Title: Lingual epilepsy due to cortical demyelination involving the frontal operculum

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ME – concept, design and first draft. TA – concept, design, literature review and critical revision. HK and CR – critical revision for important intellectual content.

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A 52-year-old right-handed woman taking dimethyl fumarate (Tecfidera) as disease modifying treatment for relapsing-remitting multiple sclerosis (MS), presented with a two-week history of frequent, brief episodes of intermittent tongue twitching lasting up to one minute. There was a prodrome of an 'electric feeling' spreading across the hard palate. She could not talk or swallow during the episodes, but there was no impaired awareness. She was admitted to hospital when two witnessed nocturnal generalised tonic-clonic seizures occurred within a 24-hour period. Episodes recorded on her smartphone were consistent with left-sided lingual and lower facial clonic movements (see online supplemental video, figure 1). These resolved after starting levetiracetam 750 mg two times per day.

MR scan of the brain with gadolinium identified no new or enhancing lesions but showed a demyelinating plaque involving the right inferior frontal cortex corresponding to the tongue motor cortical representation (figure 2). The semiology and lesion location supported demyelination as the underlying cause.

Lingual seizures are rare but are most often attributed to vascular or structural lesions involving the frontal operculum [1]. There are only a few reported cases from other causes, such as Rasmussen's encephalitis or herpes simplex encephalitis [2].

Several studies report an increased incidence of seizures in people with MS compared with the general population, with prevalence ranging between 2% and 8%. Seizures may occur at any time in the disease course [3,4], including first presentation. As in this patient, focal-onset seizures are most common, although secondary generalisation frequently occurs [5].The prognosis of epilepsy in patients with MS is uncertain, with varying outcomes reported [3,6].

Although MS is classically considered a white matter disease, grey matter pathology is well-recognised in histopathological studies [7]. MR imaging studies incorporating a double inversion recovery sequence may visualise cortical lesions in vivo [8]. These are more likely to occur in areas of cerebrospinal fluid stasis, including the cingulate gyrus and insular cortex [9]. In addition to cortical involvement, aberrant conduction in demyelinated fibres and peri-lesional glial reactivity may play additional roles in the pathogenesis of seizures in MS [10].

We report a patient with MS who developed new onset focal seizures in the context of cortical demyelination in the inferior frontal cortex, without additional clinical or radiological evidence of new disease activity.

Key points:

- Grey matter involvement in multiple sclerosis is underestimated and may contribute to the development of focal-onset epilepsy, even without radiological evidence of new disease activity.
- Epileptic seizures should be considered in the differential diagnosis of paroxysmal symptoms in people with multiple sclerosis.

Further reading:

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Figure Legend:

Figure 1 Self-recorded stereotyped left-sided lingual and lower facial clonic movements (see online supplemental video).

Figure 2 MR scan of the brain (fluid-attenuated inversion recovery (FLAIR) sequence). (A) axial view; (B) sagittal view; (C) coronal view, each showing a demyelinating lesion involving the right inferior frontal cortex and other predominantly periventricular white matter lesions. (D) Diagram illustrating the motor homunculus.

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