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CASE REPORT

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A rare case of intra-parenchymal meningioma in a female patient who presented with seizures: A case report

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Key Clinical Message

Meningiomas are slow-growing tumors that develop from the arachnoid cap cells' meningothelial cells. Males are more likely to develop intra-parenchymal meningiomas, which also manifest earlier than ordinary meningiomas and are uncommon.

Abstract

Meningiomas are slow-growing neoplasms which arise from the meningothelial cells of the arachnoid cap cells. Unlike other meningiomas, intra-parenchymal meningiomas do not originate from dura. Intra-parenchymal meningiomas are more common in males and develop earlier than regular meningiomas. Because of the rare occurrence the intra-parenchymal meningiomas, they are commonly misdiagnosed.

KEYWORDS

fibrous meningioma, granulomatous, intra-parenchymal, seizures

1 | INTRODUCTION

Meningioma is the most prevalent benign intracranial tumor. These tumors develop from cells known as arachnoid cap cells which is found in the thin membrane that covers the brain and spinal cord. Majority of the meningiomas are benign, but if they go unnoticed, can develop slowly until they are quite large and, in certain cases, can be fatally devastating.[1]

When discussing a meningioma diagnosis with patients, medical practitioners frequently use the WHO classification system.[2] Meningiomas are divided into three main types according to the WHO classification of central nervous system (CNS) malignancies, which is reflected in the WHO grades I (benign), II (intermediate), and III (malignant).[3]

Even though meningiomas typically have a Dural connection, intra-parenchymal and subcortical meningiomas do not originate from dura. Intra-parenchymal meningiomas are more common in males and develop earlier in age than regular meningiomas.[4] There is still much to learn about the pathogenesis of intra-parenchymal meningiomas. It is believed that they can develop from ectopic meningothelial cells in the stroma of the choroid plexus or the pia mater, which as a result of changes in cell migration, can cause intraventricular meningioma. It has been discovered that fibrous variants of intra-parenchymal meningiomas are the most frequent, accounting for 44% of all cases.[5]

It is quite challenging to appropriately diagnose these lesions, especially when they have rare meningioma traits,

like cystic components.[4] Here, we have reported an illustrative case of primary intra-parenchymal meningioma in a 43-year-old female with history of complex partial seizures.

2 | CASE REPORT

A 43-year-old female presented to the emergency department (ED) with a history of complex partial seizures. She was evaluated at a nearby hospital in February 2011, and CT (computed tomography) scan of the brain was suggestive of two frontal granulomatous lesions and she was started on empirical anti-tuberculous treatment (ATT). She again developed an episode of seizure in April 2011. Magnetic resonance imaging (MRI) brain showed two frontal space occupying lesions. CT scan of the Chest and Abdomen was also done to look for tuberculous primary which was negative. She was again started on ATT and anti-epileptics.

She was asymptomatic till November 2014, then developed another episode of seizure. A repeat MRI Brain showed an increase in size of the lesion with mass effect. She was advised surgical excision. But the patient was not willing for surgery.

She was asymptomatic till March 2017. Later developed inability to use the right upper limb and lower limb on and off. She also had blocking sensation of the right ear. There were no further seizure episodes since the last episode in 2014. She did not have headache, vomiting, visual disturbance, and seizures.

MRI scan was repeated which showed an increase in size of the lesion, and a possible fusion of the two lesions due to further growth of the mass, when compared to the last scan, and significant mass effect over the left lateral ventricle and midline shift of 5 mm to the right and displacement of cortical branches of the right middle cerebral artery (MCA) medially by the lesion. The mass was hypointense on T1-weighted images and hyperintense on T2-weighted images. A CT perfusion study showed a well marginated hyperdense extra-axial lesion in the posterior aspect of left Sylvian fissure (Figure 1A,B). The lesion showed very high perfusion with increased cerebral blood volume, flow and reduced mean transit time.

On examination, she was conscious, oriented, afebrile, pupils were equal and reacting, extra-ocular movements were full and no other deficits. Her motor power was normal in all limbs. She did not have any sensory deficits. A full cognitive assessment shows poor attention and concentration, delayed recall and visual retention.

All the baseline investigations were done and she was prepared for awake craniotomy, as the tumor involved eloquent areas of the brain parenchyma. She underwent a left fronto-temporal craniotomy and gross total excision of the tumor. At surgery, the tumor was intra-axial, firm, and highly vascular. There was no attachment to the dura. It

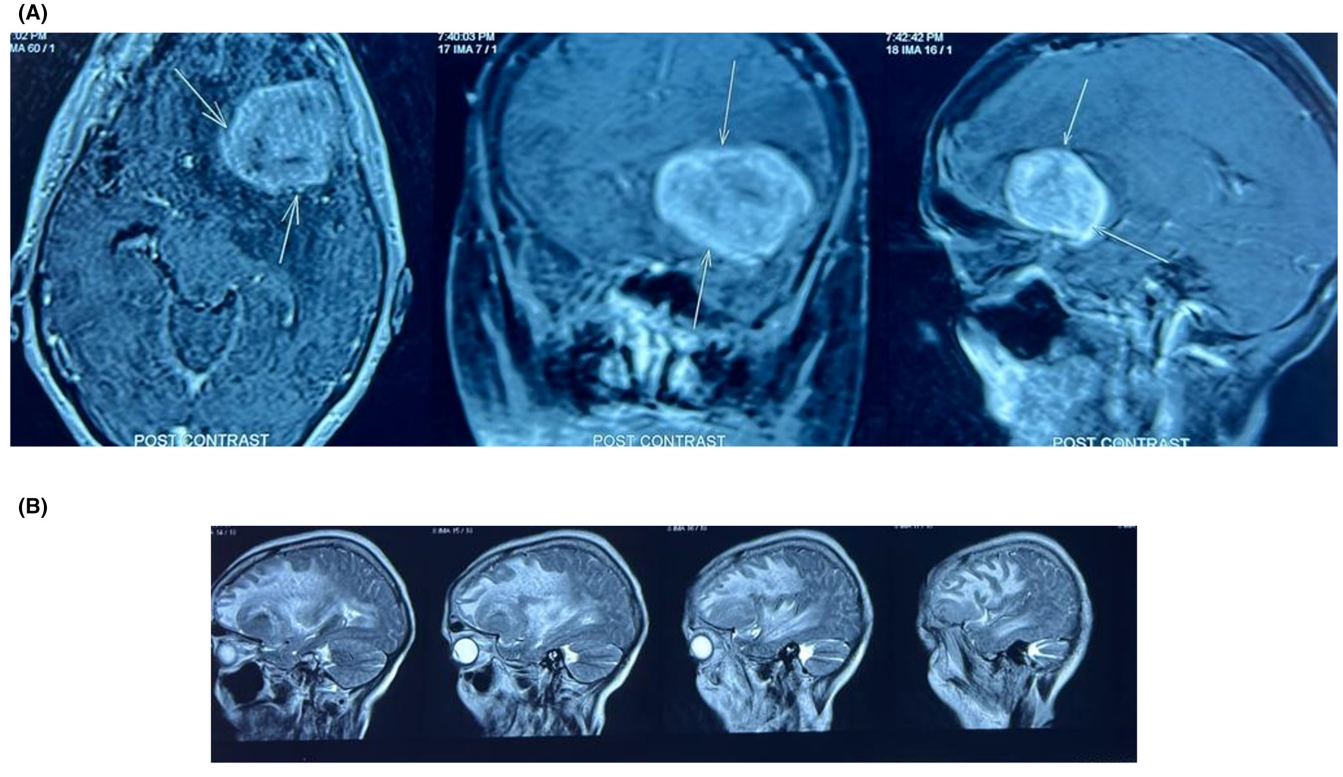

FIGURE 1 A and B: CT scan showing a well marginated hyperdense extra-axial lesion in the posterior aspect of left Sylvian fissure.

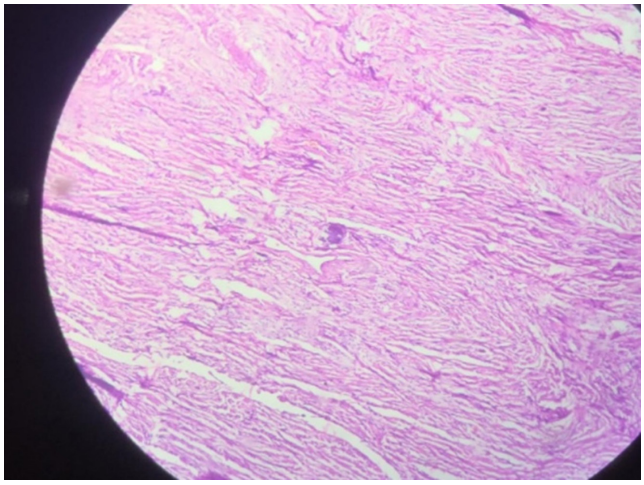

FIGURE 2 Histopathological image shows a tumor composed of neoplasticism meningothelial cells arranged as fascicles. Occasional psammoma bodies can be seen (10x).

was mainly in the posterior part of the sylvian fissure and had a good plane with the surrounding brain. There were many feeders from the MCA which were coagulated and cut. In the post-operative period, there were no neurological deficits. Postoperative CT scan of the brain showed total excision of the lesion.

The biopsy was reported as WHO grade I Fibrous meningioma (Figure 2). Immunohistochemistry showed S100 focal nuclear expression, EMA positive, CD34 negative, and p53 negative with a Ki-67 of 5%. This points toward a diagnosis of meningioma, and rules out other rare meningeal tumors, such as solitary fibrous tumor/hemangiopericytoma (SFT/HPC). She was discharged on anticonvulsants. At 6 months follow-up there has been no recurrence.

3 | DISCUSSION

Meningiomas are slow-growing neoplasms which arise from the meningothelial cells of the arachnoid cap cells. These cells are concentrated in the walls of the major venous sinuses hence the Dural origin of most of these tumors. Meningiomas without Dural attachment are rare. They are known to occur in the intraventricular region, pineal region, and also intra-parenchymal. They have been classified by Cushing and Eisenhardt[6] into four types: (1) plexus choroidal tutors, (2) telae choroidal tumors, (3) deep sylvian psammameningiomas, and (4) extracerebellar psammomeningiomas.

Because of the rare occurrence, the intra-parenchymal meningiomas are commonly misdiagnosed as in our case as granulomatous lesions, gliomas, cavernous angiomas, lymphomas or metastatic tumors. Since the treatment strategy and operative techniques differ from meningiomas and other lesions it is essential to identify these tumors preoperatively. A total of 32 cases of Sylvian meningiomas and 39 cases of intra-parenchymal meningiomas have been reported in the world literature till 2016.[4]

These tumors probably arise from the arachnoid cap cells in the arachnoid and pia of the sylvian fissure and enter the surface of the brain or along the Virchow–Robin spaces along the branches of the middle cerebral artery. It has also been speculated that the arachnoid cells rest during the migration process leading to development of meningiomas.[7,8] Intra-parenchymal meningiomas more commonly occur in the pediatric age group whereas the Sylvian meningiomas more commonly occur in adults.[4] Adult meningiomas most commonly occur in females but intra-parenchymal/Sylvian meningiomas most commonly have been described in males.[4] The most common presentation is seizures and other interesting feature is that they rarely present with neurologic deficits.[9]

Meningiomas are usually supratentorial and the frequency of intra-parenchymal meningiomas was also similar to that of the ordinary meningiomas.[10,11] The imaging characteristics of meningiomas are usually hyper-density on CT, iso-intensity on T1W images and iso to high on T2W images with intense contrast enhancement on CT and MRI.[12] Mori et al. have described enhancement along the middle cerebral artery branch, similar to the dura tail seen in meningiomas with attachment to the dura matter.[13] In our case the cortical branches of the middle cerebral arteries were displaced medially and there was no enhancement along the middle cerebral arteries.

Gross total resection of the intra-parenchymal/Sylvian meningiomas is the standard treatment.[14] When sub-total resection only has been performed adjuvant radiation can be given.[15,16] Most of these tumors are WHO grade I, the reported cases are of fibroblastic, transitional, meningothelial, or psammomatous types. Rarely anaplastic variants have also been reported.[4]

Zhang et al have classified the supratentorial meningiomas into five types such as:

(1) Intraventricular meningiomas, (2) pineal region meningiomas, (3) deep sylvian meningiomas, (4) intra-parenchymal or subcortical meningiomas, (5) others.[17] There has been a controversy as to whether Sylvian and intra-parenchymal meningiomas are the same category or different. Patients with Sylvian fissure meningiomas were older than intra-parenchymal meningiomas but the rest of the features were same.[4] Gross total resection could not be achieved in approximately 30% of the Sylvian meningiomas whereas 90% of the intra-parenchymal meningiomas have underwent gross total excision. In our case we were able to achieve a gross total excision. While comparing the

histopathology the intra-parenchymal meningiomas are approximately 75% WHO Grade I whereas Sylvian meningiomas are 85% WHO Grade I.

Considering these differences, it is better to classify and differentiate intra-parenchymal meningiomas from Sylvian meningiomas. Preoperative work-up and clinical suspicion helps in achieving an optimal outcome in these patients.

4 | CONCLUSION

In conclusion, this case report highlights a rare presentation of intra-parenchymal meningioma. The patient's symptoms and imaging findings indicated the presence of an ICSOL, and a biopsy confirmed the diagnosis of fibrous meningioma. The patient underwent gross total resection, and postoperative imaging showed complete removal of the mass. This case serves as a reminder of the importance of a high index of suspicion for intracranial tumors, even in the absence of unusual symptoms and imaging findings.

AUTHOR CONTRIBUTIONS

Shyam Duvuru: Conceptualization; formal analysis; methodology; validation; visualization; writing – original draft; writing – review and editing. **Vivek Sanker:** Conceptualization; formal analysis; investigation; methodology; project administration; supervision; visualization; writing – original draft; writing – review and editing. **Samiksha Jain:** Methodology; project administration; supervision; writing – original draft; writing – review and editing. **B. S. Sunil kumar:** Investigation; methodology; project administration; validation; visualization; writing – original draft; writing – review and editing. **M. Manoj Kumar:** Project administration; validation; visualization; writing – original draft; writing – review and editing. **Umang Gupta:** Validation; visualization; writing – original draft; writing – review and editing.

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CONFLICT OF INTEREST STATEMENT

None declared.

DATA AVAILABILITY STATEMENT

The data that support the findings of this article are available from the corresponding author upon reasonable request.

ETHICS STATEMENT

The ethical approval was not required for the case report as per the country's guidelines.

CONSENT

Written informed consent was obtained from the patient to publish this report.

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