Research

Post-cochlear impalant surgery challenges: 15-years experience at Cipto Mangunkusumo National General Hospital

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ABSTRACT

Background: Hearing loss is a significant but often overlooked disability, particularly in developing countries as Indonesia, where access to specialized care is still limited. **Purpose:** To review the 15-years experience of cochlear implantation services at Cipto Mangunkusumo National General Hospital. **Method:** A retrospective study of children aged 0–18 years with profound hearing loss who underwent cochlear implant surgery between 2009 and 2023. Data were collected from medical records, including patient demographics, surgical outcomes, and complications. **Result:** A total of 255 patients (318 ears) received cochlear implants, with the majority aged 3–5 years (37.6%), and 54.5% male. Unilateral implants were predominant (75.3%). In 2020, a 92% decline in surgeries was noted due to the COVID-19 pandemic, which led to the postponement of elective and non-urgent cases. Post-surgical complications occurred in 4.3% of patients, with facial nerve stimulation being the most common side effects (36.4%). **Conclusion:** Despite expanding services, there still some obstacles remained, including high costs, limited access to specialized care, and unequal distribution of skilled professionals. Addressing these challenges is crucial to improving patient outcomes, and ensuring the sustainability of cochlear implant programs in Indonesia.

Keywords: cochlear implant, developing countries, hearing loss, Indonesia

ABSTRAK

Latar belakang: *Gangguan pendengaran merupakan disabilitas yang signifikan namun seringkali terabaikan, terutama di negara berkembang seperti Indonesia, di mana akses ke perawatan khusus masih terbatas.* ***Tujuan:*** *Untuk meninjau pengalaman selama 15 tahun layanan implan koklea di Rumah Sakit Umum Pusat Nasional Cipto Mangunkusumo.* ***Metode:*** *Studi retrospektif pada anak-anak berusia 0–<18 tahun dengan gangguan pendengaran berat, yang menjalani operasi implan koklea antara tahun 2009 dan 2023. Data diperoleh dari rekam medis, mencakup demografi pasien, hasil operasi, dan komplikasi yang terjadi.* ***Hasil:*** *Sebanyak 255 pasien (318 telinga) menerima implan koklea, dengan mayoritas berusia 3–5 tahun (37,6%), dan 54,5% berjenis kelamin laki-laki. Implan unilateral mendominasi (75,3%). Pada tahun 2020, terjadi penurunan 92% dalam jumlah operasi akibat pandemi COVID-19, yang menyebabkan penundaan kasus elektif dan tidak* urgent*. Komplikasi pasca operasi terjadi pada 4,3% pasien, dengan stimulasi saraf wajah sebagai efek samping paling umum (36,4%).* ***Kesimpulan:*** *Meskipun layanan telah berkembang, hambatan masih ada, termasuk biaya yang tinggi, akses terbatas ke perawatan khusus, dan distribusi pakar ahli yang tidak merata. Mengatasi tantangan ini sangat penting untuk meningkatkan keberhasilan perbaikan pendengaran pasien, dan memastikan keberlanjutan program implan koklea di Indonesia.*

Kata kunci: *Implan koklea, negara berkembang, gangguan pendengaran, Indonesia*

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INTRODUCTION

Hearing loss is a significant yet often overlooked disability, especially in developing countries where access to medical care is limited.[1,2] Indonesia, an archipelagic nation with over 17,000 islands, faces unique challenges in addressing hearing impairment, particularly for children with profound sensorineural hearing loss. While cochlear implants (CI) have proven to be an effective tool for habilitation and rehabilitation, their implementation in Indonesia has encountered numerous obstacles. These barriers stem from the complexity of delivering specialized care across geographically dispersed regions, coupled with the need for substantial financial and logistical resources (Figure 1).[3,4]

Cipto Mangunkusumo National General Hospital (NGH), Indonesia's leading national referral center, began offering cochlear implantation services in 2009. Over the past 15 years, the hospital has played a key role in expanding access to cochlear implants, despite facing ongoing hurdles in resource availability and patient care. This paper aimed to provide a descriptive study of the hospital's 15-year experience in cochlear implantation, with a focus on the challenges encountered post-surgery, and the strategies employed to overcome them. By examining this evolution, this study sought to identify potential improvements for optimizing patient outcomes and enhancing the sustainability of cochlear implant programs in Indonesia.

Figure 1. Distribution of CI Centers in Indonesia
Black star represents Cipto Mangunkusumo Hospital CI center; Red star represent other CI centers

METHOD

This was a descriptive retrospective study involving children aged under 18 years old with profound hearing loss undergone cochlear implant surgery from 2009 to 2023 at Cipto Mangunkusumo NGH. The approval was obtained from the institution's ethical committee and from secured written informed consent from parents or legal guardian. The data collected from patients' medical record consisted of: (1) children under 18 years of age, (2) those who underwent unilateral or bilateral cochlear implant surgery, and (3) patients with complete pre- and post-surgical record. The data were organized onto showing the number of patients who underwent cochlear implant surgery each year, and a table displaying patient characteristics, including gender, implant side, age group, and post-surgical complications.

RESULT

Cochlear implantation care: Cipto Mangunkusumo GNH

Commencing in 2009, this center witnessed a remarkable increase in patients seeking cochlear implantation, soaring from two patients in 2009 to approximately 49 in 2016 (Figure 2). However, the trajectory was disrupted by the COVID-19 pandemic in 2020, resulting in a staggering 92% decline in annual patient numbers from 36 in 2019 to merely 3 in 2020.

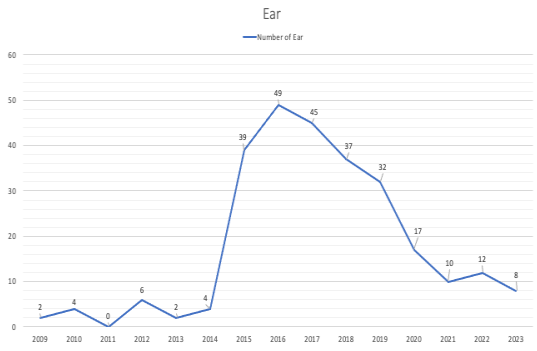

Figure 2. Number of ears underwent cochlear implantation

Cochlear implant patient characteristic in Cipto Mangunkusumo NGH

Over the course of 15 years (2009-2023), this center had catered 255 patients (318 ears) seeking cochlear implantation services (Tabel 1). Notably, a substantial majority of these patients fell within the age range of 3-5 years old (37.6%, approximately 54.5% were boys), and about two-thirds of the cochlear implants being unilateral (Table 1).

Table 1. Characteristic of cochlear implant patients

Characteristic (N=255)	N (%)
Gender	
Male	139 (54.5%)
Female	116 (45.5%)
Side of CI	
Unilateral	192 (75.3%)
Bilateral	63 (24.7%)
Age group (y)	
0-3	77 (30.2%)
>3-5	96 (37.6%)
>5	82 (32.2%)

Post surgical cochlear implant complication in Cipto Mangunkusumo NGH

Table 2 summarized the complication, in total there were 11 complications (4.3%) identified among the cochlear implant recipients. Hematoma or seroma accounted for 27.2% of the cases, while cochleovestibular complications made up 9.1%. Facial nerve stimulation was the most common side efect occurring in 36.4% of patients. Additionally, device migration was reported in 18.2% of patients, and device failure occurred in 9.1% of cases. These findings highlighted the range and frequency of post-surgical complications in cochlear implant patients.

Table 2. Complication in cochlear implant patient

Complication (N=11)	N (%)
Hematoma /seroma	3 (27.2%)
Cochleovestibular	1 (9.1%)
Device migration	4 (36.4%)
Device failure	2 (18.2%)
Facial nerve stimulation	1 (9.1%)

DISCUSSION

Over the past 15 years, Cipto Mangunkusumo NGH had experienced a substantial rise in the number of patients undergoing cochlear implantation, peaking in 2015. This trend reflected the growing recognition of cochlear implant as an effective intervention for children with profound sensorineural hearing loss.[5–7] However, the trajectory of cochlear implantations had been interrupted by various factors, particularly the COVID-19 pandemic.[8] During this period, several guidelines categorized otologic surgeries into four times frames: emergent, urgent, time-sensitive, and routine.

Cochlear implantation is classified as time-sensitive; therefore, the decision to postpone or proceed with such surgeries must balance the risks of delaying treatment against the potential exposure to COVID-19.[8,9] As a result, elective and non-urgent cases were postponed, leading to a dramatic 92% decline in the number of patients undergoing cochlear implantation in 2020. The pandemic was not only impacted surgical volume, but also underscored the fragility of healthcare services dependent on centralized facilities.

A key observation from this study was the demographic profile of cochlear implant recipients, where the majority were children aged 3-5 years, and most received unilateral implants. This might be due to the substantial financial burden associated with cochlear implantation, such as the cost of surgery, the price of devices, and follow up care which were often should be borne by the families, without significant governmental support.[10] This financial challenge highlighted the need for health policies that could offer financial relief to provide more accessible bilateral implants.

Post-surgical complication was identified in 4.3% of the patients, with facial nerves stimulation being the most common side effects, followed by hematoma, and seroma. These minor complications are typically transient

and self-limiting. Although infrequent, complications necessitate ongoing monitoring and management to ensure optimal patient outcomes. The importance of long-term follow-up care cannot be overstated, as issues may arise over time, potentially complicating the rehabilitation process.[11]

Geographic disparities in access to cochlear implant services also posed as a challenge. These services were predominantly concentrated on the islands of Java and Sumatra, leaving rural regions like Kalimantan and Sulawesi underserved. This imbalance was largely due to several shortcommings, including a lack of specialized human resources. In Java, the number of otorhinolaryngologists is relatively sufficient, with 873 specialists in DKI Jakarta and 207 in West Java.[12] However, a considerable disparity exists in other regions, such as Kalimantan, Sulawesi, and parts of Sumatra. While efforts have been made to train more otorhinolaryngologists in various regions, the distribution of qualified professionals remains uneven, with a significant concentration in Jakarta.[12] Additionally, there is a shortage of audiologists trained in cochlear implant mapping, especially in rural and remote areas.[13] The lack of auditory-verbal therapists further hinders the rehabilitation process for children with implants, often requiring greater parental involvement, or reliance on device importers for support.

Financial challenges remain a major obstacle, as cochlear implants are not covered by insurance or government programs in Indonesia. Families must bear the additional costs of pre-surgical care, devices, and postoperative care, creating a significant financial burden, especially for low-income households.[14] While solutions like remote mapping and virtual auditory-verbal therapy have been proposed to reduce costs, they face practical hurdles, including poor internet connectivity in remote areas.

Addressing these challenges of geographic disparities, financial burdens, and the shortage of specialized professionals, will be crucial for ensuring more equitable access to cochlear implant services. Collaborative efforts between healthcare providers and the government are essential to bridge these gaps and sustain the development of cochlear implant programs across Indonesia.[13] Long term monitoring and evaluation, decentralized care models, and enhanced family support will be the key to improve patient outcomes, particularly for those in remote or economically disadvantages areas.[13,15]

In conclusion, while Cipto Mangunkusumo NGH had made significant strides in expanding cochlear implant services over the past 15 years, several challenges remained. Addressing the barriers to human resources, financial acccessibility, facilities, and long-term monitoring will be crucial for optimizing patient outcomes. Future efforts should focus on improving national policies, exapanding access to care, and enhancing the sustainability of cochlear implant programs in Indonesia.

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