Learning Objectives: 1) To learn the importance of MRI diffusion in cholesteatoma followup 2) to understand how fusion of mastoid CT scan and MRI diffusion can localize precisely residual cholesteatoma.

Objective: To evaluate the ability of a preoperative mastoid Computerized tomography scan (CT scan) fusion with the postoperative diffusion weighted magnetic resonance imaging to accurately localize a residual cholesteatoma thus sparing an unnecessary postoperative CT scan radiation.

Study design: Prospective study

Setting: Tertiary care center.

Patients and methods: We followed up prospectively a consecutive group of patients presenting with middle ear cholesteatoma using preoperative mastoid CT scans, postoperative mastoid CT scan and diffusion weighted-MRI between 2008 and 2009.

Postoperative Diffusion Weighted-MRI images were fused to both: the preoperative and postoperative mastoid CT scans. Fused images were evaluated for their ability to detect accurately the location of residual cholesteatoma. If any, results were correlated to surgical findings.

Results: Twenty-seven patients were included in the study; only nine patients showed middle ear opacity on the postoperative CT scans; the remaining negative patients were excluded. Diffusion weighted MRI had detected residual cholesteatoma in 3 out of the nine patients. Both CT scans; preoperative and postoperative, were able to precisely localize the residual cholesteatoma when fused to the postoperative diffusion-weighted MRI. Intraoperatively, two patients had a residual cholesteatoma that correspond to the fused radiological images. The third was cholesteatoma free.

Conclusion: Diffusion weighted MRI / CT scan fusion combines the advantages of cholesteatoma detection and precise localization. Preoperative CT scan performed before the first surgery can be used for the fusion to spare the patient an unnecessary another CT scan and thus decreasing radiation exposure.

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Imaging for Cholesteatoma and ear structure (R676)

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How the use of CBCT and MRI has changed our management of cholesteatoma

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Cholesteatoma remains a clinical diagnosis but today imaging has become an important cornerstone in the diagnostic work-up of this condition. Conebeam CT offers a much higher resolution of the interface between bone, air and soft tissue, while the associated irradiation dose is substantially lower, as compared to multi-detector CT scans. As such, CBCT has become very useful for the pre-op work-up of patients with cholesteatoma showing with precision bony erosion of the ossicular chain and erosion of the petrous bone (as fistulae, perilymphine erosion, intracranial invasion). Also the aeration of the