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Cystic Meningioma, an Uncommon Entity: A Case Report

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Abstract Cystic meningioma refers to meningothelial neoplasms or meningiomas associated with cyst formation. Clinical features depend on the tumors' size and location, and include symptoms of increased intracranial pressure, seizures, and focal neurological deficit. Four types of cystic meningiomas are described in the literature, suggested by Nauta et al., based on radiologic findings: Type I: Intratumoral cysts in which the tumor, macroscopically visible on all sides of the cyst, surrounds the cavity; Type II: Intratumoral cysts, lying at the periphery of the tumor and surrounded by a row of neoplastic cells, detectable microscopically; Type III: Peritumoral cysts, whose walls consisted partly of adjacent parenchyma and partly of the tumor; and Type IV: Peritumoral cysts, whose walls are formed by the arachnoid (arachnoid cyst), separated from the tumor by a distinct capsule. Theories proposed to explain cyst formation include degeneration or necrosis, direct secretion by meningioma, and reactive changes (peripheral arachnoid cysts). The tumor itself has features similar to non-cystic meningiomas. The cysts are usually of variable size and can be entirely surrounded by tumor (types I or II), clearly between the tumor and the brain (type IV), or within the adjacent brain (type III). On imaging, it is sometimes difficult to distinguish between these types. We herewith present two cases of cystic meningiomas.

Keywords: *cystic meningioma*

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1. Introduction

Cystic meningiomas are meningothelial neoplasms associated with cyst formation. True cystic meningiomas may show few large central cysts, these are most common type, and others may show more numerous smaller peripheral cysts. Cystic meningiomas are over-represented in male patients and the pediatric population. Various mechanisms have been proposed for formation of cysts in a cystic meningioma, and probably more than one is applicable, depending on the location of the cysts. These mechanisms include degeneration or necrosis in the meningioma, direct secretion by meningioma and reactive changes (peripheral arachnoid cysts).

Various types of cyst formation have been described in a cystic meningioma and these are classified according to radiologic findings by Nauta et al. as follows: Type I: Intratumoral cysts in which the tumor, macroscopically visible on all sides of the cyst, surrounds the cavity; Type II: Intratumoral cysts, lying at the periphery of the tumor and surrounded by a row of neoplastic cells, detectable microscopically; Type III: Peritumoral cysts, whose walls consisted partly of adjacent parenchyma and partly of the tumor; and Type IV: Peritumoral cysts, whose walls are formed by the arachnoid (arachnoid cyst), separated from the tumor by a distinct capsule.

Prognosis and treatment options depend on a variety of factors, including histological subtype, location of the tumor, age of the patient, and associated comorbidities. Small meningiomas in asymptomatic patients can be followed with serial imaging studies, preferably MRI, to assess for interval growth. Most benign meningiomas, depending on location and accessibility, can undergo total resection and have a very low recurrence rate of approximately 6%. Trans-arterial embolization is occasionally utilized prior to surgical resection, given the highly vascular nature of some of these tumors.

2. Material and Methods

We herewith present two patients, aged 35 years (Case 1) and 43 years (Case 2), who presented to our department with the common complaint of headache. The first patient (Case 1) also had behavioral issue as another clinical presentation. Both patients had no other gross deficit and were fairly intact neurologically. Both underwent CT brain and MRI brain imaging, which revealed the brain lesions

as per Figure 1A-B (Case 1) and 2A-B (Case 2). The first patient (Case 1) had large peritumoral cysts with multiple compartments, with left falcine small solid tumor and the second patient (Case 2) had a large right temporoparietal lesion with equal sized cysts surrounding, showing contrast enhancement and pressure effects.

3. Results

All possible risks and benefits of surgical resection were discussed with the family, and once agreed surgery was offered to them. The first patient (Case 1) underwent bifrontal craniotomy and excision of the lesion with surrounding cyst and the second patient (Case 2) underwent right temporoparietal craniotomy and excision of the cyst bearing lesion. Post-operative period was uneventful. Both patients were extubated, and after a day's stay in ICU went to ward with no deficit and had satisfactory post-operative scans as per Figure 1C (Case 1) & 2C-D (Case 2). Both patients were doing well in their OPD follow up, with well healed wounds. Histopathology diagnosis for both tumors was Angiomatous Meningioma, WHO grade I, as per Figure 3 (Case 1) & 4 (Case 2).

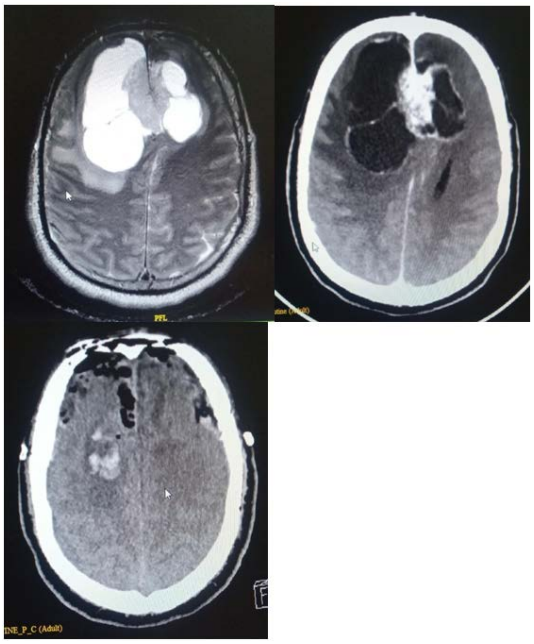

Figure 1 (Case 1). A-B. Pre-operative images. C. Post-operative images of patient 1

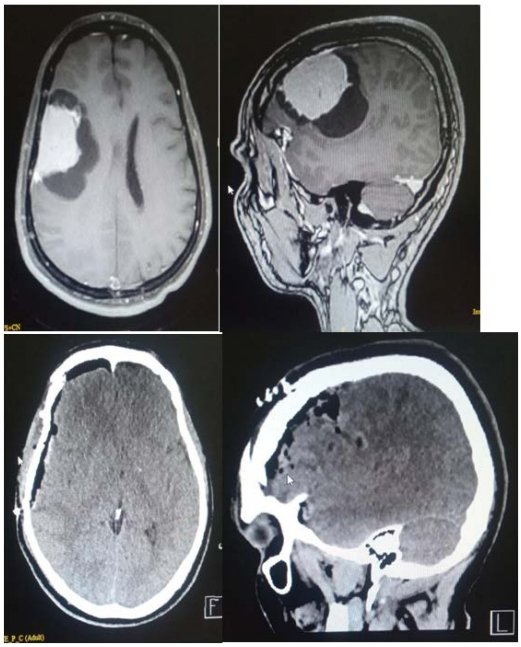

Figure 2 (Case 2): A-B. Pre-operative images. C-D. Post-operative images of patient 2

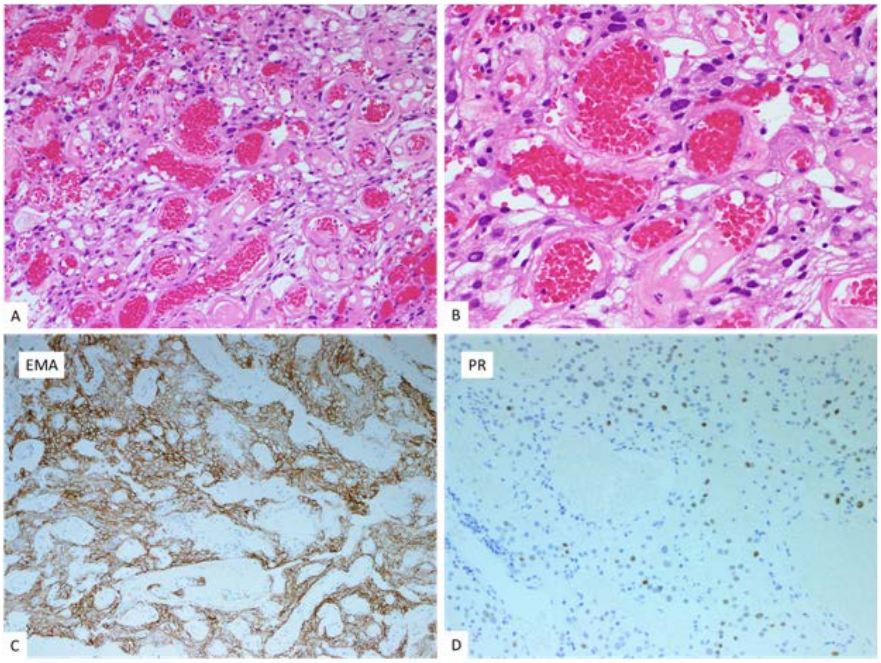

Figure 3 (Case 1). Angiomatous meningioma with abundant, closely packed, blood vessels of varying caliber (10x magnification). B. Angiomatous meningioma with abundant blood vessels and meningothelial cells with microcystic cytological features and nuclei showing degenerative nuclear atypia (20x magnification). C. Epithelial membrane antigen (EMA), immunohistochemical stain, shows positive membranous and cytoplasmic staining of the tumor cells (10x magnification). D. Progesterone receptor (PR) shows weak focal positive nuclear staining in the tumor cells (10x magnification)

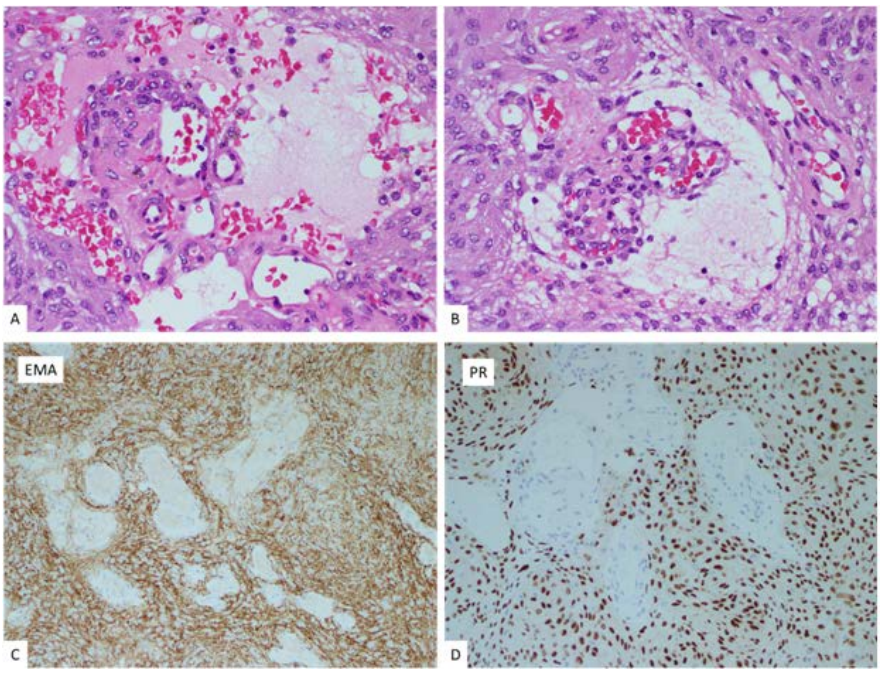

Figure 4 (Case 2): A, B. Angiomatous meningioma with abundant blood vessels of varying caliber, some with a vague glomeruloid architecture, and associated macrocysts / microcysts containing proteinaceous material (20x magnification). C. Epithelial membrane antigen (EMA), immunohistochemical stain, shows positive membranous and cytoplasmic staining of the tumor cells (10x magnification). D. Progesterone receptor (PR) shows positive nuclear staining in the tumor cells (10x magnification

4. Discussion

Nauta et al., first described and classified cystic meningiomas based on their radiologic findings in 1979. [1] Amit Mittal et al., described the unusual imaging of such cystic meningiomas in 2010. [2] Riemenschneider MJ in 2006 described histological classification and molecular genetics of meningiomas in detail. [3] Ruelle A in 1985 has elaborated in detail the definition of a true cystic meningioma. [4] Rengachary S in 1979 has elaborated the various cystic lesions associated with meningiomas. [5] Amin OSM in 2015 further described in detail various pathogenesis and treatment protocols for these lesions. [6]

5. Conclusion

Cystic meningioma is an uncommon form of meningioma and the radiological appearance and location of the cystic/solid components of the mass may create a diagnostic dilemma. Our cases, one being 35 years old (Case 1) and other being 43 years old (Case 2) had presented with usual signs and symptoms of intracranial mass effect, and imaging revealed solid lesions with large perilesional cysts. Differential diagnosis of the cases was Cystic meningioma, which was confirmed with histopathology, belonging to Type III as per Nauta et al, radiologic classification of Cystic meningiomas.

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