Portable Intraoperative CT Imaging for Temporal Bone Surgery

Brian D Nicholas MD, Patricia Loftus BS, Matthew S Clary MD, Jewel Greywood MD, Gregory J Arzt MD

Thomas Jefferson University, Dept of Otolaryngology – Neck and Head Surgery

ABSTRACT

INTRODUCTION

Complex image-guided rhinologic and anterior skull base surgeries. In our case, we used the scanner to confirm location within the petrous apex intraoperatively, as safe for use in lateral skull base surgery. The current designs are small in size and easily moved into position within the operating room. The actual well as to verify the completeness of the existing surgical dissection. This in addition to the need for intraoperative imaging technologies as there are times when real-time imaging modalities would be of significant benefit to the operating surgeon. The Xoran xCAT® volumetric scanner (Xoran Technologies, Ann Arbor, MI) has emerged as a means to provide head and neck intraoperative imaging for the management of complex temporal bone disease with a discussion of its impact on the future of lateral skull base surgery.

Methods

We present a novel application of portable volumetric CT imaging for the management of complex temporal bone disease. Image-guided surgery has been adopted with wide acceptance in rhinologic and anterior skullbase surgeries. Correspondingly, the limitations of static image acquisition technologies necessitated the development of viable intraoperative imaging technologies. Xoran xCAT® volumetric scanner has emerged as a means to provide head and neck surgeons with real-time data for complex cases. The use of this technology for lateral skull base surgery has for receiving implications for the future management of patients with temporal bone-based diseases.

CASE STUDY

DC is a 38 year old male with no prior otologic history who was treated with erythromycin for left otitis media. He had incomplete resolution of symptoms and a few days after completing the 2 week course of antibiotics he became lethargic and unresponsive. He was transported by ambulance to our institution for evaluation. CT imaging of the head and neck showed left otitis media, mastoiditis, and petrous apicitis with loss of bone architecture and extensive soft tissue expansion. These findings were consistent with bacterial meningitis. CT imaging led to the diagnosis of bacterial meningitis and resulted in a positive CSF culture. A lumbar tap was grossly positive for bacterial meningitis, which was thought to be secondary to the patient's severe acute mastoiditis. It was decided to take the patient to the operating room for resection of the diseased petrous apicitis and to help identify several opacified intracranial air cells that had not been accessed. The petrous apicitom was extended further medially, and complete surgical extirpation of all opacified areas was confirmed as well as the removal of the petrous apicitis and to help identify several opacified intracranial air cells that had not been accessed. The petrous apicitom was extended further medially, and complete surgical extirpation of all opacified areas was confirmed as well as the removal of the petrous apicitis.

Conclusions

We discuss the novel use of a portable volumetric CT scanner intraoperatively as a means to provide lateral skull base surgeons with real-time data for complex cases. The use of this technology for lateral skull base surgery has for receiving implications for the future management of patients with temporal bone-based diseases.

DISCUSSION

The portable intraoperative CT scanners were developed with the intent of aiding in complex image-guided rhinologic and anterior skull base surgeries. In our case, we were able to confirm location within the petrous apex intraoperatively, as safe for use in lateral skull base surgery. The current designs are small in size and easily moved into position within the operating room. The actual well as to verify the completeness of the existing surgical dissection. This in addition to the need for intraoperative imaging technologies as there are times when real-time imaging modalities would be of significant benefit to the operating surgeon. The Xoran xCAT® volumetric scanner (Xoran Technologies, Ann Arbor, MI) has emerged as a means to provide head and neck intraoperative imaging for the management of complex temporal bone disease with a discussion of its impact on the future of lateral skull base surgery.

REFERENCES

2. Rumboldt Z, Huda W, All JW. Review of Portable CT with Assessment of a Dedicated
4. Rummel MJ, Huda W, All JW. Review of Portable CT with Assessment of a Dedicated

CONCLUSIONS

The novel use of portable volumetric CT scanners intraoperatively as a means to provide lateral skull base surgeons with real-time data for complex cases. The use of this technology for lateral skull base surgery has for receiving implications for the future management of patients with temporal bone-based diseases. The future development will likely move us into the future as the type of applications, as well as the frequency of its use increases.