

Migration of Cochlear Implants in Cochlear Implantation and its Effect on Implant Performance

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Cochlear implantation is a worldwide and safe surgical procedure. Although there is a spectrum of surgical options available, there is an ongoing discussion about certain surgical steps and different ways are in use. Improving the quality and decrease incidence of complication of this operation remains subject of many researches.

This study aimed to detect incidence of migration of any part of cochlear implant and effect of this migration on device performance. The study was conducted on one hundred and twenty patients collected from cochlear implantation program of Kasr EL Aini hospital, Cairo University and Wadi EL Neel hospital underwent the operation from 2008 till 2017 and were in their routine follow up in 2017. The results were compared with data published in the literature.

The surgical technique used to all study patients was a simple and secure method of cochlear implant fixation without any foreign body materials. The implant device was inserted in a bony bed that was drilled into the skull fitting exactly to the size and shape of the device and the electrode was implanted intra-cochlear without any fixation method and covered by fat.

All study patients were subjected to sequence audiological Neural Response Telemetry (NRT) and impedance to each electrode channel and compared with results that were recorded intraoperative. Also all patients were subjected to 2D and 3D reconstruction CT scan to detect the implant pocket, implant stability in its pocket and intra-cochlear electrode position.

All patients with detected implant migration were audiological assessed for implant performance to know the effect of this migration on this performance and to what extent re-implantation was necessary.

The results showed slight migration of the device over the edges of the drilled pocket in 9 cases (7.5%) and basal electrode extrusion outside the cochlea in 5 patients (4.1%).

Analysis of this study illustrated that migration might occur more than expected without symptoms and this migration occurred due to many factors related to the patient or to the implant itself.

According to the age, the study showed increased incidence of device migration during childhood period due to high incidence to trauma exposure during playing and high skull curvature of their skull. However electrode migration did not show direct relation to the age of implanted patients.

According to the time from operation, the mean follow-up of this study was (3.5 ±1.9) years which were relatively long when considering the expected life of a cochlear implant the study. Neither device nor electrode migration had direct relation to the time from operation. Moreover, the study suggested that electrode migration occurred early in first postoperative weeks.

Analysis of the main cause of migration showed that head trauma represented the main cause of device migration while many factors rather than trauma caused electrode migration.

High incidence of device migration was detected in Advance Bionic manufacture might be due to its thin anterior edge and its high profile in drilling its pocket. Also, high incidence of electrode migration was detected in straight arrays of Cochlear manufacture.

Both device and electrode migration detected in the study had no effect on device performance and there was no need for further intervention.

Stability of 91.7% of implanted devices in their drilled socket and about 96% of inserted electrode intra-cochlear proved that the surgical technique used in this study is a cost and time saving procedure for fixation of the device as there is no need for additional materials or complicated suture or screw fixations.

