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Musculoskeletal problems in Parkinson's disease: Neglected issues

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ABSTRACT

Background: To identify the prevalence and clinical features of musculoskeletal problems in patients with Parkinson disease (PD) compared to controls.
Methods: 400 PD patients and 138 age- and sex-matched controls were interviewed by physicians about their musculoskeletal problems.
Results: The prevalence of musculoskeletal problems was significantly higher in the PD group than in the control group (66.3% vs. 45.7%, $P < 0.001$). Commonly involved body sites were the low back, knee, and shoulder in that order. The low back was more frequently involved in the PD group than in the control group (44.3% vs. 24.6%, $P < 0.001$), and the shoulder tended to be more involved in the PD group than in the control group (15.0% vs. 8.7%, $P = 0.061$). However, the knee was similarly involved in both group (12.3% vs. 18.0%, $P = 0.121$). Among the past diagnoses associated with musculoskeletal problems, frozen shoulder, low back pain, osteoporosis and fracture were more common in the PD group than in the control group ($P < 0.05$). Older age, female, and a higher score on the Unified Parkinson's Disease Rating Scale I & II were associated with musculoskeletal problems in the PD group. Only 26.8% of the PD patients and 52.5% of the controls with musculoskeletal problems answered that their musculoskeletal problems were recovering. Furthermore, musculoskeletal problems in the PD group tended to receive less treatment than that of the control group ($P = 0.052$).
Conclusion: Musculoskeletal problems were more common in the PD group than in the controls. Furthermore, despite PD patients having a higher prevalence, they did not receive adequate treatment.

1. Introduction

Musculoskeletal problems are the most common cause of physical disability in the general population [1]. Even though musculoskeletal problems are common, there have been few reports that describe the prevalence or clinical characteristics of musculoskeletal problems in Parkinson's disease (PD) [32].

A survey on comorbidities in PD has shown that patients with PD were more likely to have diagnoses with musculoskeletal conditions although the differences did not reach statistical significance [2]. Andreadou et al. reported that musculoskeletal problems (45%) were the most prevalent comorbid disorders seen on a survey about the impact of comorbidities on health-related quality of life (HRQoL) in patients with PD [3]. A report on the QoL in veterans has shown that arthritis and chronic low back pain were significantly more prevalent among patients with PD than in control group [4]. A population based study has shown that PD had the largest negative impact on HRQoL at the individual level. However, at the population level, musculoskeletal disorders were associated with the largest losses of QoL because of a high prevalence. These reports underlines that musculoskeletal problems are common in PD, and have a significant effect on QoL in PD patients [5].

Although musculoskeletal problems are possibly common problems and affect the QoL in PD patients, there are no studies solely on the prevalence and characteristics of musculoskeletal problems in patients with PD compared to people without PD. The aim of the present study was to evaluate the prevalence and clinical features of musculoskeletal problems in patients with PD compared to a control group.

2. Methods

2.1. Patients and controls

This case-control study compared the musculoskeletal problems between patients with PD and a control group. All included study participants were recruited

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from October 2011 to June 2012. The 400 patients with PD who agreed to the study were consecutively recruited from the Movement Disorder Clinic of Seoul National University Hospital during the study period. All patients satisfied the United Kingdom Parkinson's Disease Society Brain Bank Criteria [6]. We excluded patients with severe cognitive dysfunction or speech problems who could not explain their past medical history and current medical condition. One hundred thirty-eight age- and sex-matched healthy controls who agreed to the study were enrolled consecutively from non-relative caregivers or spouses. None of them had a family history of PD. All aspects of the study were carried out with the subjects having an adequate understanding of the study. Written informed consent was received from all subjects. This study was approved by the Institutional Review Board at Seoul National University Hospital.

2.2. Clinical assessments

Physicians interviewed all participants using a structured format and reviewed the medical records which included the following.

1) The existence of current musculoskeletal problems: musculoskeletal conditions are linked anatomically by their association with pain or impaired physical function [7]; we excluded the non-musculoskeletal pain such as dystonic pain, central pain, and neuropathic pain [8].
2) The body part in which the current musculoskeletal problems are involved in: neck, shoulder, low back, hip, knee, and others.
3) The characteristics of the current musculoskeletal problems: duration; pain intensity (using Visual Analog Scale, VAS) [9]; existence of limitations in the activity of daily living (ADL), whether the musculoskeletal problem limits the ADL rather than the PD symptoms; treatment; and the current progress of the musculoskeletal symptoms, improving, unchanged, or worsening
4) Demographic factors: underlying disease, the Unified Parkinson's Disease Rating Scale (UPDRS), Hoehn and Yahr (HY) stage, Levodopa Equivalent Daily Dose (LEDD) [10]
5) The past diagnoses associated with the musculoskeletal problems irrespective of the current problems: cervical disc disease, frozen shoulder, rotator cuff injury, low back pain (diagnoses around the low back area including spinal stenosis and spondylolisthesis), Osteoarthritis, Rheumatoid arthritis, Osteoporosis, and fractures.
6) All the treatment experiences in the past for musculoskeletal problems

2.3. Statistical assessments

The prevalence of musculoskeletal problems, body parts involved, demographic features, and past diagnoses in the PD patients were compared with those in the control group using the x^2 test or Fisher's exact test, as appropriate. Continuous variables were compared between the PD group and control group by independent sample t test. A P value of <0.05 was considered significant. These statistical analyses were conducted using the IBM SPSS statistics software, ver. 19.0.

3. Results

A total of 400 patients with PD and 138 age- and sex-matched controls were enrolled. Their demographic features are summarized in Table 1.

Of the 400 PD patients, 265 patients had active musculoskeletal problems at the time of the interview. Additionally, the PD group had a significantly higher rate of musculoskeletal problems than that of the control group (66.3% vs. 45.7%, $P < 0.001$). The most commonly involved body parts were the low back and knee among the musculoskeletal complaints in both groups. Involvement of the low back area was significantly higher in the PD group than in the control group (44.3% vs. 24.6%, $P < 0.001$). However, even though the knee was also commonly involved in the PD group, there was no difference in its prevalence between the PD and control groups (18.0% vs. 12.3%, $P = 0.121$). The PD group tended to involve the shoulder area more than that of the control group, but it was not statistically significant (15.0% vs. 8.7%, $P = 0.061$) (Table 2).

We compared the characteristics of the musculoskeletal problems between the two groups. The duration and pain severity of the musculoskeletal problems did not differ between the two groups. Whether musculoskeletal problems limit ADL was not significantly different between the two groups. However 31.8% (83/263) of the PD patients with musculoskeletal problems responded that musculoskeletal problems limited ADL more than that of the PD symptoms. Only 26.8% of the PD patients and 52.5% of the controls with musculoskeletal problems responded that the musculoskeletal problems are recovering (Table 2).

We surveyed the laterality of the musculoskeletal problems and PD symptoms (the more involved side); left, right, or bilateral. Among the 265 PD patients with musculoskeletal problems, the laterality of the musculoskeletal problems coincided with the more severe side of Parkinsonism in 81 patients (30%). On the contrary, the laterality of the symptoms did not coincide in 24 patients (9%). It partially matched in the remainder of the PD patients.

We compared the clinical characteristics between the groups with and without musculoskeletal problems. Females had more musculoskeletal problems than that of males in the PD group as well as in the control group. The age of the patients was significantly higher for patients with musculoskeletal problems than for patients without problems in the PD group (66.16 ± 8.34 vs. 63.11 ± 8.90, $P = 0.001$).

The total score for UPDRS I and II was higher in patients with musculoskeletal problems than in patients without musculoskeletal problems in the PD group (11.11 ± 8.83 vs. 7.51 ± 6.88, $P < 0.001$) (Table 3). UPDRS item posture score was higher in patients with low back pain than in patients without low back pain (0.85 ± 0.55 vs. 0.69 ± 0.61, $P = 0.008$).

We surveyed the past diagnoses associated with the musculoskeletal problems irrespective of the current problems. The prevalence of low back pain was significantly higher in the PD group than in the control group (37.5% vs. 23.9% $P = 0.004$), even though that was the most common diagnosis in both groups. Frozen shoulder was the second most common diagnosis, which was also more common in the PD group than in the control group (19.8% vs. 10.1%, $P = 0.01$). The third and fourth most common diagnoses were osteoporosis and fractures, respectively, which were also significantly more prevalent in the PD group than in the control group (17.3% vs. 10.1%, $P = 0.046$; 13.3% vs. 5.6%, $P = 0.020$) (Table 4).

We surveyed the treatment experience for musculoskeletal problems in each group. Even though musculoskeletal problems were more common in the PD group than in the control group,

Table 1
Demographic characteristics of the patients and controls.

Variables		PD group ($n = 400$)		NC group ($n = 138$)		P
Sex (M/F)		183/217		66/72		0.67[a]
Age (yr)	≤50	65.13 ± 8.65	(20)	65.75 ± 9.39	(12)	0.48[b]
	51–60		(98)		(25)	
	61–70		(165)		(51)	
	71≤		(117)		(50)	
Age at onset (yr)		57.87 ± 1.00				
PD duration (yr)		7.43 ± 5.53				
HY	I	2.32 ± 1.56	(58)			
	II		(190)			
	III		(130)			
	IV		(22)			
UPDRS I & II		9.89 ± 8.39				
UPDRS III		15.44 ± 8.54				

Abbreviations: PD = Parkinson disease; NC = Normal Control; M/F = Male/Female; HY = Hoehn and Yahr stage; UPDRS = Unified Parkinson's Disease Rating Scale Data represent the mean ± SD.
[a] Pearson's x^2 test.
[b] Independent sample t test.