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Festination in Chinese patients with Parkinson's disease

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ABSTRACT

Objective: To investigate the occurrence and clinical associations of festination in Chinese patients with Parkinson's disease (PD).
Methods: A total of 480 PD patients were recruited in this cross-sectional study. Assessments scales included the Unified PD Rating Scale (UPDRS) part III, PD Questionnaire-39 (PDQ-39), Non-Motor Symptoms Scale (NMSS), Mini-Mental State Examination (MMSE), frontal assessment battery (FAB), Montreal Cognitive Assessment (MoCA), Hamilton Depression Scale (HAMD) and Hamilton Anxiety Scale (HAMA).
Results: One hundred and forty PD patients (29.2%) reported festination. Festination occurred more frequently in patients with lower limbs as the site of onset and patients with longer disease duration or higher Hoehn and Yahr (H&Y) stage ($P<0.05$). The mean age, levodopa and entacapone use, incidences of motor complications, falls and freezing of gait, and the scores for the UPDRS part III, NMSS, HAMD and HAMA were higher in patients with festination than those without festination ($P<0.05$). There were no differences in the scores for the PDQ-39, MMSE, FAB and MoCA between the patients with and without festination. The binary logistic regression model indicated that UPDRS part III, lower limbs as the site of onset, freezing of gait and falls were associated with festination.
Conclusions: Festination is a relatively common disabling symptom in Chinese PD patients. Patients with lower limbs as the site of onset and more severe disability were more likely to experience festination. Festination in PD is not related to non-motor symptoms and cognitive dysfunction.

1. Introduction

Festination is considered to be a manifestation of advanced Parkinson's disease (PD), which was first described by James Parkinson, in his original essay on "The Shaking Palsy" published in 1817. It is characteristically progressive in nature, whereby each step in a long gait sequence becomes shorter and shorter with an accompanying increase in gait speed [1].

Current studies on the occurrence of festination and its clinical association with other Parkinsonian features are limited. Festination has been reported to be more frequent in the early-onset PD (EOPD) patients [2,3]. A previous small sample cross-sectional study found 32% PD patients reported festination and festination was associated with a longer disease duration but not the severity of PD [4]. Some studies found festination is frequently associated with other gait disorders, including falls and freezing of gait [4–6]. However, the associations between festination and other clinical factors including non-motor symptoms (NMS), cognitive function, frontal lobe function, depression, and anxiety remain unclear. The clinical symptoms of festination in the Chinese PD population have yet to be reported. The current study was conducted to investigate the occurrence of festination and clinical associations of festination in a large cohort of Chinese PD patients.

2. Patients and methods

This study was approved by the Ethics Committee of West China Hospital of Sichuan University. A total of 480 PD patients from the Department of Neurology, West China Hospital of Sichuan University were consecutively recruited between May 2011 and April 2014 for this observational study. All of the participating PD patients were diagnosed according to the United Kingdom PD Society Brain Bank Clinical Diagnostic Criteria for PD [7]. Patients with atypical and secondary Parkinsonism were excluded from this study. Clinical information including gender, age, onset age, disease

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duration, diagnosis delay, family history of PD, years of education, handedness, the site of onset symptom, treatment regimen and motor complications of each patient were collected by neurologists majoring in PD through in person interviews. The Unified PD Rating Scale (UPDRS) part III [8] and Hoehn and Yahr (H&Y) stage [9] were used to evaluate the severity of the motor symptoms. The Quality of Life (QoL) of PD patients was evaluated using the PD Questionnaire-39 (PDQ-39) [10], which is consist of 8 domains, including domains of mobility, activities of daily life, emotional well-being, stigma, social support, cognitions, communication and bodily discomfort. The severity of NMS were assessed using the Non-Motor Symptoms Scale (NMSS) [11], which contains 9 domains, including domains of cardiovascular, sleep/fatigue, mood/apathy, perceptual problems/hallucinations, attention/memory, gastrointestinal, urinary, sexual dysfunction and miscellaneous. The cognitive function was evaluated using the Mini-Mental status examination (MMSE) [12], frontal assessment battery (FAB) [13] and Montreal Cognitive Assessment (MoCA) [14]. MoCA is consisted of 7 domains, including domains of visuospatial/executive abilities, naming, attention, language, abstraction, memory and orientation. The severity of depression and anxiety were assessed using the Hamilton Depression Scale (HAMD) [15] and Hamilton Anxiety Scale (HAMA) [16], respectively. All of the assessments were conducted at "on" state. EOPD was defined as an onset age of PD younger than 50 years, and late-onset PD (LOPD) was defined as older than 50 years. PD patients were grouped into the three subtypes tremor-dominant, akinetic-rigid and mixed types based on the criteria described in a previous study [17].

The ways of combining inquiry and observation were performed to identify whether a PD patient had festination. Festination was observed by experienced neurologists during the visit and was reported by the patient, his or her family members or the caregiver when it occurred at home or anywhere outside of the hospital. If patients and their family members could not understand the definition of festination, a description or imitation of festination would be performed by the neurologists during the visit. If a PD patient felt affirmatively that his or her step become smaller and smaller combined with cadence become faster and faster, at the same time, lean forward is invincible when walking, he or she was identified as presented with festination. The answer obtained from the patients was confirmed by their relatives or caregivers and by the clinical records to ensure the accuracy of data.

3. Statistical analyses

All analyses were performed using the Statistical Package for the Social Sciences (SPSS) version 19.0 for Windows. All of the continuous data, including age, age of onset, disease duration, diagnosis delay, years of education, daily levodopa dose, UPDRS part III score, the total scores and each domain score for the PDQ-39, NMSS and MoCA, and the total scores for the FAB, MMSE, HAMD and HAMA, are presented as the mean ± standard deviation (SD). The discontinuous data, including H&Y stage, is presented as the median value (quartile). The Student's *T* test was used for the comparisons of the continuous data between the PD patients with and without festination. The Wilcoxon rank sum test was performed to compare the discontinuous data between the PD patients with and without festination. The Chi-square test was used to evaluate the differences in the categorical variables between the PD patients with and without festination. Analyses of covariance (ANOVA) adjusted for confounding factors were performed to compare the total daily dose of levodopa, the mean scores for the UPDRS part III, PDQ-39, NMSS, FAB, MMSE, MoCA, HAMD and HAMA, as well as the scores of each domain from the PDQ-39, NMSS and MoCA between the PD patients with and without festination. A binary logistic regression model was used to explore the potential factors related to festination. The presence or absence festination was used as a dependent variable in this analysis to identify potentially related factors. The parameters, such as age, disease duration, lower limbs as the site of onset, use of levodopa or entacapone, UPDRS part III, fluctuation, dyskinesia, freezing of gait, falls, the scores for the HAMD and HAMA, as well as the scores for the cardiovascular, sleep/fatigue, gastrointestinal, urinary and sexual dysfunction domains from the NMSS, were used as covariables. All statistical tests were two-tailed, and *P* values < 0.05 were considered statistically significant (for multiple comparison of chi-square test, *P* values <0.0125 were considered statistically significant).

4. Results

The demographic and clinical features of the PD patients are listed in Table 1. One hundred and forty PD patients (29.2%) reported festination. Festination occurred more frequently in patients with disease duration greater than 5 years than in patients with disease duration of less than 5 years ($P < 0.0125$). PD patients at a higher H&Y stage (3 and 4–5) demonstrated a significantly higher frequency of festination than patients at a lower H&Y stage (1–2) ($P < 0.0125$). The mean age, disease duration, UPDRS part III score and median H&Y stage were significantly greater for the patients exhibiting festination than those who did not manifest festination ($P < 0.05$). The percentages of patients receiving levodopa treatment and entacapone treatment, as well as the incidences of lower limbs as the site of onset, motor fluctuation, dyskinesia, falls and freezing of gait were higher in patients exhibiting festination than patients without festination ($P < 0.05$). After adjusting for age and disease duration, patients exhibiting festination had a higher UPDRS part III score than those without festination ($P < 0.05$), but no difference in the daily dose of levodopa was found between patients with and without festination. The gender distribution, the mean age, onset age and diagnosis delay, the percentage of PD family history, and the percentages of patients treated with amantadine, benzhexol or dopamine receptor agonist were not different between the PD patients with and without festination. There was no significant difference in the frequency of festination between the EOPD and LOPD patients, between the patients older and younger than 65 years, or among the three subtypes of PD patients.

The PDQ-39 results for the PD patients with and without festination are listed in Table 2. After adjusting for age, disease duration, UPDRS part III and NMSS, patients exhibiting festination had a significantly higher score for the social support domain compared with the patients without festination ($P < 0.05$). There were not different in the total score for the PDQ-39 and the scores for the remaining domains from the PDQ-39 between the patients with and without festination.

The NMS and cognitive function assessments results for the PD patients with and without festination are listed in Table 3. After adjusting for age, disease duration and UPDRS part III, patients exhibiting festination had a significantly higher total score for the NMSS, HAMD, HAMA and higher scores for the cardiovascular, sleep/fatigue, gastrointestinal, urinary and sexual dysfunction domains from the NMSS compared with the patients without festination ($P < 0.05$). No differences in the scores for the remaining domains from the NMSS were found between the patients with and without festination. After adjusting for age and disease duration, no significant differences in the total scores for the MMSE, FAB and MoCA, as well as the scores for the each domain from the MoCA were found between patients with and without festination.

The potential factors related to festination in PD patients are presented in Table 4. The binary logistic regression model