A Rare Case of Lateral Skull-Base Esthesioneuroblastoma Metastasis

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Abstract

Esthesioneuroblastoma (ENB) is a rare sinonasal malignancy with predominantly locoregional recurrence. We report a case of delayed, isolated temporal bone metastasis occurring five years after definitive treatment of anterior skull base ENB, initially mimicking a dural-based meningioma. This case expands the known metastatic patterns of ENG and highlights the need for prolonged surveillance and awareness of atypical skull-base involvement.

Background

Esthesioneuroblastoma (ENB), also known as olfactory neuroblastoma, is a rare malignancy arising from the olfactory epithelium and accounts for less than 5% of sinonasal neoplasms. Since its initial description by Berger et al. in 1924, ENB has been recognized to exhibit highly variable clinical behavior, ranging from indolent tumors to aggressive disease with reported recurrence rates approaching 40%. Most recurrences occur within five years of initial treatment and typically involve locoregional sites along the anterior skull base. In contrast, distant or atypical metastatic patterns remain poorly described, limiting guidance on long-term surveillance strategies.

Case Presentation

A 67-year-old man presented with right-sided nasal obstruction and was diagnosed with Hyams grade II esthesioneuroblastoma centered at the olfactory cleft. He underwent surgical resection followed by adjuvant radiation and remained disease-free on surveillance for five years. Routine imaging identified a stable right temporal dural-based lesion presumed to be a meningioma. He later developed progressive headaches, ear fullness, and sensorineural hearing loss. Imaging demonstrated rapid growth with invasion of the mastoid and petrous temporal bone. Resection via combined transpetrosal and infratemporal fossa approach revealed metastatic Hams grade III esthesioneuroblastoma. He underwent adjuvant proton therapy and remains disease-free at 18-month follow-up

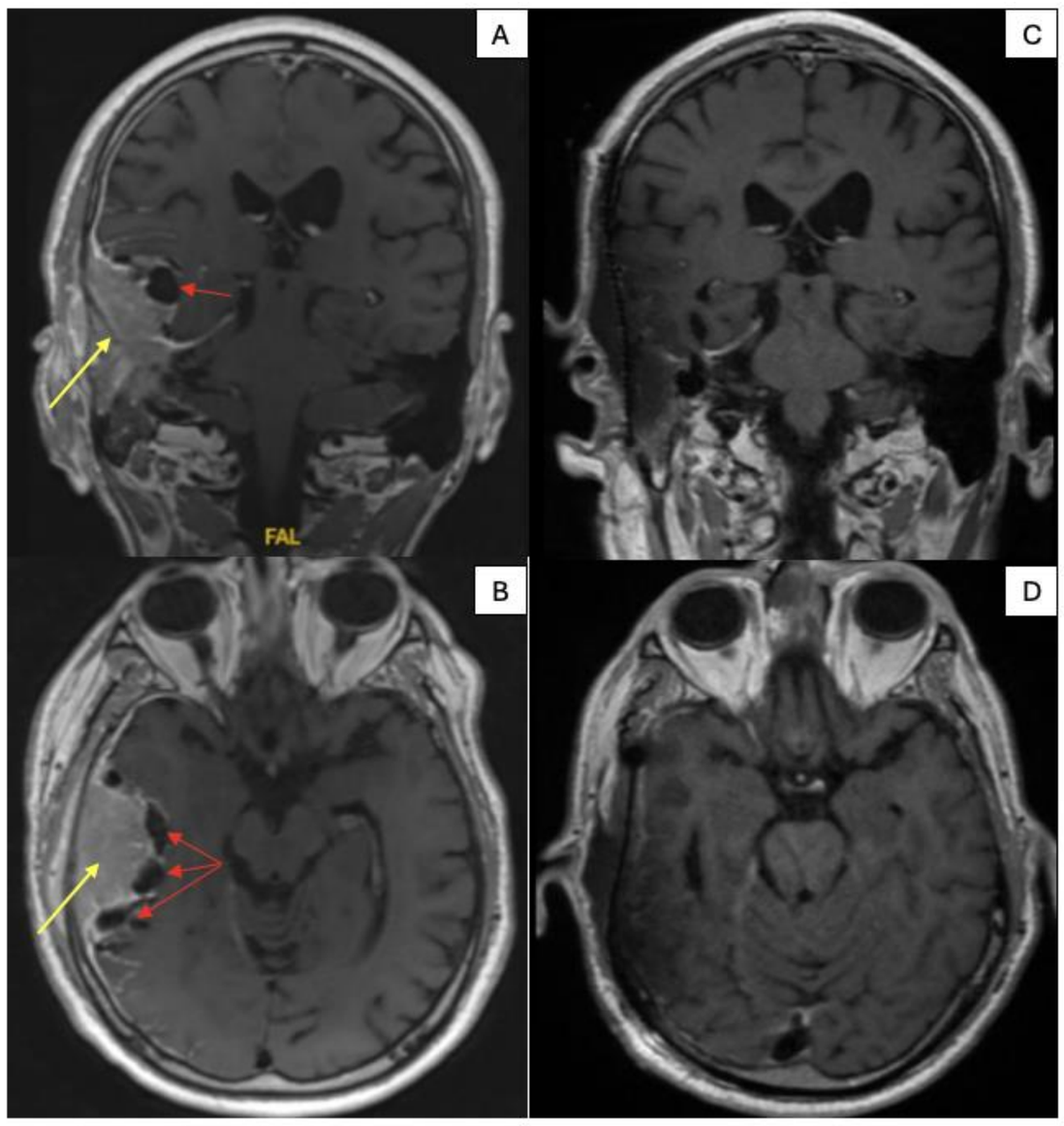

Figure 1: Preoperative (A: coronal, B: axial) T1-weighted post-contrast MRI shows a 5.5 cm homogeneously enhancing dural-based mass along the right temporal convexity (yellow arrows), with mass effect on the underlying temporal lobe, associated cystic changes at the brain-tumor interface (red arrows), and extension into the right temporal bone including mastoid air cells. 1 day-postoperative MRI (C: coronal, D: axial) demonstrates expected postsurgical changes, including a resection cavity with linear dural enhancement and no residual nodular or mass-like enhancement.

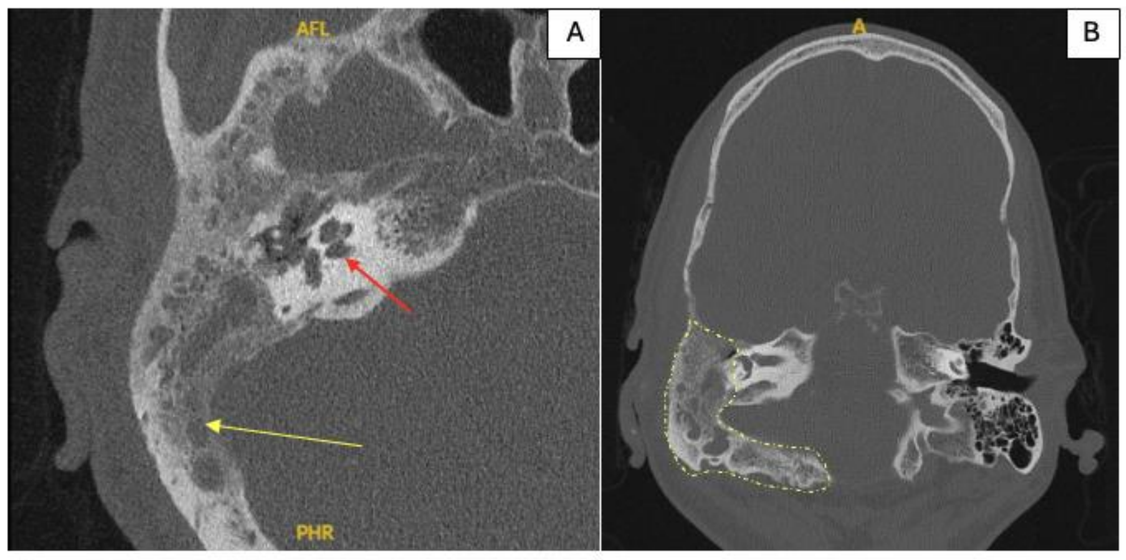

Figure 2. Axial CT images of the temporal bones show extensive opacification of the right mastoid air cells and middle ear cavity (yellow dashed outline), without definite erosion of mastoid trabeculae or ossicles. A zoomed-in view of the right temporal bone (A) and a bilateral comparison (B) both demonstrate heterogeneous marrow attenuation along the right temporal-occipital calvarium in the region of the known soft tissue mass, concerning for possible marrow infiltration (yellow arrow). Red arrow indicates location of the cochlea for orientation.

Discussion and Conclusion

This case demonstrates a rare recurrence of esthesioneuroblastoma (ENB) as an isolated temporal bone metastasis five years after definitive treatment of a primary anterior skull base tumor. The lack of direct anatomic continuity with the original sinonasal site and the prolonged disease-free interval strongly suggest hematogenous spread rather than local extension. Early imaging mimicked a dural-based meningioma, underscoring the diagnostic challenge of ENB recurrence outside its typical distribution.

Progression with temporal bone invasion required a combined transpetrosal and infratemporal fossa approach with middle cranial fossa dural resection, highlighting the surgical complexity of lateral skull base involvement. This case broadens the recognized metastatic potential of ENB and reinforces the need for sustained vigilance and indefinite surveillance beyond five years, particularly in patients with previously treated high-risk sinonasal malignancies.

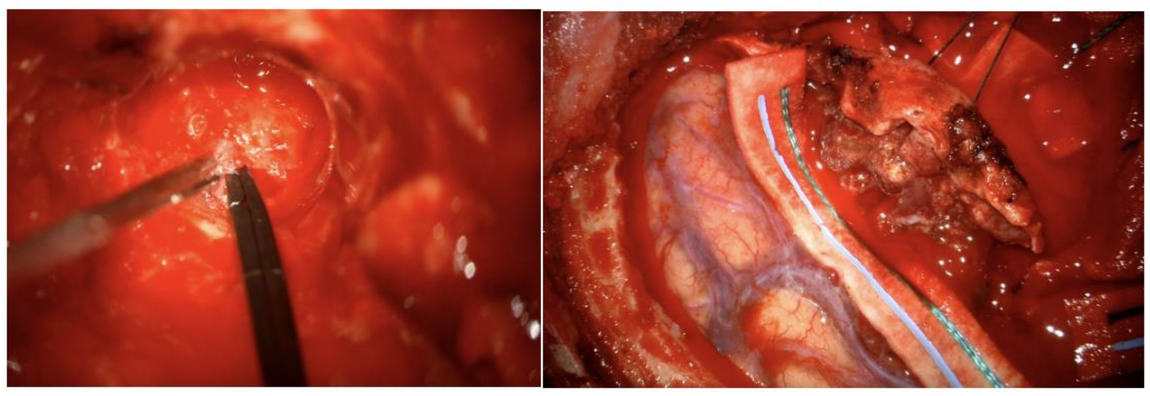

Figure 3. Left: Transcanal middle ear view after canal wall removal showing the promontory (right), stapes, and tumor removal from the sinus tympani between the oval and round windows. **Right**: Temporal lobe exposure with dural retraction (sutures) revealing tumor between the dura and temporal lobe; mastoid oriented toward the sutures.

Take Away Points

- Esthesioneuroblastoma may demonstrate delayed, atypical metastatic spread to the lateral skull base
- Dural-based temporal bone lesions in ENB patients should raise suspicion for metastatic disease
- Indefinite surveillance beyond five years is critical for early detection of uncommon recurrence patterns

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