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Epidermoid Cyst of the Cerebellopontine Angle: A Case Report and Review of the Literature

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Abstract **Case Report**

***Introduction*:** Epidermoid cysts of the cerebellopontine angle (CPA) are rare congenital lesions accounting for approximately 2% of primary intracranial tumors. Their insidious growth may cause significant neurological deficits due to mass effect on adjacent cranial nerves and brain structures. ***Case Presentation*:** We report a case of a 32-year-old woman referred for persistent headaches and balance disturbances. Initial MRI at an external institution raised suspicion of a CPA lesion. Confirmatory imaging at our facility showed a non-enhancing lesion with restricted diffusion in the left mesiotemporal region. The patient underwent combined frontotemporal and subtemporal craniectomy with amygdalohippocampectomy. Pathological examination confirmed an epidermoid cyst. Postoperative recovery was unremarkable. ***Discussion*:** MRI plays a pivotal role in diagnosing epidermoid cysts, especially diffusion-weighted imaging (DWI) and FLAIR sequences. Surgical resection is the mainstay of treatment, with total excision preferred but often limited by adherence to neurovascular structures. Subtotal resection followed by imaging surveillance remains a valid approach. ***Conclusion*:** CPA epidermoid cysts should be considered in the differential diagnosis of lesions in the posterior fossa or mesiotemporal area. Early diagnosis and individualized surgical planning are key for optimal outcomes.

Keywords: Epidermoid Cyst, Cerebellopontine Angle, Diffusion-Weighted Imaging, Skull Base Surgery, Amygdalohippocampectomy, MRI.

INTRODUCTION

Epidermoid cysts, also known as primary cholesteatomas or 'pearly tumors of Cruveilhier', are rare benign intracranial lesions originating from ectodermal inclusions during neural tube closure. The CPA is the most common location, representing 40–50% of reported cases. These cysts often grow silently and may only become symptomatic once they exert mass effect on cranial nerves or brainstem structures.

CASE REPORT

A 32-year-old female was referred for evaluation of chronic headaches and balance disturbances. Initial imaging performed at another center suggested a CPA lesion. MRI at our institution confirmed a non-enhancing, T1 hypointense, T2 hyperintense lesion with heterogeneous hyperintensity on FLAIR and marked restricted diffusion on DWI, suggestive of an epidermoid cyst. **Figure 1**

Surgical intervention was performed via a combined frontotemporal and extended subtemporal craniectomy, exposing a whitish, friable lesion adherent to the amygdalohippocampal region. An amygdalohippocampectomy was carried out, and the lesion was successfully resected. Postoperative recovery was uneventful.

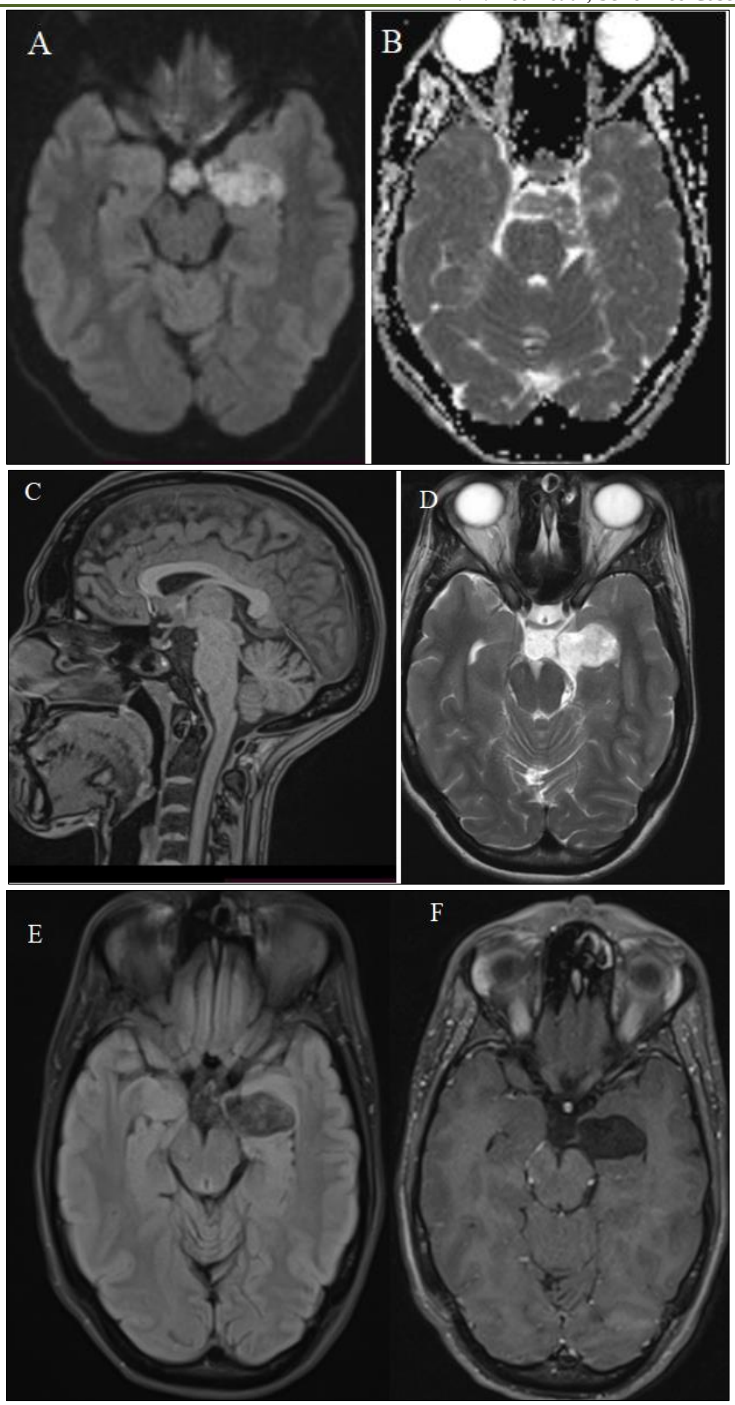

Figure 1: MRI features of a left temporal epidermoid cyst involving the mesial temporal lobe and extending toward the cerebellopontine angle

- **A.** Axial diffusion-weighted imaging (DWI) demonstrates a hyperintense lesion in the left mesiotemporal region, indicating restricted diffusion characteristic of an epidermoid cyst.
- **B.** Apparent diffusion coefficient (ADC) map confirms low ADC values corresponding to the DWI hyperintensity, consistent with true restricted diffusion.
- **C.** Sagittal T1-weighted image shows a hypointense lesion located in the left ambient cistern and posterior mesiotemporal area, compressing adjacent structures without contrast enhancement.
- **D.** Axial T2-weighted image reveals a hyperintense, heterogenous, non-enhancing lesion within the left mesial temporal lobe and ambient cistern, compatible with an epidermoid cyst.
- **E.** Axial FLAIR sequence showing heterogeneous high signal intensity without surrounding edema.
- **F.** Axial post-contrast T1-weighted image showing no enhancement of the lesion, consistent with the avascular nature of epidermoid cysts.

DISCUSSION

Imaging Characteristics

Magnetic resonance imaging (MRI) is the modality of choice for diagnosing epidermoid cysts. These lesions typically appear hypointense on T1-weighted images and hyperintense on T2-weighted images. A hallmark feature is the high signal intensity on diffusion-weighted imaging (DWI), which helps distinguish them from arachnoid cysts. Additionally, CISS (Constructive Interference in Steady State) sequences can offer enhanced visualization of lesion boundaries and adjacent structures. Epidermoid cysts do not enhance after gadolinium administration and usually exhibit irregular borders with no surrounding edema.

Treatment and Prognosis

The definitive treatment of CPA epidermoid cysts is surgical excision. Total resection, including the cyst capsule, is ideal and potentially curative. However, total excision is often limited by the capsule's adherence to critical neurovascular structures, necessitating subtotal removal in many cases. Postoperative complications may include chemical meningitis and hydrocephalus. Long-term follow-up using MRI is essential, particularly when subtotal excision has been performed.

Differential Diagnosis

The table below summarizes key differential diagnoses for CPA epidermoid cysts:

Table-1

Lesion	DWI Signal	Contrast Enhancement	T1 Signal	T2 Signal	Other Features
Epidermoid cyst	High (+++)	No	Hypo	Hyper	Irregular margins, heterogeneous
Arachnoid cyst	None	No	Iso to CSF	Iso to CSF	Smooth, CSF-like signal
Vestibular schwannoma	None	Yes	Iso to hypo	Hyper	Expands IAC, solid/cystic
Meningioma	None	Yes	Iso to hypo	Variable	Dural tail, calcifications
Dermoid cyst	None	None/Faint	Hyper (fat)	Variable	Fatty content, possible rupture
Metastatic cyst	Variable	Yes	Hypo	Hyper	Mural nodule, edema

CONCLUSION

Epidermoid cysts of the cerebellopontine angle are rare, slow-growing lesions whose diagnosis relies heavily on MRI, particularly diffusion-weighted imaging. Surgery remains the cornerstone of treatment. Early detection and multidisciplinary evaluation are essential for optimal outcomes.

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