Cochlear Implant Surgery During the Covid Pandemic Lockdown—The KEM Hospital, Pune Experience

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Received: 27 August 2020 / Accepted: 21 September 2020 / Published online: 18 October 2020
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Abstract In response to the Covid 19 pandemic many governments and professional bodies recommended cancellation of elective surgeries including cochlear implantation. Resumption of elective surgeries was recommended after appropriate permissions were given by the authorities and the hospital had adequate infrastructure in terms of equipment and manpower to start elective surgeries without compromising on patient safety and care. We began cochlear implant surgeries in April 2020. We have done 5 cochlear implants surgeries till date. This manuscript discusses the changes that we did in our preoperative, intraoperative and postoperative protocol.

Keywords Covid 19 · Cochlear implant

Introduction

The novel coronavirus was declared a public health emergency of international concern (PHEIC) by the World Health Organization (WHO) on January 30, 2020 [1]. This COVID-19 pandemic demands the best disaster/mass casualty incident (MCI) response [2]. During pandemics preserving financial and human resources is crucial. A good organization and a preventive approach are mandatory in the phase of MCI response called mitigation. To minimize resource exhaustion, the use of surgical appliances and staff must be well pondered and balanced [3]. Resource usage should be carefully considered when planning scheduled procedures, particularly concerning materials, staff, devices, intensive care beds, blood components, etc.

During these difficult times, elective surgeries like cochlear implantation were put on hold to preserve resources. Most countries came up with recommended guidelines in March 2020 in which procedures were prioritized based on the risk versus benefit of performing the procedure during the pandemic. Cochlear implantation in prelingual children with sensorineural hearing loss was considered an elective procedure where a delay of up to 3 months was considered acceptable. In India, the Association of Otolaryngologists of India issued guidelines in April 2020 to avoid any elective procedure as per directives from the Government of India. The Cochlear Implant Group of India recommended that paediatric cochlear implantation should not be made to wait for more than three months. Emergency cochlear implantation was advised only for impending ossification in cases of post meningitis hearing loss.

In our city, Pune, the first case was identified in the first week of March 2020 and a lockdown was imposed from the second week of March 2020. During this period all non-emergency services were restricted. Patients were unable to travel to centres for either evaluation or continuation of habilitation or acquire accessories etc. needed for their devices. In the second week of April, the lockdown restrictions were eased. Our centre decided to schedule cochlear implant surgeries on some of our patients who were awaiting surgery for quite some time. We have implanted five children in the last three months. This manuscript discusses our preoperative and postoperative protocols and the intraoperative modifications done while performing cochlear implantation on these children.
Protocols

The protocols focussed on reducing the chances of acquiring the infection by minimising visits to the hospital, ensuring strict sterilisation measures in the operation theatre and, home quarantine after the surgery.

Pre Operative Protocols

All waiting patients were contacted telephonically and their residential addresses confirmed. Any patient residing in a containment zone (areas where the number of Covid positive patients is high) were asked not to visit the hospital till the situation improved in their area. The other patients were advised to visit the hospital to review their candidacy, vaccination status, preoperative investigations and meet the anaesthetic team for any concerns regarding the anaesthesia. The parents were specifically counselled regarding the need for Covid testing and the undertaking that they would have to sign on admission. Parents were informed that the admission process would take longer as the patient and the family will have to follow the protocols in place for any patient entering the hospital premises.

In addition to the routine preoperative investigation, all patients had to undergo Covid testing by the RT-PCR method 48hrs prior to the date of surgery. The hospital arranged for these to be done at centres outside the hospital or even at home to minimise the exposure of these children. A telephonic call was made to the family 24 h before to enquire whether the child had any symptoms of fever or upper respiratory infection. The patient was asked to get admitted only after confirmation of a negative covid status. All patients were advised to start gargles with dilute betadine 24 h before admission. The patient and family are instructed to wear a mask at all times in the hospital and that no visitors will be allowed.

The patient was admitted on the day of surgery to minimise hospital stay. On admission, an undertaking form and a screening form was filled irrespective of the covid status of the patient. The screening form focussed on the history of any relevant symptoms and the present address of the patient. A plain chest radiograph was taken of the patient on admission and reviewed by a Chest physician. The patient is then shifted to the allocated room.

Patient transit to and from the operation theatre is made as quickly as possible. A pre-defined direct path is kept as short as possible and away from other patients and people in general within the hospital to minimize the chances of infection. All patients wear a surgical mask, disposable waterproof gloves, disposable cap during transport. Transport operators sanitize hands before transfer and minimize contact with patients. Coded routes are followed and hospital public areas avoided.

Operating Area

Operating Room Preparation

Before the procedure the operating room is sprayed with lysoformin (10 ml lysoformin in 1000 ml of water) or 1% sodium hypochlorite (10 ml sodium hypochlorite in 1000 ml of water). Twenty minutes after spraying the equipment is wiped with lysoformin using a cotton cloth and the walls and floors are wiped with sodium hypochlorite. A contact time of 20 min is maintained after which personnel are permitted to enter.

The anaesthetic team is the first to enter the operation room. All personnel entering wear a FFP2 facial mask, disposable long sleeve waterproof coats, gowns, disposable double pair of gloves, protective goggles or visors, disposable head caps and disposable long shoe covers.

Anaesthesia

All our patients underwent cochlear implantation under general anesthesia. Recommended precautions were taken by the anesthetic team during induction and intubation.

Intraoperative

The surgical team including the scrub nurse entered the theatre after intubation to minimize the chances of infection.

The surgeon, assistant and scrub nurse wore a N95 mask and a surgical mask, Goggles or face shield, double gloves and, long leg covers in addition to the normal surgical gowns. Goggles or faceshield were removed by the surgeon while using the microscope. Minimal staff was kept in the operation theatre during the procedure and once the procedure started no one was allowed to leave or enter the theatre.

The preparation of the surgical area and draping were the same as before. To minimise the risk of aerosolization associated with bone drilling we used the Southampton double microscope cover technique (Fig. 1) for the entire surgery except the initial incision and elevation of flaps and closure of the incision. Intraoperative monitoring was done in all our patients to check the integrity of the implant system. The audiologist wore the same protective gear as other OT personnel and the equipment was wiped with lysoformin before entering the OT complex. At the end of the procedure all the disposable gowns, cover, gloves etc.
were discarded as per the recommendation of the Infectious disease committee of the hospital.

At the end of the surgery, after extubation, during the recovery phase, the patients were stabilised in the OR and transferred to the room directly to minimize contact between patients and the surrounding environment.

Postoperative Care

The patients were discharged within 24 h of admission. They were advised to be in home quarantine for the next 5 days. The patients were contacted telephonically during this period to enquire about the development of fever or any symptoms of an upper respiratory infection. The patients came for a postoperative visit to the hospital after 5 days for removal of the mastoid bandage and examination of the surgical site. They were then asked to contact the audiology team for subsequent switch on and therapy sessions.

For switch on and mapping audiologists as well as patients are asked to wear disposable masks and shields.

Therapy usually first session is carried out at our centre, patients parents are trained for further tele therapy sessions which can be carried out at their homes.

Discussion

In countries like India, early diagnosis and timely rehabilitation of children with hearing loss is a goal we are all trying to achieve. In most centres the average age of implantation is still above three years. Delaying surgery would further contribute to delayed auditory stimulation for a child with profound hearing loss. Also, cochlear implant surgery is preceded by a mammoth task of gathering funds by family or organisations as this surgery is still self funded in most parts of the country. In some states where the surgery is state or government sponsored there is an age limit for the funding i.e. funding will not be given to any child above a certain age. During the Covid pandemic delaying cochlear implantation for many children would have affected the outcomes in these children and in some surgery may not have been possible due to lack of funding.

The decision to proceed with the surgery was taken after detailed discussions with the parents and understanding the due risks. Many modifications in the preoperative, operative, and postoperative protocol were implemented to minimise the chances of infection to the patient and the parents (Table 1).

### Table 1 Preoperative, operative, postoperative protocols

| Preoperative | 1. Telephonic triage done |
|--------------|--------------------------|
|              | 2. Covid testing 48hrs prior to date of surgery |
|              | 3. Minimise visits to hospital for preoperative tests |
| Hospital and surgery | 1. Patient admitted for only 24 h |
|              | 2. Longer admission procedure |
|              | 3. Universal safety precautions followed by patient and hospital personnel |
|              | 4. OT sterilisation procedure changed |
|              | 5. All personnel wear protective gear |
|              | 6. Southampton double microscope cover technique used during drilling |
| Postoperative | 1. Patient discharged within 24 h |
|              | 2. Home quarantine for 5 days |

The surgical and audiological team had to modify their approaches to minimise the chances of aerosol dispersion.

We used the Southampton double microscope cover technique to reduce the amount of aerosolization [4]. In this technique other than usual sterile microscope cover, one more cover is used upside down from microscope lens to the operating site. The surgeons’ hands are inside the cover so that aerosol generation is reduced and it gets trapped inside the cover. Most of the steps are performed under the microscope with this double cover. This technique reduced the amount of aerosol generation. The amount of condensation trapped inside the cover is proof of the same. The technique, however, requires an assistant and scrub nurse well versed with the surgical steps and requirements of the surgeon as the instruments have to be passed below the cover. There was an increase in surgical time initially as this coordination was not easy. However, with successive surgeries, this coordination improved resulting in better surgical time.
Conclusion

The current COVID-19 pandemic underlines the importance of a mindful utilization of financial and human resources. Preserving resources and manpower is paramount in healthcare. A conscious effort should be made to minimize infection in this sector.

In our limited experience Cochlear implantation during these difficult times can be undertaken and safe provided measures and guidelines to prevent infection are implemented at every level.

Financial Support This research received no specific grant from any funding agency, commercial or not-for-profit sector.

Compliance with Ethical Standards

Conflict of interest All authors declare that they have no conflict of interest.

Disclaimer The authors do feel that given the small number of cases it is difficult to talk about the safety of this approach at this time.

Reference

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