Nuclear Medicine
Interesting Case Study

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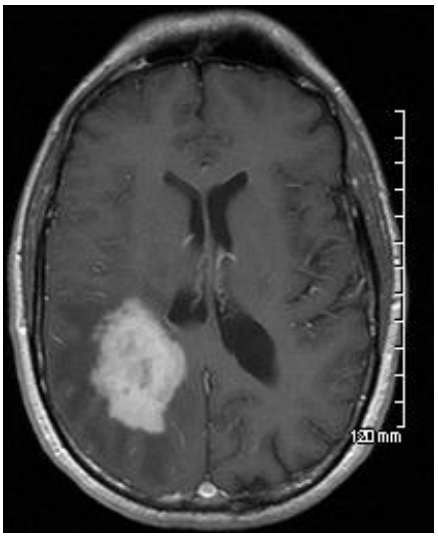
52-year-old white male with past medical history of uveitis, presented to his ophthalmologist complaints of recent onset dizziness, ataxia, and left lower extremity weakness. A MRI was ordered which showed an enhancing right parietal mass (Fig 1). He was sent into University Hospital for further work-up and management.

Fig 1: T1 weighted contrast enhanced MRI showing large right parietal mass. Based on all imaging characteristics and age of the patient, the main differential diagnosis included Lymphoma, Glioblastoma Multiforme, and metastatic lesion.



Further work up included a PET/CT and Brain Biopsy. Images from the PET/CT (Fig 2-4) demonstrate focal F18-FDG uptake by the right parietal mass, however no other abnormal areas of uptake are identified.

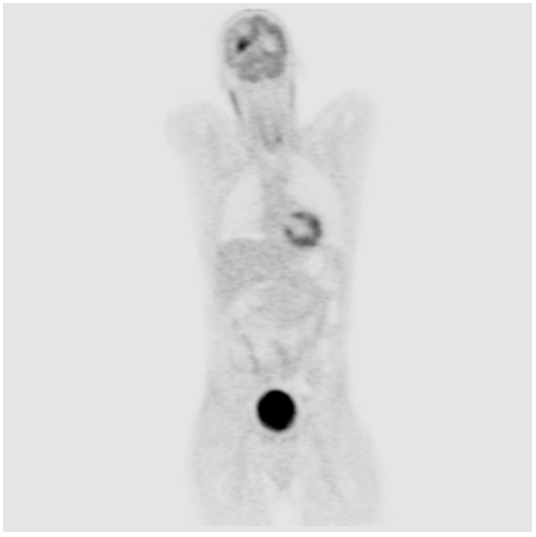


Figure 2: PET Images Axial and Coronal Images show focal FDG uptake in the right parietal lobe corresponding to the mass seen on the MRI. No other areas of abnormal uptake are identified through the remainder of the body. Normal mild myocardial uptake and bladder excretion of the radionuclide are also seen.

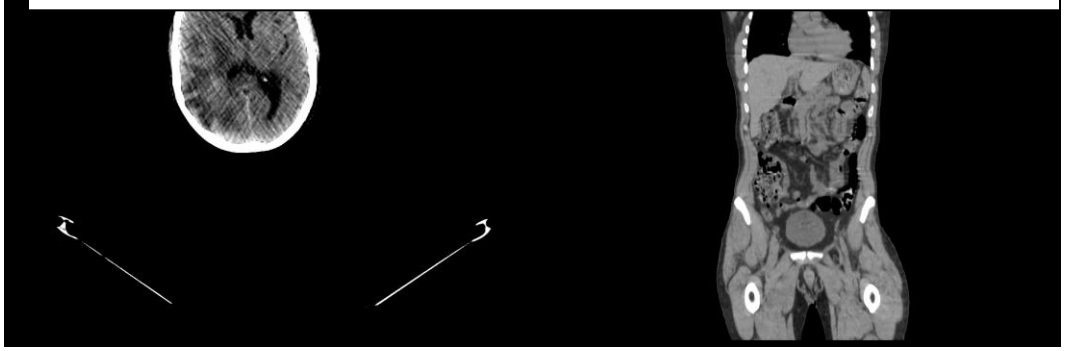


Figure 3: Concomitantly acquired CT images for attenuation correction and localization. The low density area in the right parietal lobe is consistent with vasogenic edema which surrounds the mass which is isodense to the brain parenchyma.

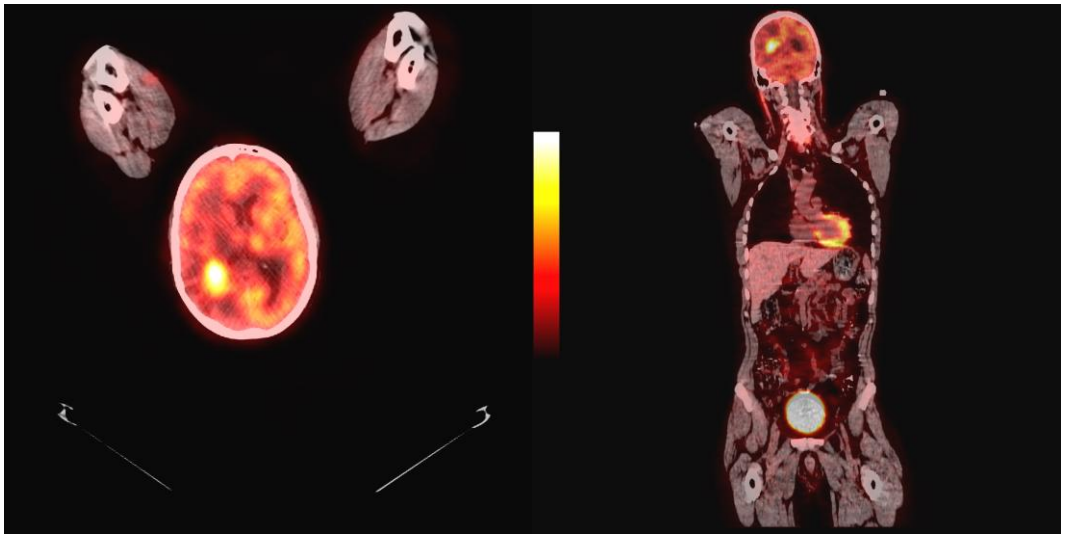


Figure 4: Axial and Coronal Fused PET/CT images. Decreased uptake surrounding the hypermetabolic mass corresponds to vasogenic edema.

The results of the brain biopsy showed a diffuse, large B-cell lymphoma. The PET/CT did not show any evidence of extra-cranial malignancy. Thus, a metastatic lesion and

systemic Non-Hodgkin lymphoma were excluded from the differential and the diagnosis of Primary CNS lymphoma was made.

Primary CNS lymphoma is an uncommon variant of extra nodal non-Hodgkin lymphoma subtype that involves the brain, leptomeninges, eyes, or spinal cord without evidence of systemic disease. Pathologically it is classified as immunohistologic subtype of diffuse large B-cell lymphoma. The most notable risk factor for the development of PCL is immunodeficiency, however when it does occur the immunocompetent patient, it occurs during 45 to 70 years of age.

In this patient, his symptoms included that of both focal neurologic deficits and ocular symptoms, given his history of "uveitis". Further exploration of the medical record revealed that the patient carried the diagnosis of intraocular lymphoma and had received treatment with intra-vitreous injections of Mexotrexate.

Primary intraocular lymphoma refers to a subtype of primary CNS lymphoma which initially presents in the eye with or without concurrent central nervous system involvement. It tends to involve the posterior segment of the eye, including the vitreous, choroid, or retina. Ocular involvement, either unilateral or bilateral, can be the initial presentation of primary CNS lymphoma in 50% of the patients. Therefore is it suggested that these patients be further evaluated with MRI brain and/or Total Spine. Additionally, 15 to 25% percent of patients with primary CNS lymphoma will have involvement of the eye, therefore these patients should have a comprehensive eye exam.

An important distinction is to separate primary ocular lymphoma from retro-orbital lymphoma, as this is frequently associated with systemic extra-nodal Non-Hodgkin's Lymphoma. Also, primary ocular lymphoma can masquerade as uveitis, therefore patients unresponsive to conventional steroid treatment for their uveitis, may need further evaluation/consideration for intraocular lymphoma.

Treatment for parenchymal brain lesions can include:

1) Corticosteroids
   - ◦Reduce associated inflammation, edema, and mass effect
   - ◦Improves clinical symptoms
2) Radiation therapy
   - ◦Stereotactic: Single, sometimes multiple lesions
   - ◦Whole brain: Single and multiple lesions
3) Chemotherapy
   - ◦Blood brain barrier disruption may enhance efficacy

Treatment for intraocular lesion usually involves intra-vitreous injection of Mexotrexate.

References:

1. Batchelor T, Loeffler JS. Primary CNS lymphoma. *J Clin Oncol. 2006;24:1281-1288.*
2. Chi-Chao Chan, MD and Dana J. Wallace, *BS.* Intraocular Lymphoma:Update on Diagnosis and Management. *Cancer Control. 2004; 11(5): 285–295.*
3. UptoDate
4. StatDX