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Cystic Meningiomas: Report of Three Cases

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ABSTRACT

Although intracranial meningiomas are usually solid and firm tumours, some are associated with diagnostically confusing cysts. In this article, we present our experience from three of our patients with cystic meningiomas and discuss the characteristics of these lesions. We detected type two cysts in our first and third cases, and a type one cyst in the second case, according to the Nauta classification. Contrast enhancement of the cyst wall was detected in our third case and an atypical meningioma was diagnosed histopathologically. We conclude that the contrast enhancement of the cyst wall might be a predictive factor for a malignant meningioma. The cyst wall should be completely removed in these patients to prevent tumour recurrences.

KEY WORDS: Cystic meningioma, intracranial tumours, glial tumour, metastatic tumour

INTRODUCTION

Cystic meningiomas are quite rare, accounting for 2% to 4% of all intracranial meningiomas. Since they may mimic metastatic neoplasms, hemangioblastomas, neuroblastomas, and glial tumours with cystic components (glioblastoma multiforme, or cystic astrocytoma) and occasionally only the final pathological examination will define the diagnosis, knowledge and recognition of the typical features of these lesions are important (1, 2, 4, 9, 10, 13, 14, 15). In this article, we present our experience from three of our patients with cystic meningiomas, and discuss the characteristics of these lesions.

CASE REPORTS

Case 1

A 58-year-old man was admitted to our clinic for tonic-clonic seizure. His neurological examination revealed confusion, aphasia and right-sided hemiparesis. Computed tomography (CT) and magnetic resonance imaging (MRI) studies demonstrated a cystic tumour in the left middle cranial fossa which had a dural attachment in contrast enhanced images (Figure 1A, B). A preoperative diagnosis of cystic meningioma was made. At surgery, we observed a peritumoural cyst containing xanthochromic fluid, which surrounded the tumour mass. It was attached to the dura and bone, was wholly extracerebral, and was separated from the surrounding normal brain by a cystic wall. The tumour was completely removed with its dural attachment via a frontotemporal craniotomy. Histopathological studies showed a meningothelial meningioma. After an uneventful post-operative course, the patient was discharged on the 7th post-operative day. There was no residual tumour or cyst in follow-up contrast enhanced CT scan (Figure 1C).

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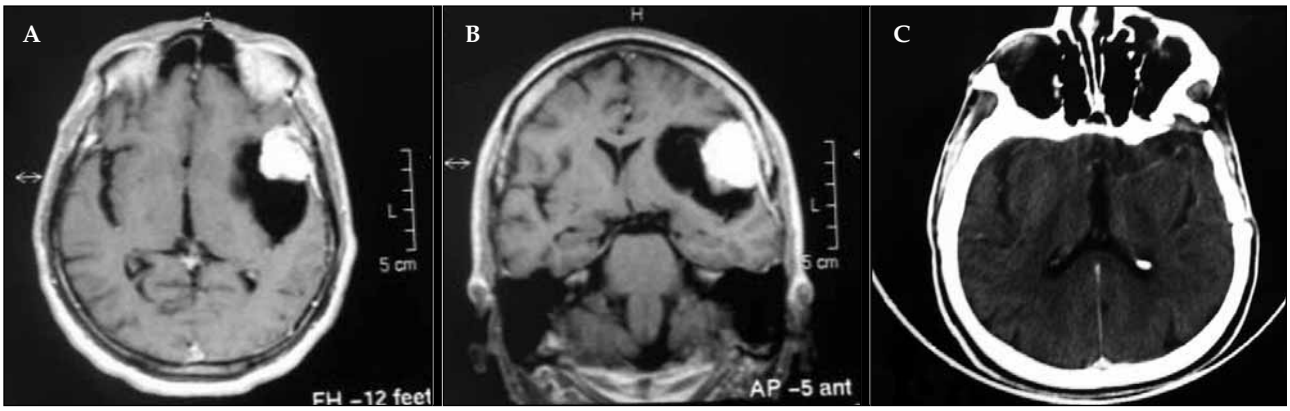

Figure 1: Axial **(A)** T1-weighted MRI of the brain revealing a cystic tumour in the left middle cranial fossa. Coronal **(B)** T1-weighted gadolinium-enhanced MRI of the brain revealing a dural attachment. Postoperative axial **(C)** contrast-enhanced CT scan shows no residual tumour or cyst.

Case 2

A 48-year-old woman presented with the complaint of headache for 3 months. Her neurological examination was normal. Both CT and MRI images revealed a tumour in the right parietooccipital region with several cysts in the mass and a wide surrounding area of cerebral oedema. The tumour enhanced with gadolinium (Figure 2A, B). A preoperative diagnosis of cystic meningioma was made, but a glial tumour was also considered in the differential diagnosis. During surgery, we observed intratumoural cysts filled with dark brown or dirty yellow fluid. Intraoperative frozen section was taken from the cyst wall and solid component, and both were diagnosed as a benign lesion. The tumour was completely removed with dural attachment via a parietooccipital craniotomy. The final histopathological examination revealed the diagnosis of a meningothelial meningioma. The postoperative course was uneventful and the patient was discharged on the 7th postoperative day. There was no residue in follow-up CT scan with contrast enhancement (Figure 2C).

Case 3

A 45-year-old male had a tonic-clonic seizure 2 months before admission, but he did not seek medical evaluation until admission. Two days before admission, he had two seizures again and was referred to our hospital. Neurological examination revealed confusion, left-sided central facial palsy, and mild left hemiparesis with mental slowness. A tumour in the right frontoparietal region with peritumoural cyst and large surrounding cerebral oedema was seen in MRI images. The mass, its attachment to dura and the cyst wall were all strongly enhanced with gadolinum (Figs. 3A, B). A

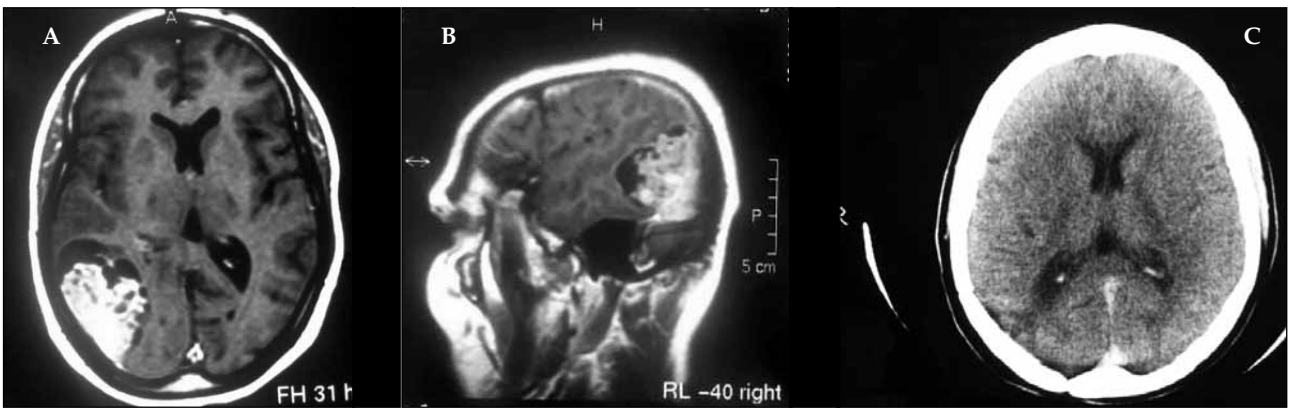

Figure 2: Axial **(A)** T1-weighted MRI shows a tumour in the right parietooccipital region with several cysts in the mass and a wide surrounding area of cerebral oedema. Sagittal **(B)** T1-weighted MRI image shows enhancement with gadolinium. Postoperative axial **(C)** contrast-enhanced CT scan shows no residual tumour or cyst.

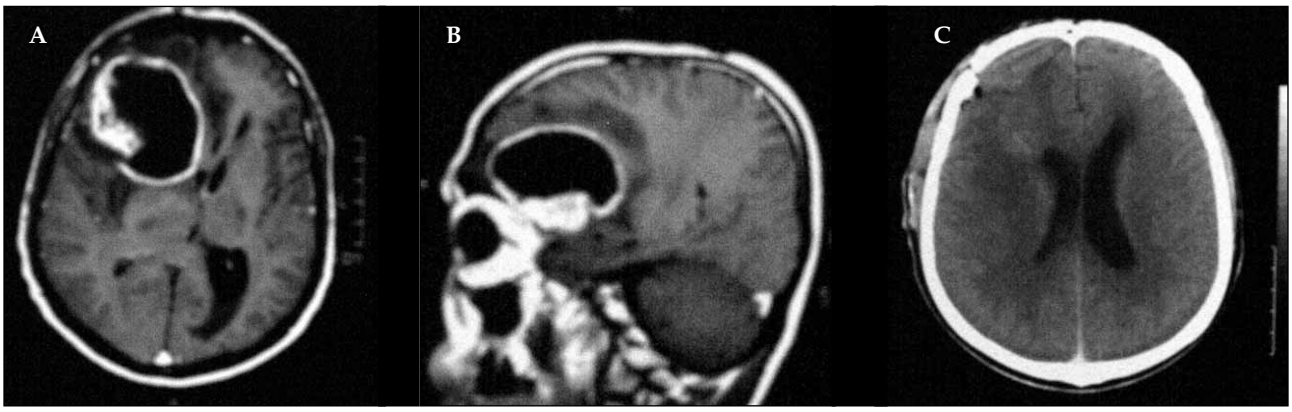

Figure 3: Axial **(A)** T1-weighted MRI shows a tumour in the right frontoparietal region with peritumoural cyst and large surrounding cerebral oedema. Sagittal **(B)** T1-weighted MRI revealing that the mass, its attachment to the dura and the cyst wall are all strongly enhanced with gadolinium. Postoperative axial **(C)** contrast-enhanced CT scan shows no residual tumour or cyst.

provisional diagnosis of right frontal cystic astrocytoma was made. However, cystic meningioma, high grade glial tumour and brain abscess were also suggested in the differential diagnosis. At, surgery, we observed a peritumoural cyst containing xanthochromic fluid, which surrounded the tumour. Intraoperative biopsy was taken from the cyst wall and solid component, and both were reported by the pathologist as a malignant lesion. The tumour was therefore completely removed together with the cyst wall via a frontoparietal craniotomy. The tumour was soft and vascular. The final pathological findings revealed atypical meningioma. Postoperatively, the patient had a mild left hemiparesis, which completely resolved after 2 months with no evidence of tumour recurrence (Figure 3C). One year follow-up revealed a normal neurological examination and no signs of tumour recurrence.

DISCUSSION

Meningiomas are common benign tumours accounting for 13 to 18% of intracranial neoplasms. The use of CT and MRI has greatly improved our ability to locate and identify the tumour with dural attachment, with a histological predictive accuracy approaching 90%. However, improved imaging techniques can not eliminate diagnostic confusion between cystic meningiomas and some other intracranial tumours (2, 4, 9).

Cystic meningiomas are not commonly encountered tumours. Fortuna et al. (6) have reported 177 patients with cystic meningioma including their own 22 patients, and these 22 account for only 1.7% of 1313 intracranial meningiomas operated on during 36 years up to 1988 at their institution. In 1938, Cushing and Eisenhardt (3) reported 13 (4.2%) patients with cyst formation in their series of 313 intracranial meningiomas. Parisi et al. (10) reported that 7 (4.6%) of 152 meningiomas were cystic, and the incidence has been stated to be as high as 7%. Jung et al. (7) reported 21 (5.5%) patients with cystic meningioma of 365 intracranial meningiomas.

Penfield (11) was the first to describe cyst formation in a meningioma. Rengachary et al. (12) recognized only two kinds of cysts: 1) intratumoural cysts and 2) peritumoural cysts, depending on whether the cyst is lined by meningothelial cells. Nauta et al. (8) classified cystic meningiomas into four types according to the site of the cavity: 1) centrally located intratumoural cyst; 2) peripherally located intratumoural cyst; 3) peritumoural cyst in the adjacent parenchyma; and 4) peritumoural cyst between the tumour and the adjacent parenchyma. We detected type 2 cysts in our first and third cases; while a type 1 cyst was detected in the second case according to the Nauta classification.

It is difficult to diagnose cystic lesions preoperatively. Ferrante et al. (5) reviewed 166 cystic meningiomas reported in the literature and noted that a correct preoperative diagnosis was made in 12.6% of cases by angiography and in 37.9% by CT scan. Meningiomas are often isointense with the brain on both T1- and T2-weighted images, but are usually well demonstrated with contrast injection. An MRI shows the presence of a dural attachment,

extra-axial location, and cerebral oedema better than CT. Demonstration of the thickening of the dura (dural tail) with MRI is sometimes a useful clue for the preoperative diagnosis of a cystic meningioma (9, 14). However, cystic meningiomas may not be differentiated from partly enhanced glioma or metastasis on MRI because of their nonenhanced cysts and focal oedema (2, 5, 13). The CT appearance of cystic meningioma with surrounding oedema as in our second and third patients may mimic that of a glial tumour with cystic or necrotic change.

Since the extraaxial location of the mass can be seen easily, a preoperative MRI is more useful than CT for appropriate surgical planning. Coronal MRI scan will help to visualize the enhancing mural nodule and its attachment to the falx or the dura. Some authors state that the existence of a dural attachment in cystic meningiomas is not very common (1, 2, 3, 5, 8, 15). However, we detected dural attachment of the tumour in two cases. In the third case, the cyst wall was enhanced with contrast medium, which is a rare feature. In this patient, the histopathological diagnosis was malignant meningioma. Therefore, in our opinion, contrast enhancement of the cyst wall might be a predictive factor for malignant meningiomas.

The surgical removal of the cyst wall of cystic meningiomas is controversial, but total surgical removal is recommended (1, 7).

CONCLUSION

The preoperative diagnosis is essential in cystic meningiomas since it will certainly affect the surgical strategy and outcome of these patients. If dural attachment or dural tails are detected on radiological evaluation, these may improve accuracy in diagnosis of cystic meningiomas. The contrast enhancement of the cyst wall might be a predictive factor of a malign meningioma. In these patients, the cyst wall should be completely removed to prevent tumour recurrences.

REFERENCES

1. Carvalho GA, Vorkapic P, Biewener G, Samii M. Cystic meningiomas resembling glial tumors. Surg Neurol 1997; 47:284-290.
2. Chen TY, Lai PH, Ho JT, Wang JS, Chen WL, Pan HB, Wu MT, Chen C, Liang HL, Yang CF. Magnetic resonance imaging and diffusion-weighted images of cystic meningioma: correlating with histopathology. Clin Imaging 2004; 28:10-19.
3. Cushing H, Eisenhardt L. Meningiomas: their classification, regional behavior, life history, and surgical end results. Thomas, Springfield, 1938.
4. De Jesús O, Rifkinson N, Negrón B. Cystic Meningiomas: A Review. Neurosurgery 1995; 36: 489-492.
5. Ferrante L, Acqui M, Lunardi P, Qasho R, Fortuna A. MRI in the Diagnosis of Cystic Meningiomas: Surgical Implications, Acta Neurochir 1997; 139: 8-11.
6. Fortuna A, Ferrante L, Acqui M, Guglielmi G, Mastronardi L. Cystic meningiomas. Acta Neurochir 1988; 90:23-30.
7. Jung TY, Jung S, Shin SR, Moon KS, Kim IY, Park SJ, Kang SS, Kim SH. Clinical and histopathological analysis of cystic meningiomas. J Clin Neurosci. 2005; 12: 651-5.
8. Nauta HJW, Tucker WS, Horsely WJ, Bilbao JM, Gonsalves C. Xanthochromic cysts associated with meningioma. J Neurol Neurosug Psych 1979; 42:529-535.
9. Odake G. Cystic Meningioma: Report of Three Patients. Neurosurgery 1992; 30: 935-939.
10. Parisi G, Tropea R, Giuffrida S, Lombardo M, Giuffre F. Cystic meningiomas: Report of seven cases. J Neurosurg 1986; 64:35-38.
11. Penfield W. Tumors of the sheaths of the nervous system. in Penfield W, Cytology and cellular pathology of the nervous system. Hoeber, New York, 1932; 955-990.
12. Rengachary S, Batnitzky S, Kepes JJ, Morantz RA, O'Boynick P, Watanabe I. Cystic lesions associated with intracranial meningiomas. Neurosurgery 1979; 4:107-114.
13. Wasenko JJ, Hochhauser L, Stopa EG, Winfield JA. Cystic meningiomas: MR characteristics and surgical correlations. AJNR Am J Neuroradiol 1994;15:1959-65.
14. Weber J, Gassel AM, Hoch A, Kilisek L, Spring A. Intraoperative management of cystic meningiomas. Neurosurg Rev 2003; 26:62-66.
15. Zee CS, Chen T, Hinton DR, Tan M, Segall HD, Apuzzo M. Magnetic resonance imaging of cystic meningiomas and its surgical implications. Neurosurgery 1995; 36:482-488.