Primary Central Nervous System Lymphoma and Meningioma in DOTATATE PET/CT

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Abstract: Although meningiomas are among the most frequent intracranial tumors, primary central nervous system lymphoma represents a rare variant of extranodal non–Hodgkin-type lymphoma. Here, we report on a 73-year-old man with 2 suspicious intracerebral lesions. Combined DOTATATE PET/CT identified 1 lesion as meningioma, whereas the second lesion could not be further specified although a different meningioma was felt very unlikely. Open biopsy of this lesion confirmed the diagnosis of primary central nervous system lymphoma.

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Conflicts of interest and sources of funding: none declared.
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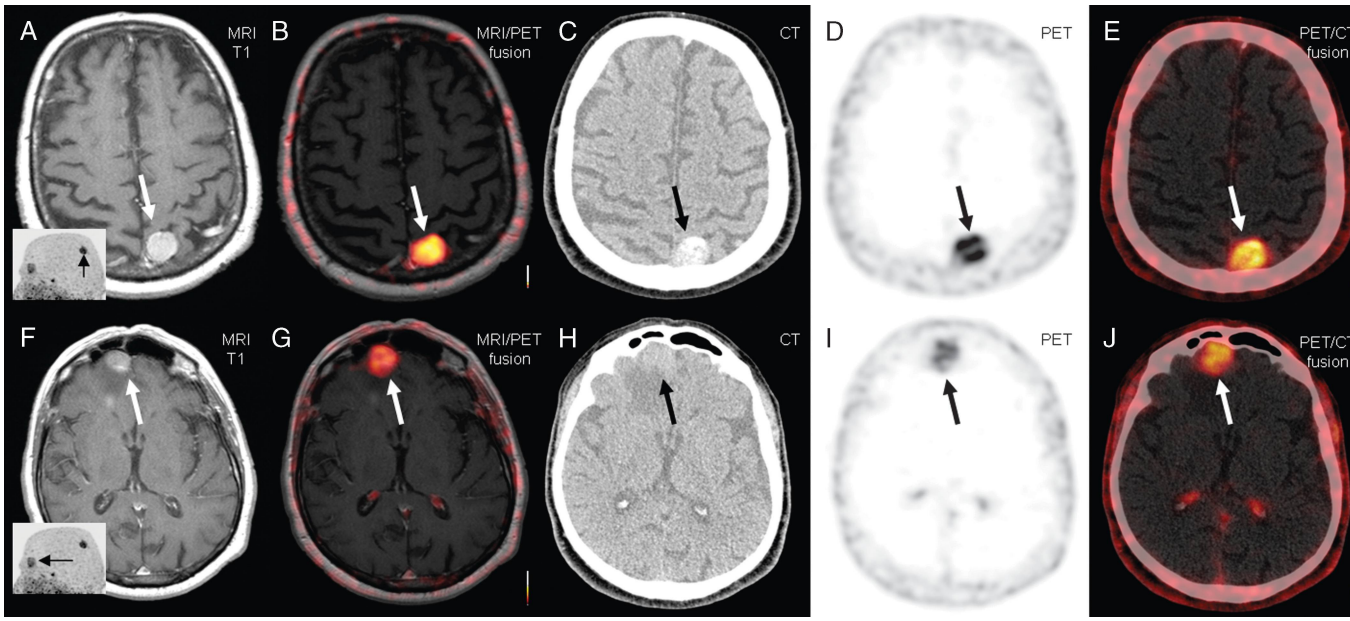

FIGURE 1. Here, we report on a 73-year-old immunocompetent man who was referred to our department for further workup of 2 intracerebral lesions (**A**–**J**). Two months before presentation, he had experienced his first generalized seizure. CT and MRI revealed a partially calcified, homogeneously contrast-enhancing dural lesion in the left posterior parietal region, highly suggestive of meningioma (**A**, arrow). However, a further contrast-enhancing lesion located within the brain parenchyma with surrounding edema could be demonstrated in the right frontal lobe (**F**, arrow). PET and CT using a somatostatin analog (^{68}Ga DOTATATE PET/CT) showed a moderate tracer binding of the parietal lesion (**D**). The partial calcification and homogenous contrast enhancement of this lesion on CT and MRI, the dural localization, and the moderate DOTATATE uptake supported the diagnosis of meningioma (**B**–**E**, arrows). In contrast, the frontal lesion showed no calcification and presented with surrounding edema on CT and MRI. It additionally had low DOTATATE uptake, which is atypical for meningiomas (**F**–**J**, arrows). Differential diagnosis included malignant glioma, metastasis, and lymphoma. Consequently, an open biopsy was performed. Histopathologic examination revealed diffuse large B-cell lymphoma. Because systemic workup ruled out further nodal or extranodal lymphoma manifestations, the diagnosis of a primary central nervous system lymphoma (PCNSL) could be established. Primary central nervous system lymphoma represents approximately 4% of newly diagnosed primary central nervous system tumors, with a reported incidence of 4 cases per million persons per year.[1] This rare intracerebral tumor belongs to the AIDS-defining malignancies and accounts for up to 15% of non–Hodgkin-type lymphomas in HIV-infected patients compared with only 1% of that in the general population.[2] Most cases of non–AIDS-related PCNSL are diagnosed in patients between 45 and 70 years.[3] In addition, 50% to 70% of immunocompetent patients harbor solitary lesions[4] in contrast to approximately 25% developing multifocal disease. Because the lesions can be localized in the brain, the meninges, the eye, or spinal cord, presenting symptoms and signs vary and include focal neurological deficits, neuropsychiatric symptoms, seizures, and ocular symptoms.[5] Contrast-enhanced MRI of the brain is the preferred imaging modality for suspected PCNSL cases. Periventricular lesions are most common (60%)[5] and appear isodense to hyperdense on CT images, isointense to hypointense on T2-weighted MRI images, and usually show homogeneous contrast enhancement. Calcification, necrosis, cystic appearance, and ring enhancement are uncommon.[6] Stereotactic or open biopsy of the involved tissue is the diagnostic procedure of choice. The role of PET scans in the diagnosis of PCNSL is unclear. ^{18}F-FDG PET scans may be used to distinguish glucose-absorbing neoplastic lesions from areas of radiation necrosis, infection, or inflammation, which may also enhance on conventional CT/MRI.[7] Furthermore, increased pretreatment FDG uptake has been recently described as an independent outcome predictor in PCNSL.[8] In contrast, the somatostatin analog DOTATATE has its main use in differentiating meningiomas from other intracerebral lesions.[9]