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SHORT ABSTRACT

Temporal Bone Computed Tomography

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Keywords: temporal bone; CT; CBCT

Reporting temporal bone Computed Tomography (CT) examinations is challenging, with many minute structures in a small volume and a wide variety of eventual diseases to be recognized. Multislice CT and conebeam CT are used to visualize the temporal bone, and the results with both techniques are comparable.

Axial and coronal CT images are traditionally reconstructed to evaluate the temporal bone, and additional reconstructions in other planes are only occasionally made. The axial CT images are reconstructed in a plane parallel to the lateral/horizontal semicircular canal. The coronal images are reconstructed exactly perpendicular to the axial imaging set.

The obtained images should be viewed in a structured way, as follows:

On the axial images:

1. Evaluate the pneumatization and aeration of the mastoid (including the petrous apex) and middle ear.
2. Evaluate the external and middle ear by following the sound wave: external auditory canal, tympanic membrane, ossicular chain (malleus, incus, stapes), oval and round window, fissula antefenestram.
3. Evaluate the inner ear from cranially to caudally: semicircular canals, vestibule and vestibular aqueduct, cochlea.
4. Evaluate facial nerve canal, carotid canal, jugular fossa, and sigmoid plate.

On the coronal images:

5. Check at least if the scutum, tegmen tympani, and the bone covering the lateral semicircular canal are intact.

During this viewing process a wide variety of pathologies can be seen. The more frequent ones and some rare but typical anomalies are listed here:

On the axial images:

1. Mastoid and middle ear in general: normal or decreased pneumatization, well aerated or opacified mastoid/middle ear, combinations of both, mastoidectomy (canal wall up and canal wall down), coalescent mastoiditis.

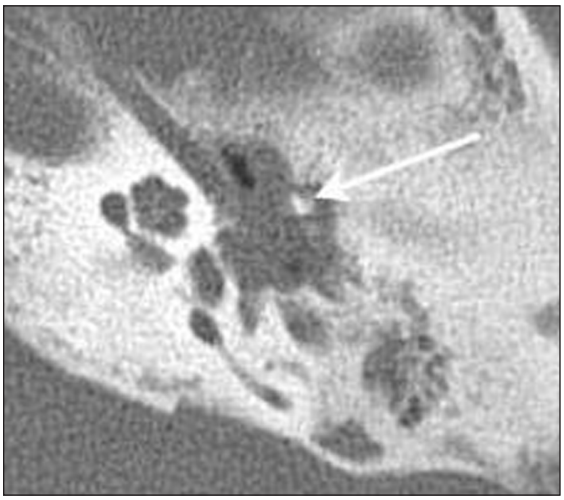

Figure 1: On this axial CT image of a temporal bone at the level of the oval window opacification of the tympanic cavity is seen, with complete erosion of the stapes and incus long process. The malleus neck is intact (white arrow): cholesteatoma with ossicular chain erosion.

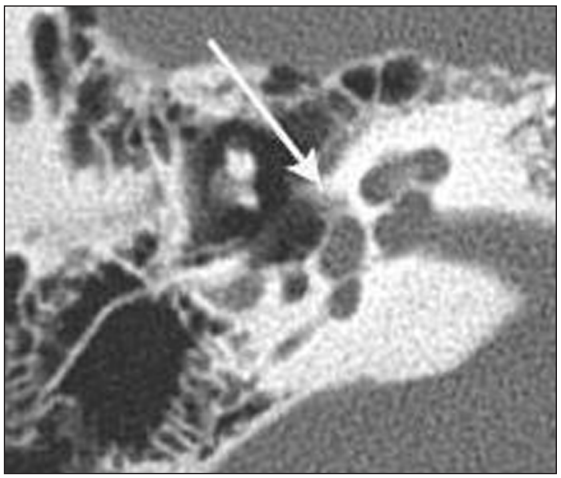

Figure 2: On this axial CT image of a temporal bone at the level of the oval window, the otic capsule appears hypodense in the region of the fissula antefenestram (white arrow): fenestral otosclerosis.

2. External and middle ear:
   a. External ear: canal stenosis or atresia, osteoma, exostosis.

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   b. Middle ear: tympanic membrane perforation, tympanostomy tubes, myringosclerosis, tympanosclerosis, new bone formation, ossicular chain dissociation, cholesteatoma with ossicular chain erosion (**Figure 1**), otosclerosis (**Figure 2**), congenital cholesteatoma, glomus tympanicum, postoperative findings (such as myringostapediopexy, incus inversion, prosthesis (PORP, TORP),...).
3. Inner ear: common cavity between vestibule and lateral semicircular canal, semicircular canal agenesis in the CHARGE association, superior semicircular canal dehiscence, enlarged vestibular aqueduct, cochlear anomalies (e.g. dysplasia with modiolar deficiency), ossifying labyrinthitis.
4. Facial nerve canal, carotid canal, jugular fossa, and sigmoid plate: dehiscent facial nerve canal, aberrant carotid artery, high riding jugular bulb, dehiscent jugular bulb, glomus jugulare, glomus jugulotympanicum.

On the coronal images:

5. Scutum, tegmen tympani and the bone covering the lateral semicircular canal: can be eroded in case of cholesteatoma.

Competing Interests

The author has no competing interests to declare.

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