

Case Report

A RARE CASE REPORT OF FIBROBLASTIC MENINGIOMA PRESENTING AS CYST WITH ENHANCING MURAL NODULE -RADIO-PATHOLOGICAL CORRELATION

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ABSTRACT

Cystic meningioma is a rare form of meningioma and the radiological appearance and location of the cystic/solid components of the mass may create confusion. We report the case of a 57 year-old left-handed man who presented with complaints of bilateral lower limb weakness, cognitive impairment and slurred speech since 5-6 months. MRI with gadolinium delineated the solid and cystic component precisely with dural tail sign. A provisional diagnosis of cystic meningioma was made and this was confirmed histologically after resecting the tumour surgically. It was a benign WHO Grade I fibroblastic meningioma. The preoperative diagnosis of cystic meningioma is not that straightforward. Brain MRI with gadolinium has a better diagnostic yield than CT scanning. Histopathological examination of the tumour cells should always be performed to confirm the category and subtype of the tumour. Cystic meningiomas are uncommon variants of meningiomas; they are challenging to diagnose radiologically as well as pathologically. If cystic component is left behind it may prove to be a source of recurrence and therefore it affects surgical plan as well as prognosis. So, it is of utmost importance to identify it preoperatively and plan surgery accordingly. The presence of peritumoral edema can also be a misleading finding. The typical differential diagnosis of a cyst with a peripheral nodule includes pleomorphic xanthoastrocytoma, pilocytic astrocytoma, ganglioblastoma and haemangioblastoma. As demonstrated by this case, cystic meningioma should also be considered in this differential.

Keywords: Atypical Meningioma, Cystic Meningioma, Fibroblastic

INTRODUCTION

Meningiomas are common tumours of the central nervous system that account for approximately 15% of all intracranial tumours and are the most common extra-axial neoplasm. However cystic meningiomas are uncommon.

WHO has classified meningioma into 3 grades:

| WHO grade | Type | Incidence | Comments |
|-----------|---|-------------|--|
| I | Benign | Most common | Fibroblastic meningioma corresponds to WHO Grade 1 |
| II | Atypical-Necrosis, Excessive mitotic activity, Evidence of brain invasion | 8% | Higher rate of recurrence. |
| III | Anaplastic | <1% | Shorter mean survival time. |

We present a case report of a supratentorial cystic meningioma with enhancing mural nodule mimicking the peripheral intra-axial location and morphology of a Pleomorphic xanthoastrocytoma. However, gross and histopathological examination revealed a fibroblastic meningioma with a mural nodule.

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CASES

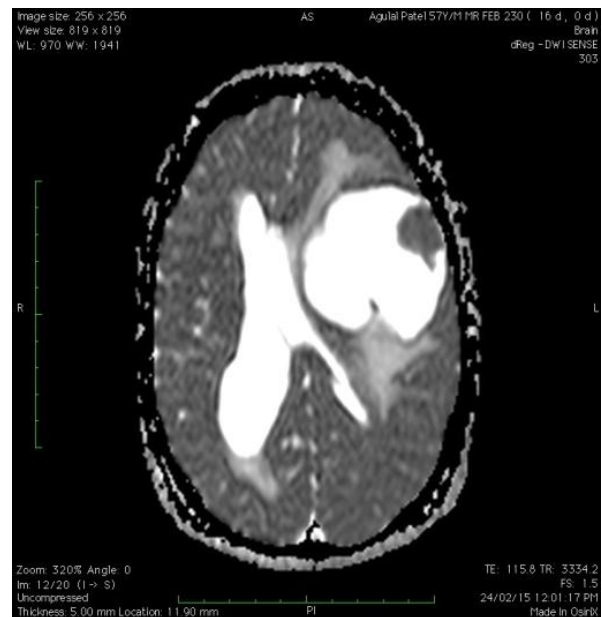
Clinical Case

A 57-year-old male presented with complaints of bilateral lower limb weakness, cognitive impairment and slurred speech since 5-6 months. Complaints were of insidious onset and gradually progressive in nature, first started with lower limb weakness, difficulty in walking, heaviness in limbs. Afterwards relatives noticed forgetfulness, memory loss and slurring of speech. Patient was chronic tobacco chewer and non-alcoholic. There was no past history of hypertension, diabetes mellitus, jaundice or tuberculosis.

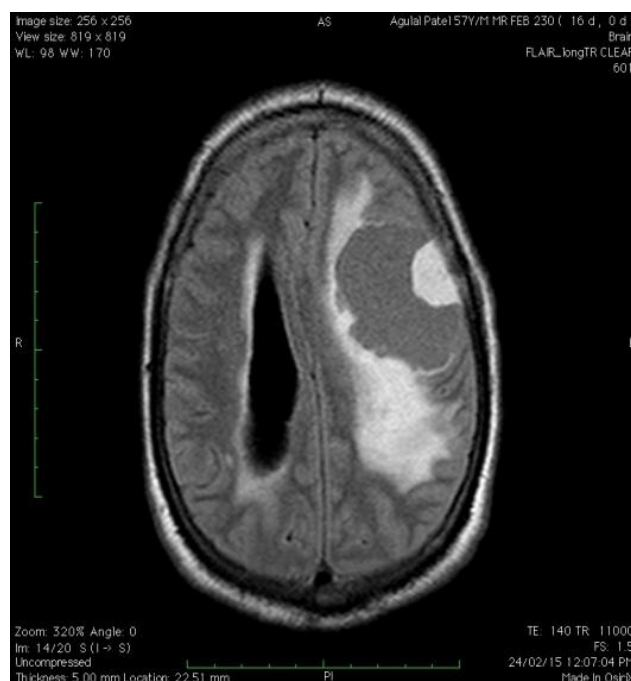
Imaging Findings



DWI



ADC

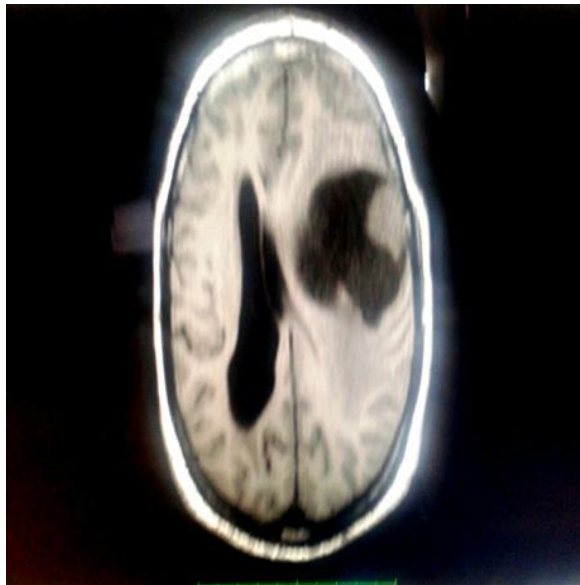


FLAIR



T2WI CORONAL

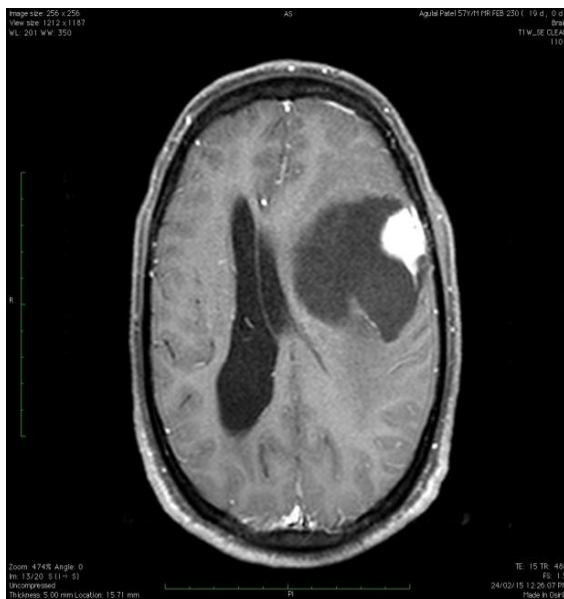
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T1WI



T2WI



Post contrast t1wi axial



Post contrast t1wi coronal

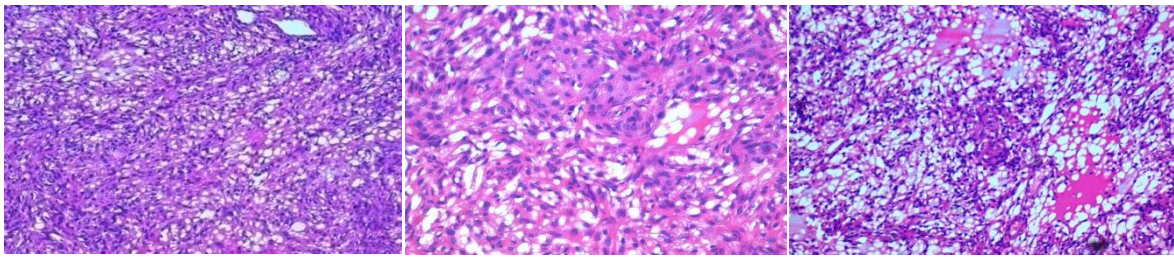
A 5.4 x 5.8 x 4.7 cm sized extra-axial cystic lesion noted in left fronto-parietal lobe which was hypointense on T1WI, and hypointense to isointense nodule and hyperintense cystic component on T2WI and did not show suppression on FLAIR images. On post contrast images, mural nodule of size 2.5 x 1.7 x 1.6 cm showed intense enhancement within lesion at meningeal surface. There were multiple septae within cystic component of lesion. The lesion also showed dural tail sign. There was perilesional edema noted on T2WI AND FLAIR images. Overlying skull vault showed minimal remodelling. The lesion was causing mass effect with midline shift of 1.2 cm causing compression over left lateral ventricle and mild dilatation of right lateral ventricle. Findings raised possibility of cystic lesion with mural nodule more likely to be an atypical cystic meningioma.

Operative Findings

The lesion showed both cystic as well as solid components and was attached to dura. Solid component was hard in consistency. The lesion was respected with approximately 2 cm dura on either side.

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Histopathological Findings

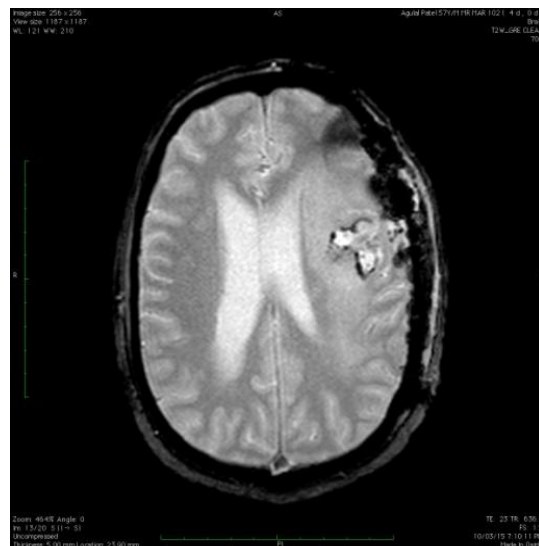


The studied sections revealed spindle shaped meningeal cells embedded in dense collagenous matrix arranged in parallel and interlacing bundles at places forming whorl like pattern as shown in images below. No evidence of psammoma bodies. Overall features were consistent with fibroblastic meningioma.

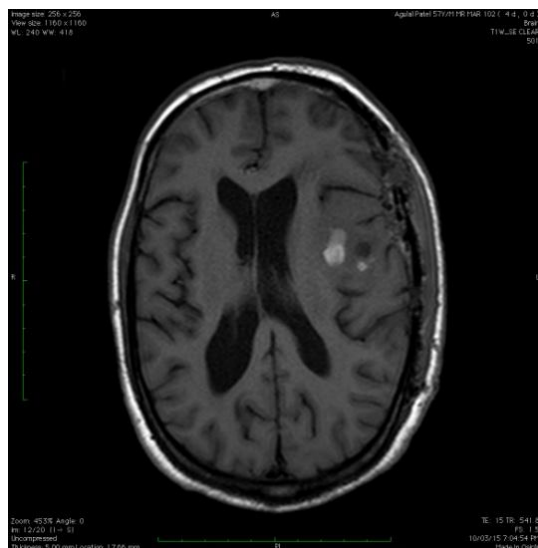
Post Operative Imaging Findings



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GRE

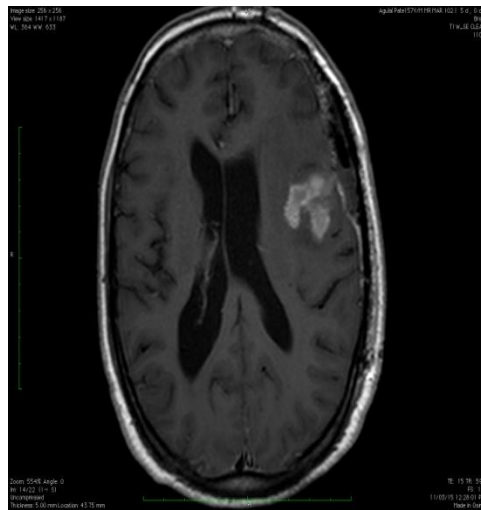


T1WI

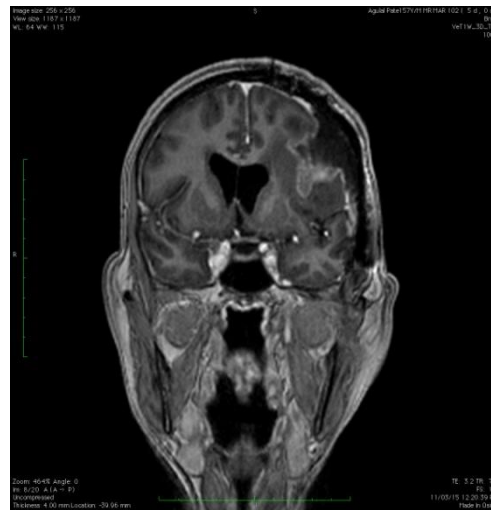


T2WI

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Post contrast t1wi axial



Post contrast t1wi coronal

On T2WI multiple hyperintense areas are noted which also appear hyperintense on T1WI suggestive of post-operative haemorrhage. There is surrounding edema noted. On contrast study irregular enhancement of margins of operated area noted, this is due to post-operative changes. Defect in the duramater seen at the operated site. Mild midline shift of the ventricles towards right side is seen. Mild post operative extradural collection noted. No enhancing lesion or cystic lesion seen on post operative images.

DISCUSSION

Meningiomas are usually solid tumours, cystic components are found in only about 3-7% of adult cases. Cystic meningiomas are more common in paediatrics than in adults. The incidence of cyst formation in meningiomas is higher in infants than in childhoods and adults (Zhang *et al.*, 2009).

At MRI, meningiomas are often isointense on T1WI and T2WI images and show homogenous and intense contrast enhancement. The thickening of the adjacent dura (dural tail sign), when evident on MRI and its extra-axial location, is highly useful for pre-operative diagnosis, however cystic meningiomas can be difficult to differentiate from gliomas which partially show enhancement after the injection of contrast media, due to presence of cyst which does not enhance due to focal edema. Contrast enhanced MRI can distinguish cystic walls infiltrated by tumour cells from those formed by gliotic tissue (Nauta *et al.*, 1979). Solid component of cysts show moderate to marked enhancement on MRI scan. It may show dural attachment, attachment, extra-axial location and cerebral edema better than CT (Zhang *et al.*, 2009).

In diffusion techniques, meningioma have different behaviour according to the degree of cellularity, usually showing restriction to water molecules. In our case, the cystic component showed no restriction presenting facilitated diffusion but to a lesser extent than CSF. The mural nodule showed restriction.

Differentiating histological varieties of meningioma on MRI scan may be difficult, however fibroblastic meningioma appear hypointense on T1WI and T2WI because of existence of dense collagen and fibrous tissue. Transitional meningiomas appear hypointense on T1WI and T2WI because of densely calcified psammoma bodies. Syncytial meningiomas are composed of sheets of contiguous cells with sparse interstitium which may account for higher signal intensity on T2WI. Microcystic changes and nuclear vesicles can also contribute to increased signal intensity. Angioplasmic meningiomas are of high signal intensity.

In our case of lesion appear low signal intensity on T1WI, high signal intensity on T2WI and DWI and post contrast scans showed highly enhancing mural nodule within cyst at meningeal surface. Dural tail sign was also observed. Benign meningiomas with heterogenous enhancement that contain small non-enhancing areas of cystic changes or necrosis occur much more frequently (upto 8-23% of cases) (Buetow *et al.*, 1991). A large cystic meningioma may have atypical, clinical presenting in that are more common

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in male and pediatric patients (Buetow *et al.*, 1991). Such meningiomas are usually difficult to differentiate from gliomas, intracranial abscesses and metastatic lesions (Buetow *et al.*, 1991).

The patho-physiological mechanisms involved in formation of intratumoral cyst within meningiomas have been discussed by various authors. According to Fortuna *et al.*, intratumoral cysts are the outcome of cystic degenerations, ischemic necrosis or hemorrhage within the tumor (An *et al.*, 2011). A peripheral cyst may present either peripheral degeneration or an arachnoid cyst (Buetow *et al.*, 1991).

Nauta *et al.*, reported three cases of large xanthochromic cysts associated with meningiomas and on the basis of described four configurations (I) centrally located intratumoral cyst that is surrounded by macroscopic tumor throughout, (II) a peripherally situated intratumoral cyst, (III) a peritumoral cyst that actually lies within the adjacent brain and (IV) peritumoral cyst at the interface of tumor and brain. Regardless of the configuration MRI appearance of such cystic meningiomas may mimic that of a glial tumor with cystic or necrotic changes leading to an incorrect presumptive diagnosis (Nauta *et al.*, 1979).

Our case was a Nauta type III – A peritumoral cyst that actually lies within the brain. The most frequent location of cystic meningiomas is overlying the cerebral convexity particularly in the fronto-parietal region. The cerebral falx is the second most frequent location. The occurrence of a cystic tumor in a typical location for a meningioma may be helpful in the diagnosis (Zhang *et al.*, 2009).

Giuseppe (1986) reported seven cases of cystic meningiomas. They suggested that the possibility of meningioma should be considered in the diagnosis of any intracranial neoplasm with a large cyst, particularly if the tumor is parasagittal (Parisi *et al.*, 1986).

Intratumoral cysts are extremely rare and seldom large but peritumoral cyst are more common larger and tend to be unilocular (Zhang *et al.*, 2009). Peritumoral cyst is often larger than the main tumor mass and may account for the mass effect produced on the adjacent tissue (Zhang *et al.*, 2009).

El-fiki *et al.*, reported meningiomas with intratumoral cysts showed greater degrees of edema than meningiomas with peritumoral cysts. The edema around cystic meningiomas is usually mild (Zhang *et al.*, 2009).

Although the imaging differentiation between a peripheral (neoplastic) intratumoral cyst and an extratumoral (reactive) arachnoid cyst may be suggested when ring enhancement is seen surrounding the fluid collection, histologic analysis, demonstrating cells in the wall, may be required for confirmation (Buetow *et al.*, 1991).

Biopsy of all suspected cerebral neoplasm is important, because an incorrect diagnosis of glioma frequently result in palliative treatment rather than surgical removal of a potentially curable neoplasm (Parisi *et al.*, 1986). An important problem that a surgeon needs to face in surgery is how to correctly deal with the cyst wall of cystic meningiomas. In fact, peritumoral cysts are due to surrounding gliosis of the brain tissue and/or loculation of CSF. In those cases, removal of the cyst wall is usually not necessary. On the contrary, intratumoral cysts with peripheral enhancement probably indicate the presence of the tumor infiltration in the cyst wall and therefore the necessity of its total removal (Zhao *et al.*, 2008).

Prognosis and treatment options depend on histological subtype, location of the tumour, age of the patient and associated co-morbidities. Small meningiomas in asymptomatic patients require follow up with serial MRI scan. Most benign tumours depending on location and accessibility can undergo total resection with a very low recurrence rate of approximately 6%. If the tumour is highly vascular in nature as diagnosed by angiography of classic mother in law type of wash out pattern that comes early and goes late, transarterial embolisation is occasionally required prior to surgical resection. Radiation therapy may be used without surgery when the tumour cannot be resected either because of high risk tumour location with close proximity to critical structures or in poor surgical candidates to control tumor growth and improve symptoms. In cases of malignant meningiomas adjuvant therapy with radiation or a combination of radiation and chemotherapy in addition to resection may increase mean survival rate.

Conclusion

Cystic meningiomas with a mural nodule are rare tumours. Their differentiation from the more common gliomas, abscesses, hemangioblastomas and metastases is sometimes difficult and possibility of cystic meningioma should be kept in mind while dealing with cystic lesion with enhancing mural nodule. A high

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degree of suspicion, keeping in mind the above mentioned scan features, as well as high-quality histopathological assessment, could aid in making effective diagnosis and definitive treatment plans. The typical location at the cerebral convexity and falx should prompt one to seek the differential of a cystic meningioma.

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