ORIGINAL RESEARCH PAPER
Volume - 14 | Issue - 10 | October - 2025 | PRINT ISSN No. 2277 - 8179 | DOI : 10.36106/ijsr
INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH

RADIOLOGICAL MENINGIOMA MIMICKING OVARIAN GERM CELL METASTASIS: A CASE REPORT

Neurosurgery

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ABSTRACT

Background: Intracranial metastasis from ovarian germ cell tumors (GCTs) is exceedingly rare and may closely resemble meningioma on imaging. **Case Presentation:** A 24-year-old woman presented with progressive headache, vomiting, and recent-onset left hemiparesis. MRI demonstrated a 5.3 cm right parietal extra-axial mass with midline shift, radiologically consistent with meningioma. She underwent craniectomy and gross total excision; histopathology revealed metastatic germinomatous GCT. Subsequent systemic evaluation identified an ovarian mass, for which tumor excision was performed. Serum markers were within normal limits, but immunohistochemistry showed strong PLAP and c-kit positivity. PET-CT revealed FDG uptake in the falx and bilateral ovaries. The patient was commenced on BEP chemotherapy and remains clinically stable. **Conclusion:** Ovarian GCT metastasis to the brain is a rare entity that can masquerade as meningioma. Recognition requires a high index of suspicion and comprehensive systemic evaluation following cranial tumor resection. Multidisciplinary management is essential for accurate diagnosis and optimal outcomes.

KEYWORDS

Ovarian Germ Cell Tumor; Intracranial Metastasis; Meningioma Mimic; Germinoma; Craniectomy.

INTRODUCTION

Brain metastasis from ovarian tumors is rare, occurring in merely 1-3% of cases, compared to lung, breast, and renal cancers (10–30%) {1-4}. Ovarian GCTs primarily include dysgerminomas, yolk sac tumors, teratomas, and choriocarcinomas. While ovarian GCTs are generally chemo-sensitive with high five-year survival, brain involvement is uncommon. Prognosis for ovarian brain metastasis is poor with median survival around 7–8 months though younger patients receiving multimodal therapy may fare better {5-7}. Intracranial germ cell tumors, often primary, are found more commonly in pineal or suprasellar regions. When ovarian GCT metastasizes to the brain, it may mimic meningioma due to dural-based appearance.

Case Presentation

A 24-year-old homemaker, mother of two, presented with a right-sided headache that progressed to holocranial pain over three months, partially relieved by medications but associated with vomiting. Fifteen days prior to presentation, she developed progressive left-sided limb weakness that impaired daily activities. Her surgical history included two cesarean sections (December 2021, January 2023).

Neurological examination revealed significant weakness in the left upper and lower extremities. Contrast-enhanced MRI demonstrated a 5.3 × 5.3 cm extra-axial, dural-based mass in the right parietal region with homogeneous enhancement, vasogenic edema, and a 7.5 mm midline shift, highly suggestive of meningioma (Fig. 1a, 1b).

She underwent right parasagittal craniectomy and gross total resection in the lateral position, with intraoperative evidence of tumor erosion into the cranial vault (Fig. 2a–c). Frozen section suggested a germ cell tumor (GCT), and final histopathology confirmed metastatic germinomatous GCT. Postoperatively, her motor weakness improved. Serum α-hCG, AFP, and LDH were within normal limits. Immunohistochemistry demonstrated PLAP and c-Kit positivity in approximately 80–90% of tumor cells, while CD30 and GFAP were negative. PET-CT revealed FDG uptake in the falx region and bilateral ovarian remnants (Fig. 3a).

Subsequently, she underwent ovarian tumor excision. Following surgery, she was initiated on BEP chemotherapy and has tolerated treatment well.

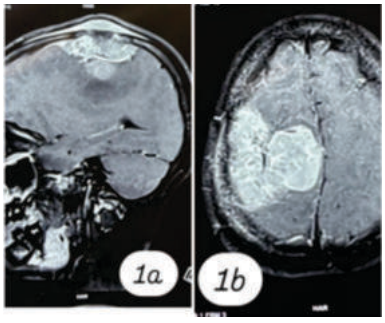

Fig 1a&b- MRI brain with contrast: (a) sagittal and (b) axial sections demonstrating a contrast-enhancing dural-based lesion in the right parietal region

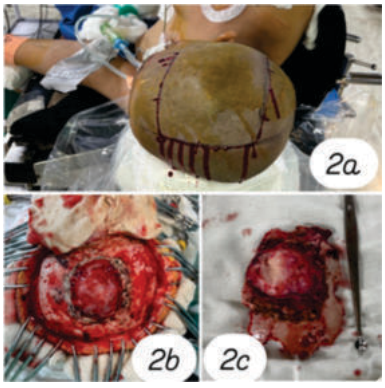

Fig 2- Intraoperative images: (a) patient in lateral position with incision marking, (b) tumor infiltration of cranial bone, and (c) excised bone flap demonstrating tumor involvement..

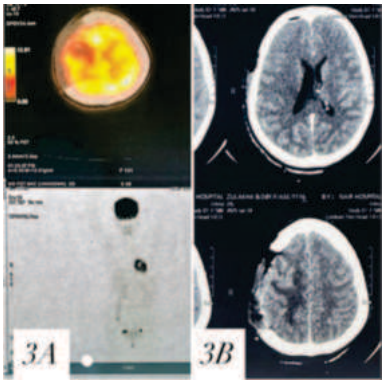

Fig 3- Postoperative imaging: (a) FDG-PET demonstrating uptake at the operative site and bilateral ovaries, (b) CT scan showing post-craniectomy status with gross total tumor excision.

DISCUSSION

CNS metastasis from ovarian tumors is rare, though its incidence is rising due to improved diagnostics {1-4}. Literature suggests that brain metastases are more frequent in non-germinomatous GCTs, especially choriocarcinoma and yolk sac tumors. Ovarian GCT metastasis to the brain is exceptional; when it occurs, it often presents as a Dural-based mass, raising diagnostic confusion with meningiomas.

Prior case reports have documented similar diagnostic pitfalls primary intracranial GCT or metastasis masquerading as meningioma. Immunohistochemical panels, including PLAP, c-Kit positivity with CD30 negativity, help distinguish germinomas. Additionally, negative AFP/HCG in serum, as seen in our case, does not rule out germinoma, reinforcing the need for tissue diagnosis. {8-9}

Management of intracranial GCT metastasis includes multimodal strategies: surgical resection for mass control, platinum-based chemotherapy, and radiotherapy tailored to tumor subtype and residual disease. In brain metastasis from GCT, frontline systemic chemotherapy is often recommended, with surgery or radiotherapy reserved for residual lesions or symptomatic mass effect. {8-9}

Our patient received surgical debulking followed by BEP chemotherapy, which is consistent with current best practices for metastatic germ cell tumors. Her favorable response underscores the value of aggressive multimodal treatment, even in atypical metastatic patterns.

CONCLUSION

This case highlights the diagnostic challenge of ovarian germ cell tumor metastasis masquerading as meningioma. It underscores the need for comprehensive systemic evaluation in patients with atypical intracranial lesions, as early identification of the primary tumor can guide management decisions and enable holistic treatment of both the primary and metastatic disease. A coordinated multidisciplinary approach remains essential for accurate diagnosis and optimal patient outcomes

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