CASE REPORT

Cystic meningioma

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SUMMARY

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. We report on the case of an 80-year-old left-handed man who presented with recurrent focal motor seizures and secondary generalisation. A large left-sided parieto-occipital cystic mass was detected on contrast CT of the brain. The appearance suggested a malignant tumour. However, brain MRI with gadolinium delineated the solid and cystic component precisely. 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.

BACKGROUND

The presence of cystic components within meningiomas is an uncommon radiological appearance. A diagnosis other than meningioma usually comes into mind; therefore, this would easily misguide the preoperative diagnosis and management plan.^{1–3}

CASE PRESENTATION

An 80-year-old left-handed man had been experiencing recurrent focal motor seizures with secondary generalisation for a few years. He had had a persistent pancephalic headache for the past 10 years. He was hypertensive but not diabetic. He denied head trauma or alcohol or illicit drug ingestion. There was no family history of note. The patient was illiterate and lived in a mountainous village near the Iraq–Iran border. Examination revealed intact cognition with no language or speech abnormality, but the patient had grade 4 right-sided pyramidal weakness, exaggerated deep tendon reflexes and an extensor plantar reflex. The patient demonstrated mild right-sided sensory neglect.

INVESTIGATIONS

A battery of routine blood tests, chest X-ray and abdominal ultrasonography turned out to be unremarkable. A CT of the brain with contrast revealed a large left-sided parieto-occipital cystic mass with solid components and perilesional oedema (figure 1). The radiologist suggested a diagnosis of primary or secondary intra-axial malignant tumour. However, brain MRI with gadolinium delineated the presence

Figure 1 Contrast CT of the brain of the patient. There is a large left-parieto-occipital contrast-enhanced mass surrounded by hypodense rim and perilesional oedema. There is compression of the adjacent lateral ventricle. The radiologist suggested a diagnosis of primary or secondary malignant tumour.

of an extra-axial mass with peripheral cystic components and underlying brain oedema. The mass took the contrast homogeneously and there was a dural tail; the appearance was highly suggestive of cystic meningioma (figure 2).

DIFFERENTIAL DIAGNOSIS

Primary or secondary malignant tumours usually rank first on the list of differential diagnoses; previous strokes, subdural haematomas, abscesses and even hydatid cysts, may be diagnostic possibilities.

TREATMENT

The mass was removed surgically and histopathological examination confirmed a benign WHO Grade I fibroblastic meningioma; there was no significant cell necrosis or mitosis.

OUTCOME AND FOLLOW-UP

The in-hospital course was uneventful and the patient was discharged home after 7 days. He was prescribed oral levetiracetam. Unfortunately, the patient died suddenly after 3 weeks because of heart attack, as the family had stated.

DISCUSSION

Meningiomas are the most common primary non-glial intracranial tumours; they arise from meningotheelial cells of the meninges. They form about 20% of all central nervous system tumours. Meningiomas with a cystic component, so-called cystic meningiomas, comprise approximately 3–7%

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Figure 2 MRI of the patient with different sequences; axial T1-weighted film with gadolinium (A), coronal T2-weighted film (B), axial T2-FLAIR film (C) and axial diffusion-weighted image (DWI) film (D). There is a well-defined extra-axial durally based mass measuring 6.6×5.1×6.5 cm in maximum diameters. The mass is located at the left parieto-occipital region, and consists of solid and peripheral cystic components. The solid component shows intermediate signal intensities on the T1-weighted and T2-weighted images with restricted diffusion on the DWI and demonstrates homogenous contrast enhancement. The mass shows no underlying cerebral invasion but there is perilesional brain oedema and mass effect on the adjacent brain tissue and left lateral ventricle. This is cystic meningioma.

of adult meningiomas, are more common in males and are more commonly found at the frontoparietal areas.^{1–6}

Meningiomas are typically solid tumours. The mechanism (or mechanisms) behind the formation of these cystic meningiomas is still unclear. A variable combination of cellular necrosis, ischaemia and haemorrhage might develop. This may be followed by gradual build-up of xanthochromic fluid at the periphery of the mass with subsequent coalescence, and formation of cavities and then large cysts. Active secretion of fluid by functional tumour cells into the tumour, with glial proliferation as a response to the presence of a tumour with the elaboration of fluid by glial cells, is an additional mechanism.^{5–7}

On brain CT imaging, meningiomas usually appear as diffusely and homogeneously enhancing extra-axial solid masses; about two-thirds demonstrate a variable appearance of peritumoural oedema, depending on their location and type.⁴ A sensitivity of 100% and a specificity of 90% of these scans can be reached, allowing a precise preoperative diagnosis in the majority of cases. However, the appearance of a mass with cystic changes broadens the differential diagnosis and prompts the physician to think of a diagnosis other than meningioma. Primary or secondary malignant tumours usually rank first on the list; previous strokes, subdural haematomas, abscesses and even hydatid cysts, may be diagnostic possibilities. Brain MRI with contrast achieves a preoperative diagnostic accuracy of 80%, a figure that is much higher than that of CT scanning (approximately 50%).^{8–10} For instance, Guan *et al*³ found an infratentorial cystic mass in a 30-year-old woman. The radiological diagnosis was a haemangioblastoma. However, when they performed the operation to remove the tumour, the intraoperative

appearance of the mass was more suggestive of a pilocytic astrocytoma. Finally, histopathological examination confirmed that the mass was a WHO Grade 1 meningioma.

In 1979, Nauta *et al*¹¹ classified cystic meningiomas into four subtypes, depending on the radiological location of the cyst:

1. Centrally located intratumoural cyst;
2. Peripherally located intratumoural cyst;
3. Peritumoural cyst in the adjacent parenchyma;
4. Peritumoural cyst between the tumour and the adjacent parenchyma.

Our patient's MRI had demonstrated the presence of a Nauta type 4 cystic meningioma. The formation of peritumoural cysts of Nauta type 4 may be secondary to a widening of the sub-arachnoid space or mechanical trapping of the cerebrospinal fluid spaces compressed by the tumour and, less commonly, true arachnoid cysts.⁷

The treatment and long-term outcome depend on several factors: location of the tumour, histological subtype of the cells, the patient's age and the presence of other comorbidities.⁹ One must emphasise that about 8% of all cystic meningiomas are malignant and that approximately 12% are angioblastic.⁷ Small asymptomatic tumours can be managed conservatively with frequent imaging follow-ups. If the tumour localisation permits full access, complete resection, with or without preoperative embolisation, results in a recurrence rate of 6%.²

In conclusion, cystic meningiomas are uncommon forms of meningiomas that do not demonstrate pathognomonic radiological findings. In addition, such tumours are not a histopathological variant/subtype of meningiomas. The appearance of cystic components within/around the mass usually prompts the physician to think of a diagnosis other than meningioma.

Histopathological diagnosis is always required to confirm the diagnosis of meningioma.

Patient consent Obtained.

Provenance and peer review Not commissioned; externally peer reviewed.

Learning points

- ▶ Cystic meningiomas comprise approximately 3–7% of adult meningiomas, are more common in males and are more commonly found at the frontoparietal areas.
- ▶ The mechanism (or mechanisms) behind the formation of these cystic meningiomas is still unclear.
- ▶ Primary or secondary malignant tumours, old strokes, subdural haematomas, abscesses and hydatid cysts, may be differential diagnostic possibilities.
- ▶ The treatment and long-term outcome depend on the location of the tumour, histological subtype of the cells, the patient's age and the presence of other comorbidities.

Contributors OSMA diagnosed the patient, managed the patient and drafted the manuscript. SSS helped in the diagnosis and manuscript drafting. FK helped in the diagnosis and manuscript drafting.

Competing interests None.

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