CASE REPORT

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Meningioma mimicking an intraparenchymal cystic tumor

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ABSTRACT

Meningiomas rarely exhibit cystic lesions with mural nodules, and may be misdiagnosed as intraparenchymal cystic tumors. We herein present a 64-year-old woman with a cystic lesion and enhancing mural nodule in the left temporal lobe accompanied by peritumoral brain edema. Differential diagnoses included low-grade gliomas, hemangioblastoma, and cystic meningioma. Gross total resection of the tumor was achieved through a temporal surgical approach. Intraoperative findings showed that the tumor was an extraparenchymal tumor. The cyst was covered by an extraparenchymal thin membrane and the cystic fluid was yellowish in color. The final result of the pathological examination was microcystic meningioma, WHO grade I. Although intraparenchymal tumors, such as hemangioblastoma, ganglioglioma, pilocytic astrocytoma, and pleomorphic xanthoastrocytoma, commonly display this MRI pattern, meningioma needs to be included in the differential diagnosis.

Keywords: microcystic meningioma, cystic lesion, intraparenchymal tumor, mural nodule, cystic meningioma

INTRODUCTION

Meningiomas arise from the meninges and account for 25% of primary intracranial tumors.[1)] Cyst formation is uncommon and accounts for 3–5% of all intracranial meningiomas.[2,3)] Cystic meningiomas may be misdiagnosed as a primary glial tumor or metastatic tumor on preoperative magnetic resonance imaging (MRI).[2,4)] Furthermore, cystic meningiomas may exhibit a mural nodule and be misdiagnosed as hemangioblastoma, pilocytic astrocytoma, and ganglioglioma.[5)] We herein report a case of microcystic meningioma that radiologically mimicked an intraparenchymal cystic tumor showing as a cystic lesion with a solid mural nodule on preoperative MRI.

CASE REPORT

A 64-year-old right-handed woman presented with dizziness and ear fullness and had a

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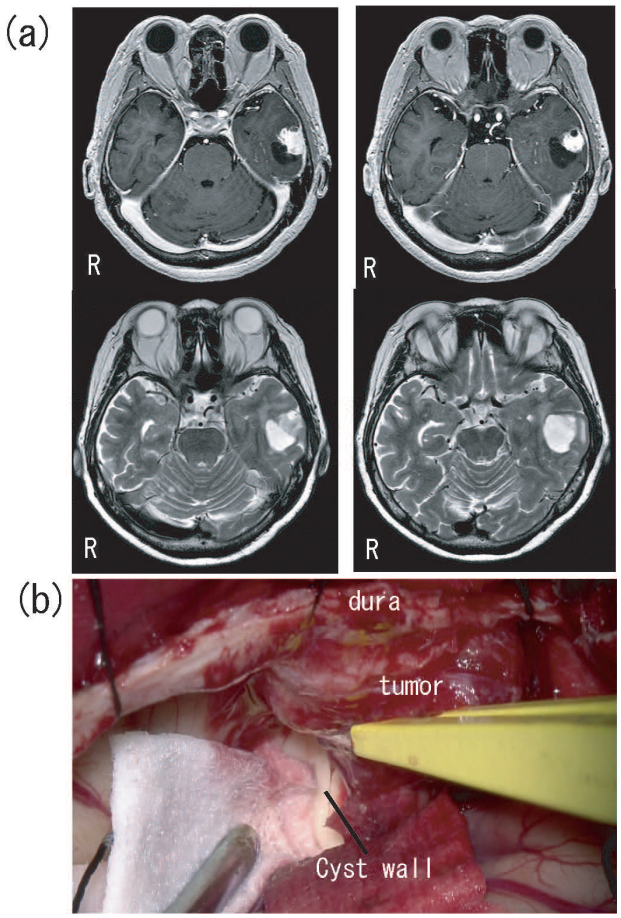

Fig. 1 (a) Preoperative gadolinium-enhanced T1-weighted magnetic resonance imaging (MRI) shows a cystic lesion with an enhancing mural nodule. The cystic lesion (40×23×25 mm) showed a low T1 signal and high T2 signal with peritumoral brain edema.
(b) An intraoperative image of the tumor. The tumor was pinkish in color, granular, and attached to the dura.

previous history of ulcerative colitis. A neurological examination revealed mild cerebellar ataxia. Brain MRI showed atherothrombosis in the right cerebellar hemisphere as well as a cystic lesion (40×23×25 mm) with T1 signal hypointensity, T2 signal hyperintensity, and a solid enhancing mural nodule in the left temporal lobe with peritumoral edema (Fig. 1a). Differential diagnoses were low-grade gliomas, hemangioblastoma, and cystic meningioma. Functional MRI revealed left-side language dominance. Therefore, in consideration of the possibility of an intraparenchymal tumor in the language dominant side, awake craniotomy was prepared in order to prevent post-operative neurological deficits. Gross total resection of the tumor was achieved through a temporal surgical approach. The tumor was pinkish in color, granular, and attached to the dura (Fig. 1b). The boundary between the tumor and brain was clear and the surface arachnoid was contiguous to the cyst wall. Awake craniotomy was not performed because intraoperative findings showed that the tumor was an extraparenchymal tumor. The cyst was covered by an extraparenchymal thin membrane and the cystic fluid was yellowish in color.

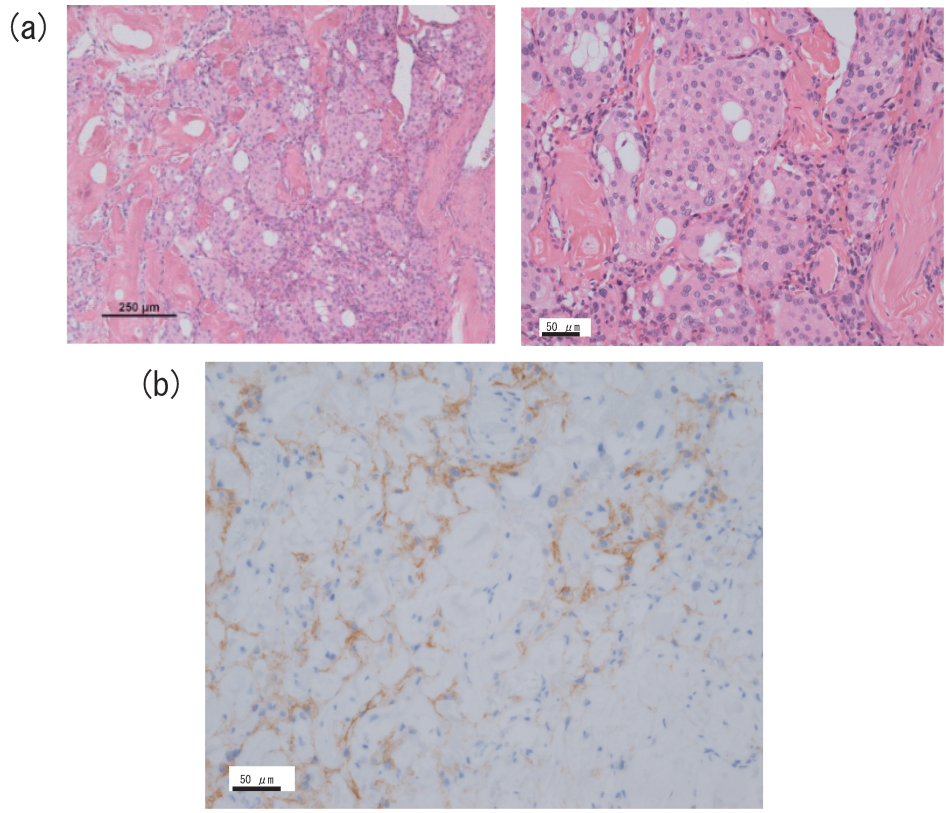

Fig. 2 Histological features of the tumor. (a)Tumor tissue exhibited microcystic components and tumor cells showed large pleomorphic or hyperchromatic nuclei with hematoxylin and eosin (H&E) staining. (b) The epithelial membrane antigen (EMA) tested positive.

Permanent hematoxylin and eosin-stained sections showed meningioma with a predominantly microcystic morphology. Tumor cells had large pleomorphic or hyperchromatic nuclei and were immunohistochemically positive for the epithelial membrane antigen (clone E29, Dako) (Fig. 2). The positive expression rate of Ki-67 was 5% (clone Ki-67, Dako). The final diagnosis from the pathological examination was microcystic meningioma, WHO grade I. Inflammatory cells, but no tumor cells were observed in the cystic fluid. She exhibited no postoperative neurological deficits.

DISCUSSION

Our patient had atherothrombosis in the right cerebellar hemisphere, and cystic meningioma in the left temporal lobe was incidentally diagnosed with MRI. MRI findings were a cystic lesion and solid enhancing mural nodule with peritumoral brain edema, which mimicked an intraparenchymal cystic tumor. Cystic meningiomas are rare, accounting for 3–5% of all intracranial meningiomas.[2,3] Several mechanisms have been suggested for cystic formation in meningiomas, such as the loculation of widened subarachnoid spaces, ischemic necrosis, peritumoral demyelination, cystic degeneration with or without hemorrhage, the transudation of cerebral edema into a peritumoral cyst, and secretion by tumor cells or reactive astrocytes.[3,5] In

our case, extraparenchymal cystic formation suggested peritumoral arachnoid cysts rather than intratumoral degenerative cysts as the mechanism responsible for cyst formation. A previous study reported that meningothelial meningioma most frequently forms the cyst from a histopathological aspect, and edema and enhancement were less marked in microcystic meningioma than in meningothelial meningioma.[3] We encountered difficulties diagnosing meningioma subtypes based on presurgical MRI. Microcystic meningioma accounts for 1.6% of intracranial meningiomas,[5,7] and has a distinct morphological pattern, including a loose texture and microcysts with the formation of large extracellular spaces containing edematous fluid.[6] A previous study reported that the MRI findings of microcystic meningiomas showed hypointensity on T1-weighted images, hyperintensity on T2-weighted images, and a high coincidence of peritumoral edema,[8] which were consistent with the MRI findings of the present case. Previous case series reported microcystic meningiomas manifesting a cystic lesion with a mural nodule; however, this finding is extremely uncommon in microcystic meningiomas.[5] Cystic meningiomas with a mural nodule are uncommon and difficult to diagnose radiologically. These presurgical diagnoses affect surgical strategies. In our case, in consideration of the possibility of an intraparenchymal tumor in the language dominant side, awake craniotomy had been prepared, but was ultimately not performed based on intraoperative findings. Although intraparenchymal tumors, such as hemangioblastoma, ganglioglioma, pilocytic astrocytoma, and pleomorphic xanthoastrocytoma, commonly display this MRI pattern, meningiomas need to be included in the differential diagnosis.

CONFLICT OF INTEREST

There are no conflicts of interest.

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