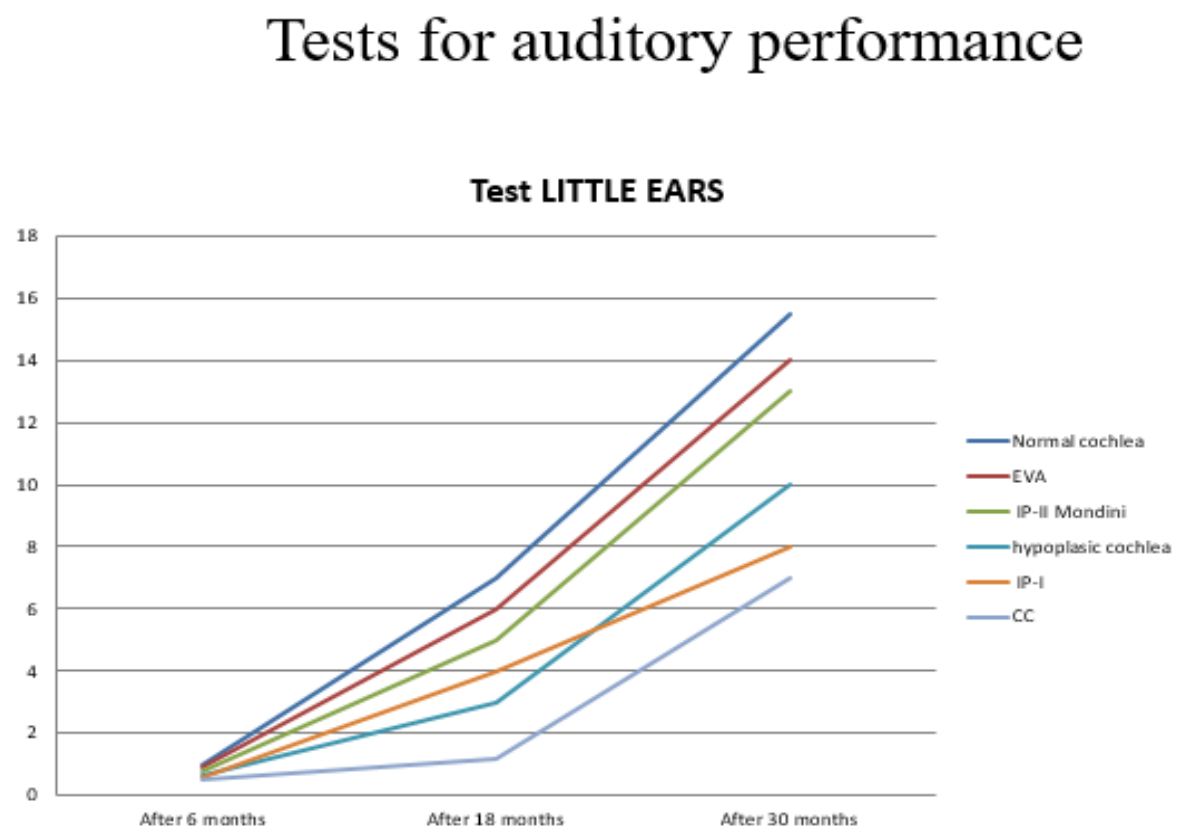
Tests for auditory performance



Tests for auditory performance



 DOI : 10.70780/medpeer.000QGM7



Figures 3,4,5,6 : The four tests to assess functional results after implantation in malformations of the inner ear

According to our results, patients with inner ear malformations can also benefit from cochlear implants and showed significant improvements in their communication skills, although their results were significantly less satisfactory than those of patients with normal cochlea. except in cases of minor malformations.

Discussion

It is possible to improve communication skills with cochlear implants in patients with inner ear malformations despite variations in postoperative performance. Patients with dilated vestibular aqueduct, incomplete partition type II, and hypoplastic cochlea performed best while those with common cavity, incomplete partition type I, and narrow internal ear canals performed worst in terms of hearing skills.

The indications for the cochlear implant have expanded since 1995. Most candidates for the implant are congenitally profoundly deaf children for whom the implant must be placed very early in order to optimize the development of perception. and language. The implant can

currently be discussed in certain specific cases, in children with associated pathologies, in cases of inner ear malformations or even severe or profound deafness [1,2].

Malformations of the inner ear represent approximately 20% of the etiologies of congenital sensorineural hearing loss [1]. Previously, inner ear malformations were considered contraindications to cochlear implantation; this is essentially due to histological bases proving the scarcity of nervous tissue in malformed ears. The first case of cochlear implantation in a malformed inner ear was reported in 1983 by Mangabeiria and Albernaz, but they discovered this malformation intraoperatively [3]. And since then, several patients with an inner ear malformation have been successfully implanted by numerous teams [1]. These malformations can be severe (unique vesicle, Mondini type malformation) or more moderate (dilation of the vestibule aqueduct) [4] .

Patients with relatively minor malformations such as dilatation of the vestibular aqueduct and incomplete Type II cochleae generally perform best, while those with common cavities, hypoplastic cochlea, and Type I partitioning show limited improvement. It is important to assess the severity of the deformation of the inner ear in order to identify problems that may complicate the surgery and hinder the subsequent management of the patient as it is imperative to respect the principle of precocity and multidisciplinarity of this long process of hearing rehabilitation [5] .

Conclusion

Patients with inner ear malformations were long deprived of the chance of having a cochlear implant. Currently, except those with a Michel malformation, these patients can benefit from this implantationPatients with relatively minor malformations such as dilated vestibular aqueduct and incomplete cochleae generally perform best, while those with common cavities, hypoplastic cochlea, and narrow internal ear canal show limited improvement.

Acknowledgements

All authors declare no conflict of interest

 DOI : 10.70780/medpeer.000QGM7

References

1. Sennaroglu L, Sarac S, Ergin T. Surgical results of cochlear implantation in malformed cochlea. Otol Neurotol. 2006; 27(5):615-23.
2. Loundon N, Rouillon I, Munier N, Marlin S, Roger G, Garabedian EN. Cochlear implantation in children with internal ear malformations. Otol Neurotol. 2005;26(4):668-73.
3. Weber BP, Dillo W, Dietrich B. Pediatric cochlear implantation in cochlear malformations. Am J Otol 1998; 19 :747- 53.
4. Monsell EM, Jackler RK, Motta G. Congenital malformations of the inner ear: histologic findings in five temporal bones. Laryngoscope 1987; 97:18- 24. 5.
5. Schmidt JM. Cochlear neuronal populations in developmental defects of the inner ear. Acta Otolaryngol (Stockh) 1985; 99:14-20.