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Objective:

To evaluate the prevalence of parkinsonism in patients with multiple sclerosis and examine the causal relationship, if any.

Background:

- Rare cases of coexisting multiple sclerosis and parkinsonism have been reported in the literature^{1,2}.
- The true prevalence, clinical characteristics, and causal relation between the two entities have not been systematically evaluated.

Methods:

- Patients referred to a multiple sclerosis clinic were evaluated by a neurologist with double training in neuroimmunology and movement disorders.
- Patients were screened for movement disorders via a movement disorder survey and a focused exam.
- Video samples were rated by two blinded movement disorder raters.
- Pre-specified criteria were developed for potential clinical scenarios: incidental idiopathic Parkinson's disease, incidental Parkinson-plus syndrome, drug-induced parkinsonism, acute symptomatic parkinsonism, and chronic symptomatic parkinsonism.

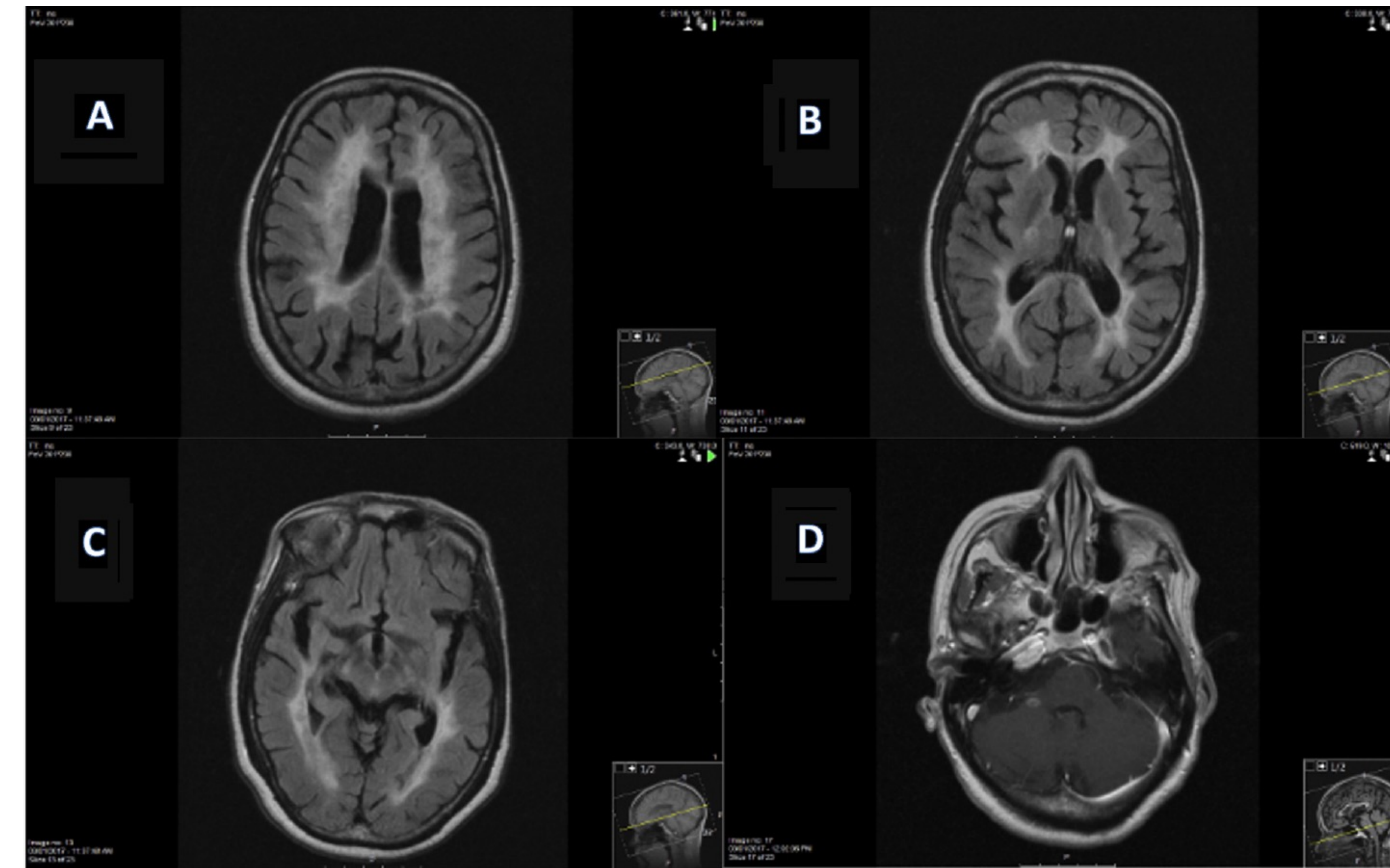


Figure 1: A, B, and C) MRI FLAIR axial images showing confluent and discrete periventricular, and infratentorial lesions as well as demyelinating lesions in the bilateral deep grey matter. D) Post-Contrast T1 axial image showing a ring-enhancing demyelinating lesion in the right middle cerebellar peduncle confirming active demyelinating disease.

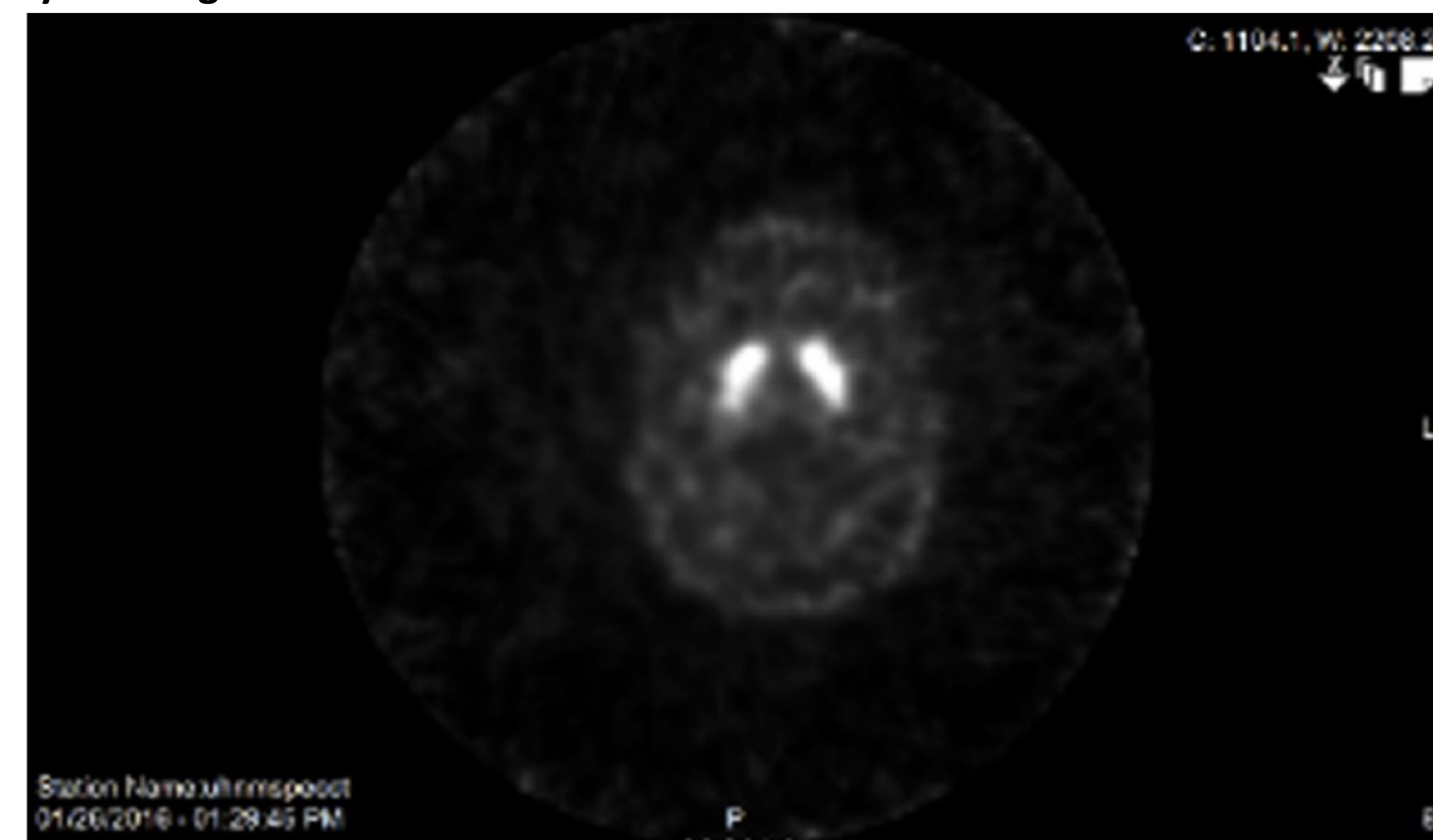


Figure 2: DAT scan showing normal dopamine uptake bilaterally.

Results:

- From 2016 to 2021, 336 patients were evaluated, 12 (3.6%) of which had clinical parkinsonism (average age 68, 66% females).
- Of the 12, 9 patients were deemed to have incidental parkinsonism, 2 had drug-induced parkinsonism, and 1 was deemed to have demyelination related chronic symptomatic parkinsonism.
- The latter presented with gradual and progressive parkinsonism without prodromal symptoms.
- In addition to typical demyelinating lesions, the patient had bilateral basal ganglia lesions, positive oligoclonal bands in CSF, and a normal DAT scan.
- The patient was diagnosed with PPMS manifesting with secondary parkinsonism.
- The patient's disease stabilized with ocrelizumab.

Conclusions:

- While parkinsonism in MS is rare and most cases are incidental, clinicians must recognize the entity of demyelination related symptomatic parkinsonism.
- Parkinsonism may be the sole clinical presentation of MS and the only indication of DMT initiation.
- Prospective studies utilizing high field MRI and DAT scans may better characterize the relationship between parkinsonism and demyelination.

References:

- 1- Abboud, H., Yu, X.X., Knusel, K., Fernandez, H.H., Cohen, J.A., 2019. Movement disorders in early MS and related diseases: a prospective observational study. *Neurol Clin Pract* 9 (1), 24–31.
- 2- Etemadifar, M., Afshar, F., Nasr, Z., Kheradmand, M., 2014. Parkinsonism associated with multiple sclerosis: a report of eight new cases and a review on the literature. *Iran J Neurol* 13 (2), 88–93.