

The Concurrence of Multiple Sclerosis and Glioma

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Introduction

The concurrence of multiple sclerosis (MS) and glioma is rare, although it must be kept in mind when an atypical lesion develops in a patient with MS. Indeed, pseudo-tumoral MS lesions may resemble gliomas, and conversely early-stage gliomas may mimic MS. Their entangled presentation may thus pose a significant diagnostic and therapeutic challenge that must be addressed early to enable the best patient outcome. We here present two cases followed by a literature review.

Case 1: 43 year-old woman diagnosed with MS (2016) on the basis of an initial clinical presentation of optic neuritis and the presence of CSF oligoclonal bands and demyelinating lesions on brain and spinal MRI.

- Presentation (2016): Generalised tonic-clonic epileptic seizures, aphasia and right-sided hemiparesis.
- MRI: Left fronto-parietal infiltrating lesion (Figure 1).
- PET imaging: Hypermetabolic left fronto-parietal lesion,
- Biopsy: Grade III glioma, IDH1-mutated, MGMT-methylated.
- Treatment: 12 cycles of Temozolomide, followed by further Temozolomide with concurrent radiotherapy.

She remains stable at 4-years follow-up.

Case 2: 62 year-old man diagnosed with primary progressive MS (2016).

- Presentation (2020): New left-leg weakness.
- MRI: Large infiltrating lesion in the right temporo-insular area with Gadolinium enhancement (Figure 2).
- PET imaging: Hypermetabolic right temporo-insular area
- Biopsy: Grade III anaplastic astrocytoma, IDH-wild-type, 1p/19-q-non co-deleted, TP53 mutated, with an elevated Ki-67, but lack of microvascular proliferation and necrosis.
- Proposed treatment: Temozolomide with concurrent radiotherapy, followed by adjuvant Temozolomide therapy.

He is due to start treatment shortly.

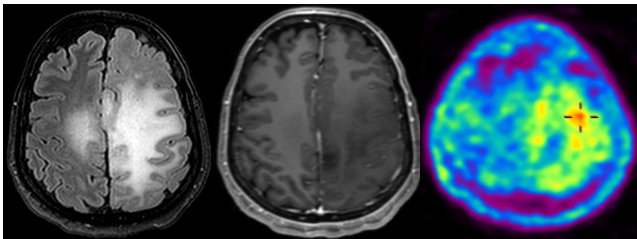


Figure 1: MRI Flair, MRI T1 with Gadolinium, PET imaging.

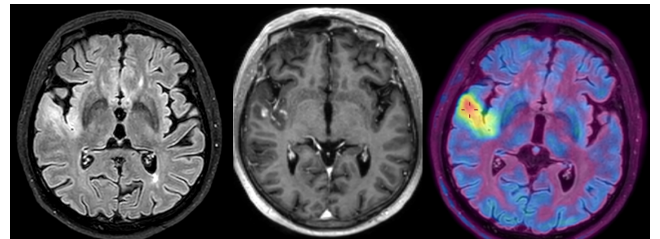


Figure 2: MRI Flair, MRI T1 with Gadolinium, PET-MR.

Discussion

These cases highlight the diagnostic dilemma in differentiating a MS relapse from a neoplastic phenomenon, both in terms of clinical presentation and imaging interpretation. Of note, neither patient had received previous MS disease-modifying therapies. The question as to whether the co-existence of multiple sclerosis and gliomas is incidental or not has been much debated, with several proposing they may be causally related. Neoplastic transformation may be favoured by the chronic inflammatory environment induced by MS, the proliferation of reactive glial cells in demyelinated plaques, and the presence of neurotropic growth factors in the remyelination process. Further studies are however needed to establish whether the coexistence of MS and gliomas influences the clinical evolution of either pathology.

Conclusion

The accurate identification of such atypical tumefactive lesions, not only in the initial diagnostic workup but also in the differentiation of subsequent 'relapses', is therefore of the utmost prognostic, if not therapeutic, importance. Surveillance with yearly MRIs is thus recommended, with complementary imaging such as spectroscopy, positron emission tomography (PET), and tumour biopsy being indicated if there is any clinical doubt as to the nature of the lesion.

References

- Currie S, Urich H. Concurrence of multiple sclerosis and glioma. *J Neurol Neurosurg Psychiatry*. 1974 May;37(5):598-605.
- Isidori A, Caroli E, Frati A, D'Andrea G, Brogna C, Piccirilli M, Salvati M. Multiple sclerosis and gliomas. Clinical remarks on 10 cases and critical review of the literature. *J Neurosurg Sci*. 2004 Sep;48(3):129-33; discussion 133.
- Plantone D, Renna R, Sbardella E, Koudriavtseva T. Concurrence of multiple sclerosis and brain tumors. *Front Neurol*. 2015 Mar 4;6:40.