INTRODUCTION

Glioblastoma is the most common and most malignant primary brain tumor in adults, and in fact, comprises approximately 50% of the cases occurring in patients aged greater than 65 years\(^7\). The diagnosis of glioblastoma bestows a poor prognosis for patients in all age groups; however, elderly patients seem to be affected the greatest exhibiting poorer survival rates than younger patients\(^5\).

It is not difficult to identify brain tumors upon clinical presentations, brain MRI, and Fluorine-18 fluorodeoxyglucose positron emission tomography (\(^{18}\)F-FDG-PET) scans. However, it can often be hard to distinguish temporal lobe tumors from herpes simplex encephalitis (HSE). After 8 months, the patient complained of recurrent seizures. A follow-up brain MRI revealed marked increases in size and surrounding perilesional edema in the temporal lobe lesion on T2-weighted images and a new contrast-enhancing lesion on gadolinium-enhanced T1-weighted images. Stereotactic brain biopsy revealed a glioblastoma. The atypical encephalitic presentation of glioblastoma should be considered if definitive evidence for the diagnosis of HSE cannot be obtained.

Key Words: Glioblastoma · Herpes simplex encephalitis.
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HSE is the major cause of serious sporadic encephalitis with a predilection for the temporal lobe. Therefore, intravenous acyclovir should be continued until the temporal lesion is diagnosed as any other diseases except HSE, because failure to consider the possibility of HSE can lead to a delay in accurate diagnosis and proper treatment, with a significant risk of mortality and morbidity. The HSV-PCR assay of the CSF is an invaluable test in the diagnosis of a patient with suspected HSE. However, it sometimes tends to remain false-negative in the acute phase of HSE because the intensity of the PCR product is low.

### DISCUSSION

This case highlights unusual central nervous system (CNS) manifestations in a patient with temporal lobe glioblastoma. The presenting encephalitic symptoms, CSF findings, brain MRI, and 

18F-FDG-PET scans are suggestive of HSE. However, similar clinicoradiological findings for glioblastoma and HSE, can lead to delays in the diagnosis of glioblastoma and treatment of patients, and thus resulting in significant cerebral morbidity and poor prognosis.

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**Fig. 1.** Brain MRI and Fluorine-18 fluorodeoxyglucose positron emission tomography (18F-FDG PET) scan at admission. Axial T2-weighted image shows a hyperintense lesion with mild swelling in the left medial temporal lobe (A, B and C). Gadolinium-enhanced T1-weighted image shows normal findings (D and E). Transaxial PET scan reveals a well-defined region of increased uptake of 18F-FDG in the left medial temporal lobe (F).

**Fig. 2.** Brain MRI and pathologic examination at an 8-month follow-up. Axial T2-weighted image shows an extensively diffuse hyperintense lesion with central necrosis, marked perilesional edema in the left temporal lobe and compression of the left cerebral peduncle (A, B and C). Gadolinium-enhanced T1-weighted image shows an irregular peripheral rim-enhancement with central necrosis and surrounding perilesional edema (D and E). Pathologic examination reveals an increased cellularity, tumor necrosis, and endothelial cell proliferation (hematoxylin and eosin stain, ×100) (F).
band of an earlier CSF sample is weak. For this reason, the negative result of the HSV-PCR assay in our case was overlooked and acyclovir continued to be intravenously administrated. The patient improved at the time of discharge. In retrospect, it may have been due to the corticosteroid effect but not acyclovir administration.

Primary and metastatic brain tumors, including glioblastoma, can present as acute encephalitis or encephalopathy, although the frequency is very low. Ginsberg and Compston\(^\text{41}\) reported that 1 (1.5%) out of 65 patients with acute encephalitis actually had a brain tumor (oligodendroglioma). Whitley et al.\(^\text{12}\) reported that 5 (5.3%) of 95 patients who were biopsy-negative for HSE had brain tumors, of whom 3 had primary CNS tumors (2 patients with glioblastomas and 1 patient with primary CNS lymphoma) and 2 had metastatic colon adenocarcinoma. Further, Rees and Howard\(^\text{13}\) reported 3 patients with high grade gliomas mimicking acute viral encephalitis. They suggested that stereotactic brain biopsy should be considered in patients with temporal lobe masses if a definitive diagnosis using PCR assays for common viruses is unavailable. If we had performed stereotactic brain biopsy on our patient based on the initial CNS manifestations, functional deficits would have been much less severe.

MRI, \(^{18}\)F-FDG-PET, and Proton-MR spectroscopy (MRS) scans of the brain are commonly done in the work-up of patients who appear clinically to have had a brain tumor. First, MRI is more sensitive than computerized tomography (CT) in the detection of brain tumors. However, it has been occasionally encountered the patients whose initial MRI were negative or had mild abnormalities, and soon thereafter had high grade glioma. Second, \(^{18}\)F-FDG uptake is generally high in high-grade tumors or in anaplastic transformation of previously known low-grade tumors. However, Lee et al.\(^\text{14}\) reported that \(^{18}\)F-FDG-PET hypermetabolism can be observed in the acute phase of encephalitis due to active inflammation. Third, MRS features of glioblastoma tend to have elevated lipid signal, whereas those of acute encephalitis tend to have elevated myoinositol signal and gradual normalization after the initial acute phase of encephalitis. However, encephalitis tends to resemble low-grade glioma or gliomatosis cerebri with reduced N-acetylaspartate signal and elevated choline and myoinositol. After all, in suspected tumors, serial brain imaging studies are needed to document the evolution of brain tumor and to rule out underlying encephalitis. In our case, additional brain MRI could not be performed in our case due to loss of follow-up. If we had performed short repeat brain imaging after being discharged, early surgical removal for temporal lobe glioblastoma would have been sufficiently available.

**CONCLUSION**

High-grade brain tumors may present as acute encephalopathy with temporal lobe involvement by brain imaging. Therefore, an intensive follow-up with short repeat brain imaging as well as stereotactic biopsy is necessary in patients with temporal lobe masses if definite evidence for the diagnosis of HSE cannot be obtained.

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