AMSER Case of the Month January 2025

65 y/o M with incidentally discovered right external auditory canal mass on MRI brain

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Patient Presentation

- HPI: Patient presents to clinic upon referral for incidentally discovered 2 cm R external auditory canal (EAC) mass on MRI brain. Asymptomatic.
- PMHx: Bilateral sensorineural hearing loss, asymmetric; bilateral tinnitus
- PSHx: Noncontributory
- FHx: Noncontributory
- Physical Exam:
  - Medium size masses in bilateral EACs
  - Tympanic membranes intact and normal bilaterally
  - Pinnae normal in shape and position bilaterally

What Imaging Should We Order?

Select the applicable ACR Appropriateness Criteria

Variant 2: **Acquired conductive hearing loss secondary to cholesteatoma or neoplasm with suspected intracranial or inner ear extension. Surgical planning.**

Procedure	Appropriateness Category	Relative Radiation Level
CT temporal bone without IV contrast	Usually Appropriate	☢☢☢
MRI head and internal auditory canal without and with IV contrast	Usually Appropriate	O
MRI head and internal auditory canal without IV contrast	May Be Appropriate	O
CT temporal bone with IV contrast	May Be Appropriate	☢☢☢
CTA head with IV contrast	May Be Appropriate (Disagreement)	☢☢☢
CT head with IV contrast	Usually Not Appropriate	☢☢☢
CT head without and with IV contrast	Usually Not Appropriate	☢☢☢
CT head without IV contrast	Usually Not Appropriate	☢☢☢
CT temporal bone without and with IV contrast	Usually Not Appropriate	☢☢☢
MR venography head with IV contrast	Usually Not Appropriate	O
MR venography head without IV contrast	Usually Not Appropriate	O
MRA head without and with IV contrast	Usually Not Appropriate	O
MRA head without IV contrast	Usually Not Appropriate	O

This imaging modality was ordered by the physician

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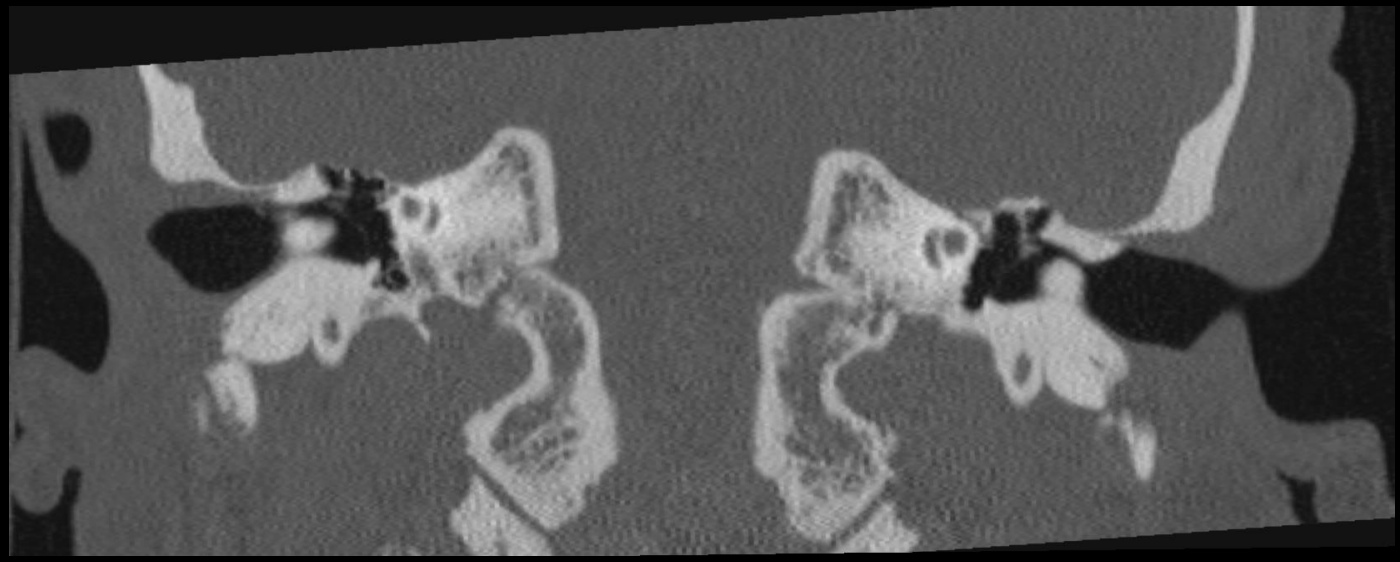
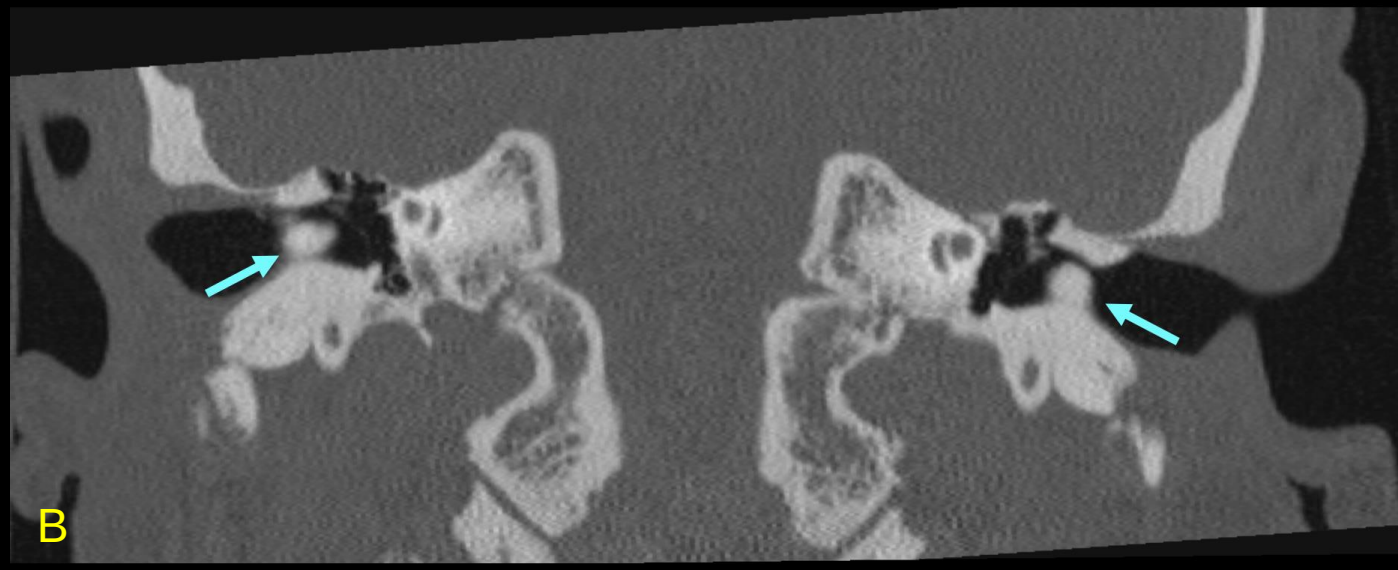
Findings (unlabeled)



Findings: (labeled)



A) Axial and B) coronal non-contrast CT of the temporal bones showing smooth, bony overgrowth of the left and right external auditory canal walls, resulting in narrowing of EACs

Findings: (labeled)

3D volumetric rendering of CT temporal bone data, windowed to show bone, showing osseous thickening of the left external auditory canal resulting in luminal narrowing

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Final Dx:

External Auditory Exostoses (“Surfer’s Ear”)

Case Discussion

- Etiology: Chronic cold-water exposure in the EACs causing benign bone outgrowths
- Pathophysiology: Exact mechanism not confirmed. Hypothesized that cold water exposure induces vasodilation in bony auditory meatus, causing increased vascular tension. Inflammation stimulates osteoblastic activity, followed by fibrosis, ossification, and new bone growth.
  - The tympanic ring is the pathologic location for the formation of exostoses due to the lack of insulating subcutaneous tissue between the very thin stratified squamous epithelium and underlying periosteum of the temporal bone. This allows for bone growth to extend into the EAC.

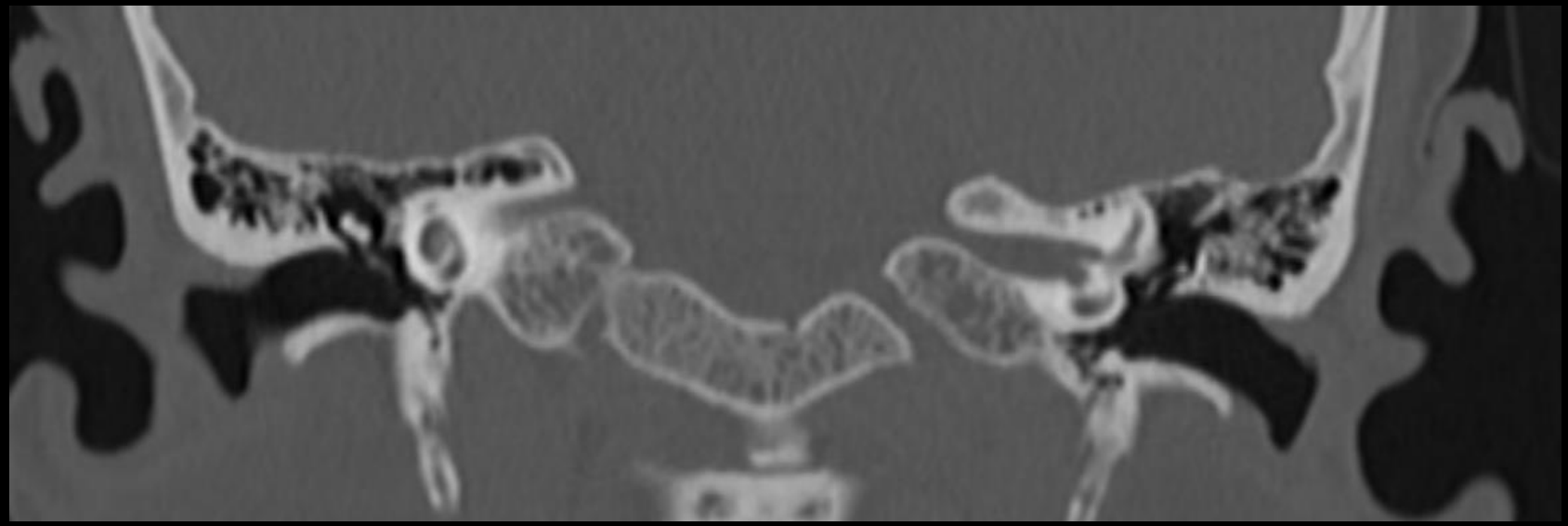
Case Discussion

- Epidemiology:
  - Most commonly seen in surfers (prevalence 26-73%). May also be seen in swimmers, divers, and participants of cold-water sports
  - More prevalent in coastal regions, especially areas with colder water temperatures and cooler climate
  - Direct relationship between cold water temperature and duration of exposure and severity of exostoses
  - Most commonly presents in 3rd and 4th decade of life
  - M>F

Case Discussion

- Clinical Presentation: Most commonly asymptomatic. Severe disease may cause conductive hearing loss, aural fullness, otorrhea, chronic otitis externa, or sensation of water trapped in ears.
- Diagnosis:
  - Clinical diagnosis
  - DDx: Osteomas, keratosis obturans, aural polyps, cholesteatomas, tumors
- Imaging:
  - Not necessary for every patient. CT temporal bone w/o IV contrast may be used for further evaluation, often for pre-operative planning.
  - CT temporal bone shows broad-based bony overgrowth in EACs

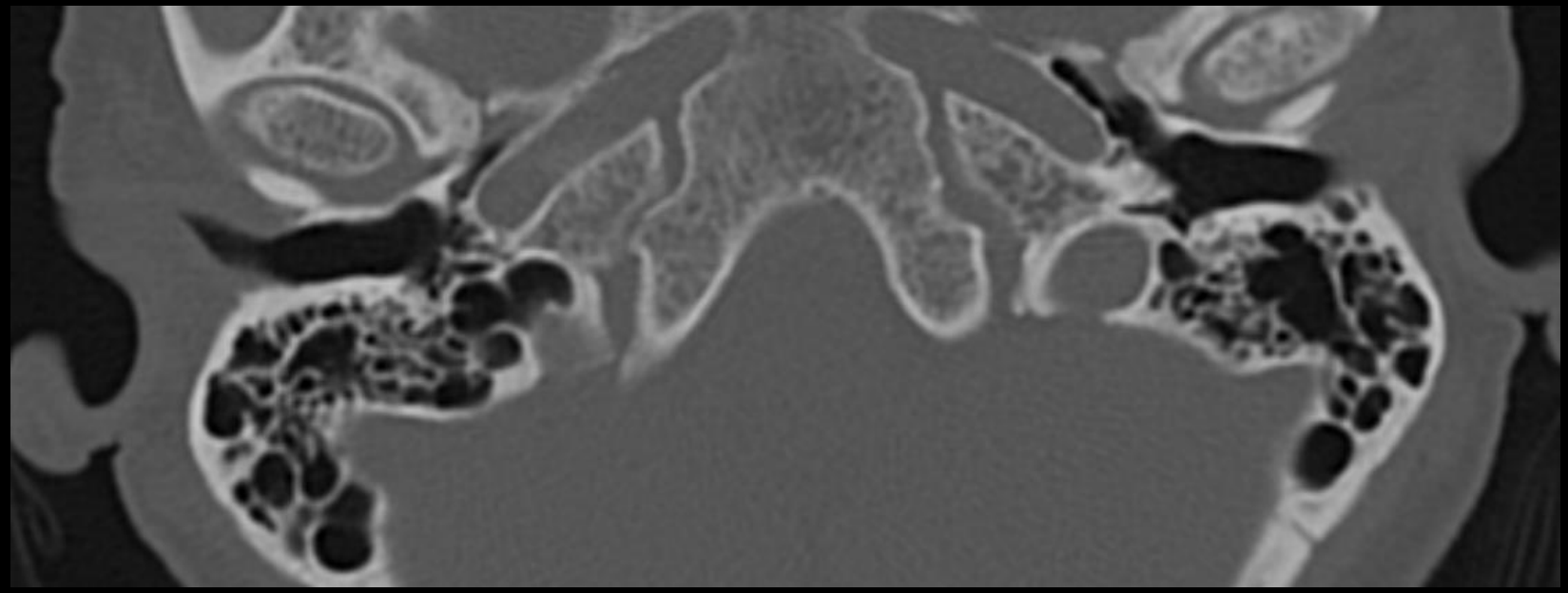
Normal



Coronal CT Temporal bone

Surfer's Ear

Normal



Axial CT
Temporal
bone

Surfer's Ear

Case Discussion

- Management:
  - Asymptomatic/mild or moderate disease: observation; conservative measures to prevent complications (e.g., regular cleaning of EACs to prevent recurrent otitis externa or conductive hearing loss)
  - Severe disease: Canalplasty

References:

- Kroon DF, Lawson ML, Derkay CS, Hoffmann K, McCook J. Surfer's ear: external auditory exostoses are more prevalent in cold water surfers. *Otolaryngol Head Neck Surg*. 2002;126(5):499-504. doi:10.1067/mhn.2002.124474
- Landefeld K, Bart RM, Lau H, Cooper JS. Surfer's Ear. In: *StatPearls*. Treasure Island (FL): StatPearls Publishing; April 30, 2023.
- Vallée A. External auditory exostosis among surfers: a comprehensive and systematic review. *Eur Arch Otorhinolaryngol*. 2024;281(2):573-578. doi:10.1007/s00405-023-08258-5