

Effects of the Coronavirus Disease 2019 Pandemic on Motor Symptoms in Parkinson's Disease: An Observational Study

It is becoming clear that many patients with Parkinson's disease (PD) are experiencing subjective worsening of motor symptoms during the coronavirus disease 2019 (COVID-19) pandemic.¹ However, little evidence using established quantitative scales is available on longitudinal changes in motor symptoms during the pandemic. We therefore evaluated changes in Movement Disorder Society Unified Parkinson's Disease Rating Scale, Part III (MDS-UPDRS-III), scores during the pandemic.

We included PD patients who continuously visited the Department of Neurology outpatient clinic, The University of Tokyo Hospital, and whose MDS-UPDRS-III (ON) scores and levodopa equivalent daily doses (LEDDs) from May 2019 to October 2020 and those at the last visit before May 2019 were available in their medical records. The observational period was divided into six subperiods of 3 months each. The latter three subperiods were considered part of the pandemic, as the Japanese public began to be urged to stay home from February 2020 after the first infected patient was reported on January 16.² Changes in MDS-UPDRS-III scores from baseline (Δ MDS-UPDRS-III) were averaged for each subperiod. Patients in each subperiod were classified according to the Δ MDS-UPDRS-III values. A Δ MDS-UPDRS-III value between -3 and $+4$ was considered a minimal clinically important difference (MCID).³ Patients were also

categorized according to LEDD changes (increased, maintained, and decreased) during the pre-pandemic and pandemic periods. This study was approved by the ethics board of the Graduate School of Medicine and Faculty of Medicine, The University of Tokyo (approval registration number 2339-4).

Forty-four patients were enrolled. The mean age was 69.4 ± 9.1 years, and 22 (50.0%) were female. Thirty-nine (88.6%) showed Hoehn & Yahr stage 1 or 2 at baseline. They had a mean disease duration of 6.7 ± 6.5 years, a mean MDS-UPDRS-III score (ON) of 15.8 ± 9.3 , and a mean LEDD of 480.5 ± 277.1 mg. During the pandemic, the mean MDS-UPDRS-III and proportion of patients with worsening motor symptoms (above MCID) were significantly higher than those at baseline (Fig. 1A,B). Furthermore, the number of patients whose LEDDs were increased every 9 months increased significantly after the pandemic outbreak (Fig. 1C).

We found that about 40% of PD patients showed Δ MDS-UPDRS-III above MCID during the pandemic in Tokyo and required increased medication compared with the pre-pandemic period. Because this was a retrospective study with a small sample size without the evaluation of nonmotor symptoms, we cannot comment on the exact reason for this. It is reasonable, however, to assume that people reduced their activity levels despite the lack of legal penalties in Japan for going out,² were staying in a confined space,^{4,5} and experienced prolonged psychological stress, which may have exacerbated PD motor symptoms by reducing dopaminergic medication efficacy.^{6,7} Alternatively, the worsening status during the pandemic may be related to disease progression, independent of reduced activity levels or psychological stress.

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*Correspondence to: Dr. Mitsuhiro Kainaga, Department of Neurology, The University of Tokyo Hospital, 7-3-1, Hongo, Bunkyo-ku, Tokyo 113-8655, Japan; E-mail: kainaga-tyk@umin.ac.jp

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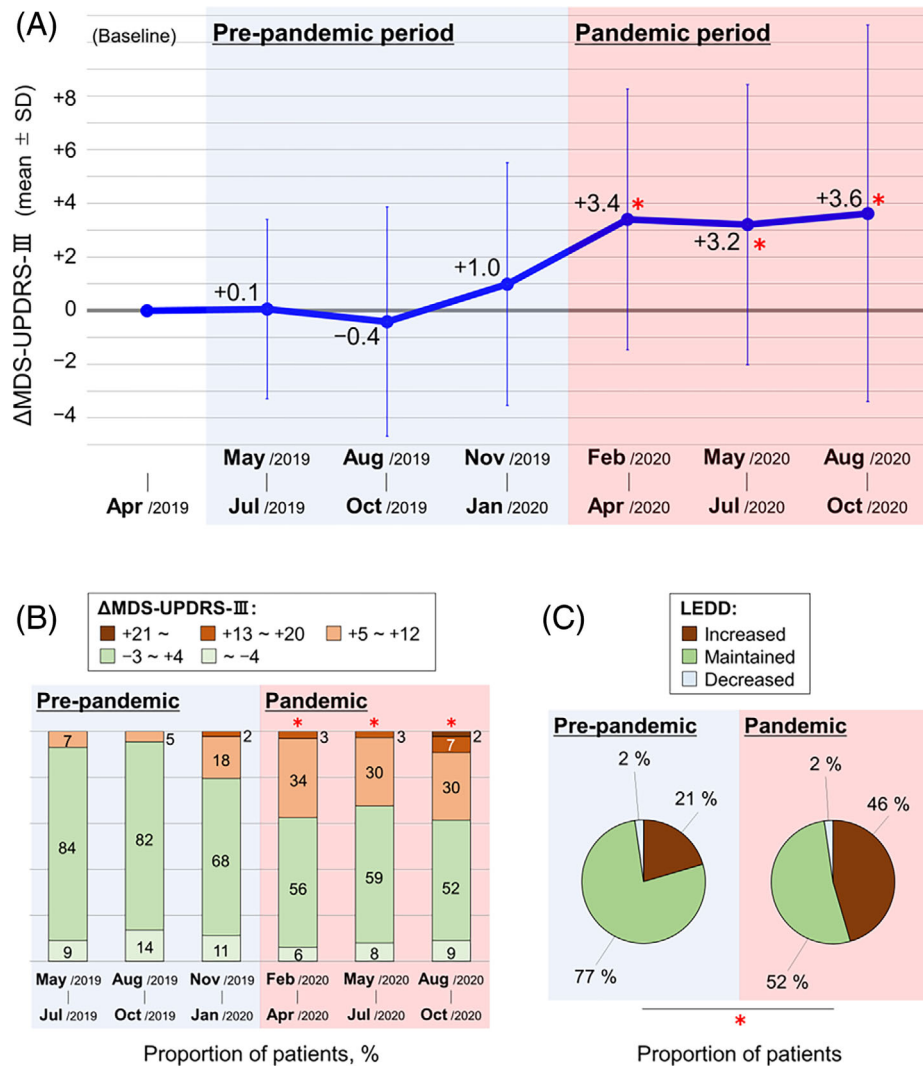


FIG. 1. (A) Mean change in MDS-UPDRS-III scores toward baseline (Δ MDS-UPDRS-III) in each subperiod. Whereas there was no significant change in the subperiods before the pandemic (Δ MDS-UPDRS-III = 0.1 \pm 3.3, -0.4 \pm 4.3, 1.0 \pm 4.5, respectively; Wilcoxon's signed-rank test compared to baseline, not significant), the score was significantly higher during the pandemic subperiods (Δ MDS-UPDRS-III = 3.4 \pm 4.7, 3.2 \pm 5.2, 3.6 \pm 7.0, respectively; * P < 0.001). (B) Distribution of Δ MDS-UPDRS-III values at each subperiod. The proportion of patients with worsening motor symptoms (groups in yellow, orange, and red) was significantly higher in the pandemic subperiods than in the pre-pandemic subperiods (Wilcoxon's rank-sum test compared to baseline, * P < 0.01). (C) Distribution of LEDD (levodopa equivalent daily dose) changes during each period. The proportion of patients whose LEDDs increased over 9 months was significantly higher after the pandemic outbreak than before the pandemic (pre-pandemic, 21%; pandemic, 46%; Wilcoxon's rank-sum test, * P < 0.05). The number of patients receiving each drug class at baseline was as follows: dopamine precursors, 40 (90.0%); dopamine agonists, 20 (45.5%); monoamine oxidase-B (MAO-B) inhibitors, 11 (25.0%); catechol-O-methyl transferase (COMT) inhibitors, 10 (22.7%); and others, 17 (38.6%). LEDD, levodopa equivalent daily dose; MDS-UPDRS-III, Movement Disorder Society Unified Parkinson's Disease Rating Scale, Part III; SD, standard deviation. [Color figure can be viewed at wileyonlinelibrary.com]

In conclusion, about 40% of PD patients showed exacerbation of motor symptoms. Careful and continuous evaluation and optimal drug adjustment are important for PD patients during a pandemic. ●

Data Availability Statement

The data that support the findings of this study are available from the corresponding author upon reasonable request.

Mitsuhiro Kainaga, MD,^{1*} Yuichiro Shirota, MD, PhD,^{1,2} Satoshi Kodama, MD, PhD,¹ Tatsushi Toda, MD, PhD,¹ and Masashi Hamada, MD, PhD¹

¹Department of Neurology, The University of Tokyo Hospital, Tokyo, Japan, and ²Department of Clinical Laboratory, The University of Tokyo Hospital, Tokyo, Japan

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