

Postoperative CBCT imaging in case of a complication after MR imaging

© Prasun Dastidar, MD, PhD, Neuroradiologist, Tampere University Hospital Tampere, Finland

Jorma Järnstedt DDS, Specialist of dentomaxillofacial radiology,
Tampere University Hospital, Tampere, Finland

Janne Kääriäinen, MD, PhD, Specialist in ear, nose and throat diseases, ENT surgeon,
Special competence in diving and hyperbaric medicine,
Tampere University Hospital, Tampere, Finland

CASE STUDY

This case study describes two postoperative cases with cochlear implantation that showed complications in the processor part of the implant after undergoing magnetic resonance imaging (MRI) of other parts of the body.

Both of the patients were previously implanted with Nucleus Hybrid L24 cochlear implants. Patient # 1 was imaged with one Tesla MRI due to a problem arising in the right knee osteoarthritis and patient #2 was imaged also with one Tesla MRI due to a prolapse suspected at level L4-L5. A recommended safety belt was wrapped around the implant area to keep the magnetic part of the implant in its position before imaging of the patient.

During MRI imaging the patients felt problems and pain in temporal bone area, and the extra cochlear part of the implant was suspected to be deflected from its normal position.

Both patients were imaged immediately with CBCT using SCANORA® 3Dx (SOREDEX, Finland). The field of view (FOV) was 140 x 165 mm and voxel size 0.2 mm. Imaging parameters were 90 kV, 8 mA, 4.00s. Standard 1 mm axial, coronal and sagittal reformations were made, as well as MIP and 3D reconstructions using OnDemand3D™ software (Cybermed, South Korea).

CBCT proved to be optimal for imaging of these implants, because of the superior bony delineation and nearly artefact free images. All four parts, i.e. the receiver stimulation part, extracochlear electrode implanted on the surface of the temporal bone, the extracochlear electrode plate and the intracochlear electrode array could be well imaged with CBCT.

On CBCT all the four important parts of the implant were very well seen both on the axial slices and three dimensional surface reconstruction images. The implant is placed on magnetic plates, and the extracochlear part was seen in abnormal separated position. The intracochlear electrode array showed no signs of separation in neither of the cases. The intracochlear electrodes were well seen in both of the cases.

The optimal images of these two patients are shown below.

Both patients underwent minor operations where the separated posterior portion was pushed back into its normal position.

CASE STUDY

Conclusion

As a result, we recommend that after operation patients with cochlear implants should be imaged with CBCT and particularly, in case of suspected postoperative complications CBCT should be the imaging modality of choice. Because the radiation dose is so low compared to MDCT we recommend the use of CBCT instead of MDCT in these cases, and naturally a very careful fastening of a belt is preferred before MR imaging, if MRI is necessary at all.



Fig. 1 Patient #1: Sagittal oblique reformatted CBCT image showing the intracochlear portion of the implant.

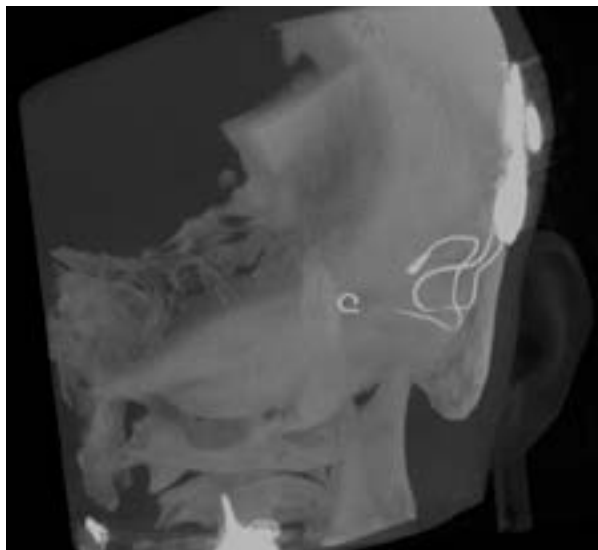


Fig. 2 3D MIP image of patient #1.

CASE STUDY



Fig. 3 3D reconstruction image of patient #1.

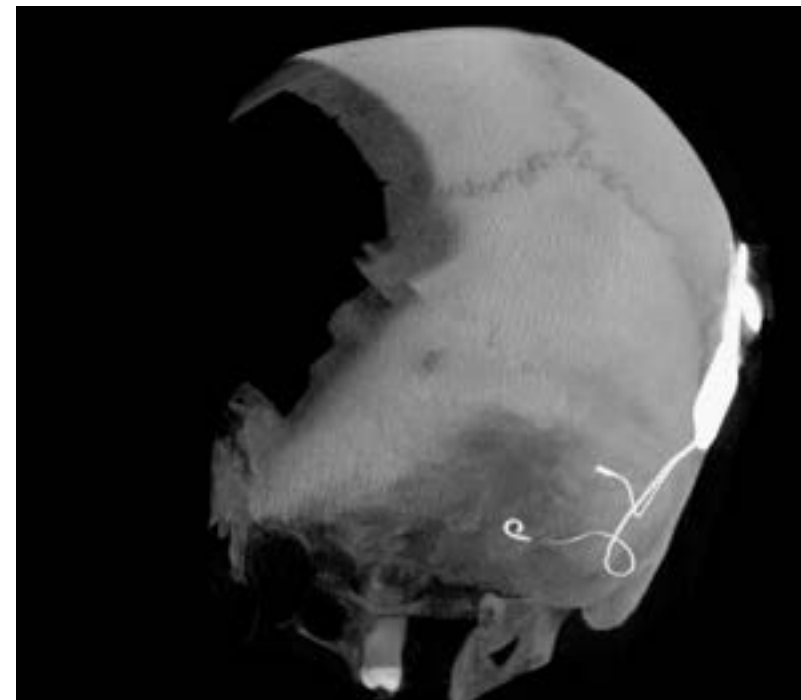


Fig. 4 3D MIP image of patient #2.

CASE STUDY



Fig. 5 3D reconstruction image of patient #2.



Fig. 6 Sagittal thick MIP image of the implant of patient #2.

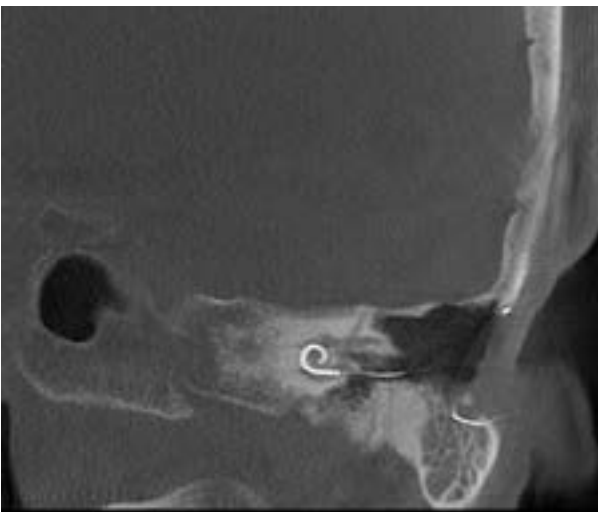


Fig. 7 Patient #2: sagittal oblique image of the intracochlear portion of the implant.