

Postural instability in Parkinson's disease – 120 years after Charcot's death

Instabilidade postural na doença de Parkinson – 120 anos após Charcot

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ABSTRACT

The authors present the original Charcot's description of postural instability in Parkinson's disease as well as the evolution of this sign after 120 years of Charcot's death.

Keywords: Parkinsonism, Parkinson's disease, postural instability.

RESUMO

Os autores apresentam a descrição original de Charcot da instabilidade postural na doença de Parkinson, bem como a evolução deste sinal 120 anos após a morte de Charcot.

Palavras-chave: Parkinsonismo, doença de Parkinson, instabilidade postural.

Parkinson's disease (PD) is the second most common neurodegenerative disease and the most common cause of parkinsonism^{1,2}. The clinical criteria for the diagnosis of probable PD are the United Kingdom PD Society Brain Bank's, currently known as Queen Square brain bank clinical diagnostic criteria¹. These criteria requires the presence of bradykinesia, associated with at least one of the following signs: rigidity, 4-6 Hz rest tremor, and postural instability (PI), after the exclusion other causes of parkinsonism. These criteria also include supportive findings, such as unilateral onset, persistent asymmetry primarily affecting the side of onset, excellent response to levodopa, and the development of levodopa motor complications. In PD, PI is generally considered as a late stage feature, and is in fact a landmark of disease progression^{1,2}. The aim of this review is to describe the original description of PI by Charcot, and to compare his view with its modern definition.

JAMES PARKINSON DESCRIPTION OF SHAKING PALSY

In 1817, James Parkinson published this famous masterpiece entitled "An Essay on the Shaking Palsy"³. In this original description, Parkinson presented only six illustrative

patients (all of them male, with age ranging from 50 to 72 years) with PD, three of which were personally examined, other three who were recognized casually in the street (two later evaluated, the remaining one described as "the lamented subject of which was only seen at distance")³. Parkinson described the presence of involuntary tremor, with "lessened voluntary muscular power, associated to muscle paralysis" and "the propensity to bend the trunk forwards, and to pass from a walking to a running pace". There was no description of PI in his classical essay³.

THE CONTRIBUTION OF JEAN-MARTIN CHARCOT ON PD

In 1886, Charcot, made a seminal contribution to the clinical definition of PD^{2,4}. He described the presence of tremor, bradykinesia, muscle rigidity (not paralysis), micrographia, and PI. Charcot also described other motor and non-motor symptoms, such as dysarthria, dysphagia, depression, constipation, autonomic problems, and cognitive impairment (Parkinson's previously had the impression that the disease had no cognitive implications)^{2,4}.

Regarding the description and evaluation of PI, Charcot described in details the presence of PI in PD in the book

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(written by Bourneville) entitled “Leçons sur les maladies du système nerveux faites à la Salpêtrière”, published in 1892⁵. At this time Charcot discussed about the presence of propulsion and retropulsion in the late stages of PD.

THE CHARCOT’S PULL TEST

In the famous “Tuesday Lessons” (Leçons du Mardi a la Salpêtrière) Charcot presented a case of PD with no rest tremor in 1888. This report was translated and commented by Goetz in 1987⁶. In the neurological examination of the patient, Charcot comment:

You notice the tendency to run ahead, propulsion, so aptly noted in Parkinson’s original description. I am going to show you how, in addition to propulsion, there is an equally marked tendency for this patient to retropulse. To demonstrate this I will stand behind the patient and pull on his clothes two or three times to displace him backwards. This maneuver must be carefully performed, for once the retropulsion begins the patient continues to fall backwards and if not stopped may well fall⁶.

PI IN THE HOEHN AND YAHR CLASSICAL PAPER OF 1967

Hoehn and Yahr published a classical study in 1967, entitled “Parkinsonism: onset, progression, and mortality”⁷. This study is considered a milestone in which the authors described the rate of progression of PD patients, including different degrees of disability⁷. Patients were rated on a scale from stages I to V. On Stage I the motor symptoms and signs are unilateral; on stage II the disease is bilateral but there is no PI; on stage III, patients have PI but are independent; on stage IV the disease is disabling enough to imply lack of independence; and on stage V patients are confined to bed or wheelchair unless aided⁷. In summary, in stage III, PI is the defining hallmark to more disabling disease.

THE UNIFIED PD RATING SCALE (UPDRS) - PI

The Unified Parkinson’s Disease Rating Scale (UPDRS) is the most widely used clinical rating scale for PD⁸. This scale has four components, and is commonly used tied-up with

the modified Hohen and Yahr and Schwab and England scales⁸. PI is evaluated in the part 3 (motor), item 30 (response to sudden posterior displacement produced by pull on shoulders while patient erect with eyes open and feet slightly apart), rated as 0 (normal, *i.e.*, up to three steps backwards for recovery), 1 (retropulsion, *i.e.*, more than three backward steps but recovers unaided), 2 (absence of postural response, would fall if not caught by examiner), 3 (very unstable, tend to lose balance spontaneously), to 4 (unable to stand without assistance)⁸. In clinical practice, these rates have a good correlation with the risk of falls, and PI is considered positive when in the pull test is rated with a score >0. The Movement Disorder Society (MDS) Task Force for Rating Scales for PD approved a new version of the UPDRS in 2003⁹.

THE EVALUATION CLINICAL OF PI IN THE NEUROLOGICAL CLINICAL PRACTICE

The pull test, however, is usually poorly performed and interpreted. In 2004, Munhoz et al. assessed how experienced examiners involved on a NIH sponsored clinical trial performed the pull test in PD patients¹⁰. A total number of 25 examiners assessed 66 pull test and the results demonstrated that only 9% of examinations were error-free¹⁰. The most common errors were, the patient tapped or pulled too lightly (77.3%), examiner does not allow recovery space for patient (36.4%), and patients stands with feet held together or too far apart (22.7%), among others¹⁰.

CONCLUSION

PI due to loss of postural reflexes is commonly a sign of the late stages of PD. PI and freezing of gait are considered the most common cause of falls, and contributes to the risk of hip fractures¹. In spite of recent advances in unraveling the complex pathophysiology of PI, several questions remain unsolved, particularly related to its treatment. However, neurological clinical evaluation continues using the classical pull test described by Charcot.

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