Clinical rating scales

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Parallel Session: Pain and Fatigue in PD

Title: Clinical Rating Scales

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S U M M A R Y

In Parkinson's disease (PD) rating scales are used to assess the degree of disease-related disability and to titrate long-term treatment to each phase of the disease. Recognition of nonmotor symptoms required modification of existing widely used scales to integrate nonmotor elements. In addition, new scales have been developed for the assessment of nonmotor symptoms. In this article, assessment of PD patients will be discussed, particularly for nonmotor symptoms as pain and fatigue.

1. Introduction

Parkinson's disease (PD) is a common progressive neurodegenerative disorder in which dopamine (DA) deficiency arises as a consequence of degeneration in the substantia nigra. The clinical diagnosis of PD rests on the identification of motor symptoms as bradykinesia, tremor, rigidity and loss of postural reflexes [1]. Recent neuropathological studies, however, have revealed that neuronal loss occurs beyond the dopaminergic system, and consequently patients display non-motor symptoms (NMS) [2]:

a. *Neuropsychiatric symptoms* (depression, apathy, anxiety, anhedonia, deficits in attention, hallucinations, dementia, obsessional behaviour, confusion, panic attacks)

b. *Autonomic symptoms* (bladder disturbances, sweating, orthostatic hypotension, sexual dysfunction)

c. *Gastrointestinal symptoms* (constipation, salivation, loss of taste, dysphagia)

d. *Sensory symptoms* (pain, paraesthesia, olfactory disturbance);

e. *Sleep disorders* (restless legs and periodic limb movements, rapid eye movement (REM) sleep disorder, non-REM-sleep related movement disorders, excessive daytime somnolence);

f. *Other symptoms* (fatigue, diplopia, blurred vision, seborrhoea, weight loss).

Although NMS correlate with advancing age and disease severity, some non-motor symptoms such as olfactory problems, constipation, depression, and rapid eye movement disorder, can occur early in the disease. These symptoms are increasingly recognized to precede motor symptoms by many years as the pre-motor (pre-symptomatic) stage of PD [2]. The neuroanatomical and neurochemical substrates for the non-motor symptom complex in Parkinson's disease remained unknown until the breakthrough made by Braak and colleagues, who introduced the concept of a six-stage pathological process putting extranigral structures in the centre of interest (dorsal motor vagus nucleus, olfactory bulb, the serotonergic raphe nuclei, cholinergic brainstem complex) [3]. Despite this emphasis on motor symptomatology, several studies have shown that the NMS of Parkinson's disease have

greater significance when assessed by Quality-of-life measures, institutionalization rates, and health economics.

2. Clinical rating scales

Although, both PET and SPECT scanning are sensitive enough to detect a subclinical degeneration of the DA system, nuclear imaging techniques are costly, and frequently not widely available for screening for premotor PD. Therefore, the patient's medical history and neurological assessment form the basis for making a PD diagnosis. PD is usually diagnosed when motor symptoms appear, but many patients will in hindsight recall a prodromal phase including non-motor symptoms.

Clinicians use several subjective rating scales to evaluate PD patients in order to make a correct diagnosis. In addition, the increasing number of therapeutic interventions in PD has highlighted the importance of measuring clinical outcome. Thus, in PD, rating scales are used to assess the degree of disease-related disability and progression, to monitor patient care, and to titrate long-term treatment in each phase of the disease. Simple but reproducible rating scales are essential and clinicians should be widely aware of these scales and know how and when to use them. Those that fulfil such conditions are the Hoehn and Yahr scale (HY) [4], the Schwab and England scale [5], and the Unified Parkinson's Disease Rating Scale (UPDRS) [6, 7].

The UPDRS is the most widely used, having proven intra and inter-observer validity. It is a standardized clinical assessment that is used to document both disease progression and response to treatments. This four tiered scale, with particular emphasis on motor measurement, provides a detailed evaluation of:

I, Nonmotor Experience of Daily Living; II, Motor Experience of Daily Living; III, Motor Examination; IV, Motor Complications

The 5-stage HY scale is used to classify patients based on the severity of symptoms and ability to live independently.

The Schwab and England scale can be used by patients, family members or health care providers to assess the impact of PD on independent living skills.

2.1. Clinical rating scales: non-motor symptom

The great importance of the accurate detection and evaluation of NMS in PD was recognized by the Movement Disorders Society (MDS) who sponsored a revision of the original UPDRS that was developed in the 1980s [6]. The MDS-UPDRS retains the UPDRS structure of four parts, but these have been modified to provide a section that integrates nonmotor elements of PD [7]. In addition, the clinical significance of NMS in PD resulted in development of a new 30-item rating scale, the Non-Motor Symptoms assessment scale for Parkinson's disease (NMSS) [8]. Data from nine domains provides information on the following systems: cardiovascular, sleep/fatigue, mood/cognition, perceptual problems, attention/memory, gastrointestinal, urinary, sexual function, and miscellaneous. The scale is easy to administer, reproducible, and has acceptable clinical accuracy. There is a significant relationship between NMSS score and severity of disease based on HY scale. Furthermore, the growing interest in non-motor aspects of the disease is exemplified by publications of specific, validated, Parkinson's disease scales for the assessment of such specific NMS domains as autonomic function (SCOPA-AUT) [9], sleep (Parkinson's disease sleep scale, SCOPA-sleep) [10], cognitive function (Parkinson's Disease-Cognitive Rating Scale) [11], depression (Beck depression inventory) [12], and fatigue [13]. In chronic neurological diseases such as PD, one requires knowledge of the impact of the illness on the patient's life. Thus, quality of life (QoL) questionnaires have been developed to measure the impact of the disease on general well-being that cannot be assessed by rating scales [14].

3. Sensory dysfunctions

There is a wide spectrum of sensory symptoms in PD but only olfactory disturbance, visual impairment and pain are characteristic sensory features in the disease. These symptoms may precede the motor phase, but only olfactory testing is considered currently to be a potential preclinical marker for PD [2].

3.1. Pain

Although pain is a prominent NMS in PD it has not been well studied. It was usually considered that pain was due to secondary causes such as being of musculoskeletal origin, or related to motor fluctuations and dystonia. Sometimes, secondary pain is relieved by levodopa, indicating that it should be considered as part of the spectrum of NMS. However, attention is now being focused on the recognition and quantization of pain as NMS [2]. The NMS of PD is frequently overlooked by neurologists if quantitative assessment and rating instruments are not used, and this is especially true in the setting of pain. Implementation of the NM self-completed questionnaires, Visual Analogue Scale and/or McGill questionnaire [15, 16] in clinical practice indicate that pain may precede the diagnosis of PD and that 'shoulder pain' could be a presenting symptom.

Our study investigating NMS in 56 de-novo PD patients showed that the most frequent NMS was depression, as expected (43.3 %), followed by constipation (35.3 %) and unexplained pain (29.3 %), mostly in the shoulder region (17). Our results indicate that the NMS questionnaire was effective in pain assessment in de-novo PD patients. In addition, quantitative assessments of pain in chronic PD patients on long-term therapy with motor complications can reveal the association between pain and different clinical variables. Tables 1 and 2 show the association between pain and various demographic and clinical variables in 43 PD patients (21 with pain and 23 without pain). Patients with pain showed a significantly higher mean levodopa dose, more severe motor complications, and a more frequent use of sleeping pills. There was no difference between patients with predominantly akinetic-rigid type PD, and those with tremor, and no difference for those with left, right or symmetric symptom dominance. The most important finding was that there was no difference in depression and cognition scores between the groups with and without pain. Thus quantitative assessments of pain indicate the presence of pain in PD both as a prodromal sign, as well as a comorbid condition in the later stage of the disease.

4. Neuropsychiatry

The cognitive and neuropsychiatric NMS of PD range from apathy, anxiety and panic attacks to depression, psychosis, mild cognitive impairment, and dementia. Most of the neuropsychiatric disorders develop in the later stage of the disease and/or occur as side-effects of medications. Psychotic symptoms and dementia strongly correlate with the need for nursing home placement. Depression is the most significant predictor of quality of life in PD patients, and is present in 10-45% of patients with PD. It is considered that depression could be one of the presenting symptoms of PD that predate motor symptoms [1, 2].

4.1. Fatigue

Chronic fatigue is reported in more than 20% of people in primary care. Fatigue is a typical symptom of neurological disease, but still poorly understand. Although often recognized as a sign or symptom of a disease, or a side effect of treatment, fatigue is a subjective experience. In the absence of a biological marker or gold standard for defining fatigue, assessment of fatigue represents a great challenge. Fatigue may be an important determinant of quality of life and physical disability in PD and it is underestimated in terms of its negative impact on patient well-being [18]. It has been shown that fatigue is a consistent and common but underdiagnosed problem in PD patients. Several studies investigating fatigue in PD have been published but often have used different rating scales [19, 20]. The MDS task force recently evaluated available clinical rating scales for fatigue (Table 3) [13]. A scale that demonstrates sensitivity to changes in PD specifically rather than in other areas is 'recommended'. If a scale failed to meet all the criteria of a recommended scale, it was 'suggested'. Scales were 'listed' if they had been used in PD studies but had little or no psychometric data to assess. Some scales could be used both to screen for fatigue, as well as to assess severity. Only the Fatigue Severity scale was 'recommended' for both screening and severity rating.

5. Concluding comments

There is a wide range of motor and non-motor symptoms that occur in Parkinson's disease, and consequently it is difficult for a single instrument to encompass the whole spectrum of symptoms,

possibly explaining why many different rating scales have been developed. The main purpose of each scale is to be simple to use, reproducible, to have acceptable clinical precision and accuracy, and to be available for clinicians dealing with patients with movement disorders. NMS cause problems in the daily life of PD patients and have a great impact on the quality of life, but they are usually underdiagnosed and are not adequately treated. To improve the treatment of PD patients, both motor as well as non-motor symptoms should be assessed using well-validated rating scales and questionnaires.

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Conflict of interests

None.

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Table 1

Demographic and clinical data for patients with Parkinson's disease with and without pain

	With pain mean (SD) *N*=21	**Without pain mean (SD) *N*=23**	**p values**
Age (years)	68.3 (6.5)	69.1 (7.3)	0.50
Duration of disease (years)	10.3 (5.5)	9.7 (4.5)	0.59
MMSE score	23.7 (5.5)	22.9 (3.5)	0.50
BDI score	12.6 (8.7)	11.9 (7.1)	0.53
VAS	36.1 (9.7)	83.4 (12.3)	0.001
UPDRS motor score	22.7 (12.0)	21.9 (11.9)	0.47
Hoehn and Yahr	2.8 (1.0)	2.6 (1.1)	0.57
Levodopa dose (mg/day)	591.7 (263.1)	474.5 (215.3)	0.005

MMSE, Mini Mental Status Examination; BDI, Beck Depression Inventory; VAS, Visual Analogue Scale; UPDRS, Unified Parkinson's Disease Rating Scale;
Mann-Whitney test

Table 2

Demographic and clinical data for patients with Parkinson's disease with and without pain

	With pain no (%) *N*=21	**Without pain no (%) *N*=23**	**p values**
Gender	11 (52.3)	12 (57.1)	0.5
Dexterity of symptoms			
Right	12 (57.1)	11 (52.3)	
Left	8 (38.1)	10 (47.6)	0.37
Symmetry	1 (4.7)	2 (9.5)	
Disease type			
Akinetic	4 (19)	4 (19)	
Tremor	2 (9.5)	3 (14.3)	0.5
Mixed	15 (71.4)	16 (76.2)	
Motor complications	15 (71.4)	6 (28.6)	0.001
Sleeping pils	13 (61.9)	10 (47.6)	0.005

Chi – square test for frequency

Table 3

Fatigue rating scales review

Scale name		Recommended	Suggested	Listed
Fatigue severity scale	Screening	+		
	Severity	+		
Fatigue Assessment Inventory	Screening		+	
	Severity		+	
The Functional Assessment of Chronic Illness Therapy-Fatigue	Screening	+		
	Severity		+	
The Multidimensional Fatigue Inventory	Screening		+	
	Severity	+		
Parkinson Fatigue Scale	Screening	+		
	Severity		+	
Fatigue Severity Inventory	Screening			+
	Severity			+
Fatigue Impact Scale for Daily Use	Screening			+
	Severity		+	
Visual Analogue Scale	Screening			+
	Severity			+
Global Impression Scale	Screening			+
	Severity			+

Adapted from Friedman et al. [13]