Malignant Lymphoma Arising in the Cerebral Parenchyma Adjacent to a Parasagittal Meningioma
—Case Report—

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Abstract
A 70-year-old woman with an asymptomatic parasagittal meningioma had been under observation with follow-up imaging for 2 years. She gradually developed motor weakness in the left hand. Magnetic resonance (MR) imaging disclosed a newly developed well-enhanced area in the cerebral parenchyma adjacent to the stable original meningioma. The new lesion was enhanced more intensely and less well demarcated. We suspected that the meningioma had enlarged into the brain parenchyma, although MR imaging suggested a border between the extra-axial and intra-axial portions. Craniotomy was performed. Two separate tumors were identified with quite different histological features. The extra-axial tumor was identified as benign transitional meningioma and the intra-axial tumor as diffuse large cell type malignant lymphoma. Immunostaining revealed the lymphoma had B cell origin. After surgical resection, stereotactic radiosurgery was performed for the residual lymphoma. The original site of the lymphoma remained free from relapse, but another lesion developed in the right frontal lobe 3 months later and chemotherapy was performed. The main concern for follow-up imaging of asymptomatic meningioma without surgical resection is growth of the meningioma. However, development of new different tumors is possible, although thought to be rare.

Key words: lymphoma, parasagittal meningioma, double tumor, magnetic resonance imaging, cerebral parenchyma

Introduction
Meningiomas are relatively common and almost invariably benign tumors accounting for 14–18% of intracranial neoplasms.3) Meningiomas occur in various locations throughout the cranial vault and spinal canal, and are intimately associated with the dural and leptomeningeal membranes. Meningiomas usually grow very slowly, with reported growth rates of 2.4 mm per year9) and 3.6% per year.5) Asymptomatic meningiomas, if not large, are usually observed.

We describe an unusual case in which malignant lymphoma developed in the cerebral parenchyma just beneath an untreated parasagittal meningioma after observation for 2 years.

Case Report
A 70-year-old female presented with complaints of tinnitus in March 1998. The tinnitus was thought to be associated with hearing disturbance. However, head magnetic resonance (MR) imaging showed a well-demarcated extra-axial mass lesion with homogeneous enhancement after administration of gadolinium (Gd) in the right frontal region (Fig. 1A). T2-weighted MR imaging showed minimal perifocal edema in the adjacent brain parenchyma without enhancement with Gd. The diagnosis was asymptomatic parasagittal meningioma. The tumor was asymptomatic and only approximately 2 cm in diameter, so we continued to observe the patient with follow-up imaging.

Two years later she gradually developed motor weakness in the left hand. MR imaging disclosed a newly developed well-enhanced area adjacent to the stable original meningioma (Fig. 1B–E). The new
Fig. 1 T1-weighted magnetic resonance images with gadolinium at the initial presentation (A: coronal image) and 2 years later (B: coronal image; C–E: 5 mm-interval axial images, lower [C], middle [D], and upper [E]). A well-demarcated parasagittal meningioma with homogeneous enhancement (arrow) was seen in the right frontal lobe (A). Two years later, another well-enhanced mass (arrowhead) had developed in the parenchyma just beneath the initial mass (B), which was enhanced more intensely than the original tumor and less well demarcated, whereas the original tumor (arrow) was unchanged (C–E). Perifocal edema surrounding the second tumor was seen as a low intensity area (B–E).

lesion was enhanced more intensely and less well demarcated. We suspected that the meningioma had enlarged into the brain parenchyma, although MR imaging suggested a border between the extra-axial and intra-axial portions.

Craniotomy was performed under general anesthesia. Two separate tumors were identified with quite different histological features (Fig. 2). The extra-axial tumor was identified as benign transitional meningioma and the intra-axial tumor as diffuse large cell type malignant lymphoma. Immunostaining revealed the lymphoma had B cell origin. Computed tomography of the chest and abdomen, and gallium scintigraphy found no abnormalities. Bone marrow examination of the sternum was negative. Therefore, the lymphoma was believed to be a primary brain tumor.

Postoperative stereotactic radiosurgery was given for the residual lymphoma. The original site of the lymphoma remained free from relapse, but another lesion developed in the right frontal lobe 3 months later and chemotherapy was performed.

Discussion

This unusual case involved the development of a malignant lymphoma in the cerebral parenchyma just beneath an untreated parasagittal meningioma after observation for 2 years. The patient did not show indications of associated phacomatosis. The two different tumors might be coincidental and unrelated. However, this seems very unlikely, considering the exact correspondence of the sites of the tumors. In a previous case of meningioma and primary brain lymphoma, the lymphoma was located in the temporal lobe and the meningioma in the posterior fossa. There are only a few reports of two distinct tumors in contact, usually involving
meningioma and glial tumors.1,2,4,6,8,10,11)

Various mechanisms for the development of two contiguous tumors of different origin have been proposed.10) The compression by the meningioma could cause an inflammatory reaction and subsequent cytological changes of glial cells. The meningioma might produce an oncogenic factor or other factors that may induce a second tumor. If the second tumor is metastatic, the increased blood flow adjacent to the meningioma may induce accumulation of the metastatic tumor cells to form a mass. In our case, the primary brain lymphoma arose just around the bottom of the concave brain parenchyma beneath the meningioma that had existed for more than 2 years. We speculate that the brain parenchyma was considerably deformed. The meningioma may have acted as the primary irritant resulting in induced neoplastic changes in the underlying brain tissue.

The patient was old and already had mild left hemiparesis. She and her family rejected conventional fractionated whole brain radiation therapy, because of the risk of dementia, for the residual lymphoma after surgical resection. Therefore, we performed radiosurgery intending to achieve prompt shrinking of the tumor2) to relieve the patient’s hemiparesis. We later performed chemotherapy for the recurrence in another region in the brain.

The main concern for follow-up imaging of asymptomatic meningioma without surgical resection is growth of the meningioma. However, development of new different tumors is possible, although thought to be rare.

References


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