# 3 Pathology of the Temporal Bone

## Pathology of the External Auditory Canal

### Inclusion Cholesteatoma and Atresia of the External Auditory Canal

#### **Differential Diagnosis**

- Any benign mass in the region of the external auditory canal, post-traumatic cholesteatoma of the external auditory canal, or cholesteatoma due to secondary stenosis of the external auditory canal as a result of chronic cicatrizing external otitis or bony stenosis due to fibrous dysplasia or exostosis in the lateral part of the external auditory canal.
- Aural atresia is often related to syndromes such as Treacher Collins, Crouzon, Nager, Goldenhar, Klippel–Feil, and Pierre Robin.

#### Points of Evaluation

- Expansion toward and/or destruction of the temporomandibular joint and toward the middle ear structures, abscess formation, and osteomyelitis and (intracranial) spread of infection.
- In case of aural atresia (first branchial groove anomaly), other dysmorphic features may be present too, especially in case of syndromal comorbidity.
- Particular attention needs to be paid to:
  - the appearance of the middle ear cavity and mastoid pneumatization
  - signs of ankylosis or malformation of the ossicular chain
  - presence of inner ear deformities, the round and oval windows and the vestibular aqueduct
  - aberrations in the anterior and/or lateral course of the facial nerve, which may complicate surgery.



Fig. 3.1 a-c Patient with Treacher Collins syndrome and purulent discharge from a pinpoint external auditory canal.

**a CT**, **axial**. Expanding, round, smooth-bordered lesion (1) in the cranial part of the mastoid with partial destruction of the cortex (2). The head of the malleus is possibly dysmorphic and ankylotic (3). Note the geniculate ganglion (4) with a clearly visible greater petrosal nerve canal anteriorly. The vestibule and horizontal semicircular canal (5) are normal.



**b CT**, **axial**. More caudally, osseous atresia of the external auditory canal is observed with osseous occlusion (1). The mastoid is not pneumatized (2). Lateral to the atresia is an expanding mass (3), suggestive of inclusion cholesteatoma, filling the meatus. The cochlea (4) and internal auditory canal (5) show normal features.



Fig. 3.1c

**c CT**, **axial**. On a lower slice, a narrowed and endingobstructed meatus is observed (1), as well as an expansile mass (2) near the temporomandibular joint (3) without signs of destruction. The slice is taken at the level of the basal cochlear turn (4) and of the roof a high jugular bulb (5).

#### Exostoses of the External Auditory Canal

#### **Differential Diagnosis**

- Exostoses are frequently multiple and bilateral.
- An osteoma of the external auditory canal is most often unilateral, isolated, and round in shape.
- Fibrous dysplasia has a specific appearance on computed tomography (CT) and typically is not limited to the external auditory canal (see also "Fibrous Dysplasia" [1] and [2]).
- Clinically, exostoses can be easily differentiated from soft-tissue tumors by palpation.

#### Points of Evaluation

- In patients with aural discharge, chronic otitis may be the result of infected epithelial stasis.
- In cases with a narrowed orifice and meatus, a meatoplasty might be considered for better aeration and cleaning options. Furthermore, CT might be reassuring, showing a normal aerated middle ear.



Fig. 3.2 a Patient referred by his general practitioner because of abnormalities in the outer ear canal.

**a CT**, **axial**. Small exostoses are visualized in the roof of the external auditory canal near the annulus (1), and a larger one laterally on the floor of the meatus (2). Although some accumulation of cerumen (3) is present, hearing did not seem to be compromised, and there was no discharge. Also clearly seen are the basal cochlear turn (4), vestibule (5), and horizontal (6) and anterior (7) semicircular canals.



Fig. 3.2 b Another patient with more extensive exostoses.

**b CT**, **axial**. Only a small lumen remains (1), with accumulation of cerumen or epithelium more medially (2) with a high risk of impaction and development of an inclusion cholesteatoma. Note the internal carotid artery (3), indicating the caudal orientation of this slice.

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