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CLEAR CELL MENINGIOMA – A RARE CASE REPORT

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ABSTRACT

Clear cell meningioma (CCM) is a rare World Health Organization (WHO) Grade II meningioma known for its clear cytoplasmic morphology, aggressive biological behavior, and high likelihood of recurrence. This report presents a case of CCM arising in the cerebellopontine angle (CPA) of a 44-year-old female who presented with progressive headache, hearing impairment, and focal neurological deficits. MRI revealed a well-circumscribed extra-axial mass in the left CPA, and histopathology confirmed CCM through its characteristic clear cytoplasm caused by glycogen accumulation and prominent perivascular collagen deposition. Given the tumor's infiltrative nature and high recurrence potential, accurate histopathological identification and complete surgical excision remain critical for optimal patient outcomes. This case underscores the importance of early recognition, thorough pathological assessment, and long-term follow-up in managing this rare subtype of meningioma.

INTRODUCTION

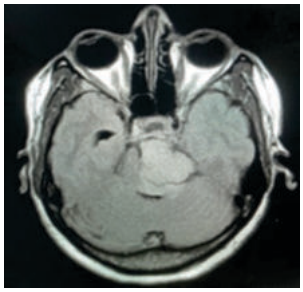
Clear cell meningioma (CCM) is an uncommon and distinct histological subtype of meningioma classified as WHO Grade II due to its aggressive clinical course and elevated recurrence rate. It accounts for approximately 0.2%–0.8% of all meningiomas and is characterized by tumor cells with clear glycogen-rich cytoplasm. CCM occurs predominantly in younger adults and frequently involves the spinal canal especially the lumbar and thoracic regions as well as intracranial locations such as the cerebellopontine angle. Because its radiological appearance often resembles other benign tumors, diagnosis largely depends on histopathological evaluation. This report describes a rare case of posterior fossa clear cell meningioma in a middle-aged woman, contributing valuable data to the limited literature and highlighting the importance of recognizing this aggressive variant.

AIMS

1. To present a rare case of clear cell meningioma located in the cerebellopontine angle of a 44-year-old female patient.
2. To describe the clinical features, imaging findings, histopathological characteristics, and prognosis of CCM.
3. To highlight the significance of correct diagnosis because of the tumor's aggressive behavior and tendency for recurrence.

Clinical History

A 44-year-old woman reported persistent headaches, progressive hearing loss, and worsening neurological symptoms for four months. MRI of the brain revealed a large, extra-axial, lobulated, homogeneously enhancing mass measuring 37 × 23 × 33 mm in the left CPA, extending into the prepontine cistern and compressing adjacent neural structures. A provisional radiological diagnosis of meningioma was suggested. The patient subsequently underwent surgical excision of the lesion and the resected tissue was submitted for histopathological evaluation.



METHODS

The specimen consisted of multiple soft grey-brown tissue fragments collectively measuring 0.6 × 0.3 × 0.1 cm. Standard tissue processing was performed, followed by hematoxylin and eosin (H&E) staining. Special stains and immunohistochemistry were used where necessary to differentiate the lesion from other clear-cell neoplasms, including metastatic renal cell carcinoma and hemangioblastoma.

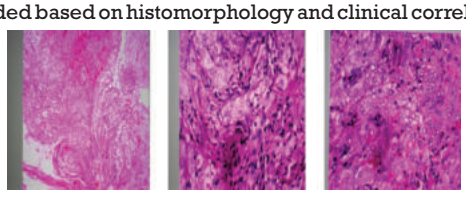
RESULTS

Gross Examination

The specimen comprised small, soft tissue fragments without distinctive macroscopic features. No overt hemorrhage or necrosis was noted.

Microscopic Examination

Microscopy revealed sheets and nests of polygonal tumor cells arranged in a largely pattern less configuration. The cells displayed clear cytoplasm due to abundant glycogen, confirmed by PAS staining. Nuclei were round to oval with moderate chromatin and inconspicuous nucleoli. Prominent perivascular and interstitial collagen deposition a hallmark of CCM was noted. Mitoses were sparse; however, the infiltrative architecture supported the diagnosis of WHO Grade II meningioma. Psammoma bodies were absent. Differential diagnoses particularly metastatic renal cell carcinoma were excluded based on histomorphology and clinical correlation.



CONCLUSION

Clear cell meningioma is a rare but clinically significant subtype of meningioma with a tendency for early recurrence and cerebrospinal fluid dissemination. It commonly affects individuals in the first five decades of life and shows a slight female predominance. Though spinal intradural locations are most common, intracranial involvement especially in the CPA is well documented. Histologically, the characteristic clear cytoplasm is caused by glycogen accumulation, which is removed by diastase on PAS staining. Radiologically, CCM resembles other enhancing extra-axial lesions; thus, imaging alone is insufficient for diagnosis. In CPA lesions, the differential diagnosis includes vestibular schwannoma, epidermoid cyst, and other meningioma subtypes. Recognizing the clear cell variant is critical because its

recurrence rate is much higher (40%–80%) than that of conventional meningiomas. Gross total resection (GTR) is the preferred treatment, as subtotal resection is strongly associated with early recurrence. Adjuvant radiotherapy may be considered for residual or recurrent tumors. Chemotherapy has no established role. This case reinforces the need for accurate histopathological classification and vigilant long-term surveillance, given the tumor's malignant potential despite its deceptively benign appearance.

CONCLUSIONS

This case highlights the significance of recognizing clear cell meningioma as a distinct and aggressive variant of meningioma. Accurate diagnosis, complete surgical excision, and diligent long-term follow-up are essential due to the high rate of recurrence. Further research is needed to establish reliable prognostic markers and determine the potential role of adjuvant therapies, particularly in cases where complete resection is not possible.

Declaration

The authors declare no conflict of interest.

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