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Urinary symptoms and associated factors in Parkinson's disease

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Introduction: *Urinary dysfunction, primarily in the form of detrusor overactivity (DO), is highly prevalent (30-80%) in patients with idiopathic Parkinson's disease (IPD). The most widely accepted mechanism is through cell depletion in the substantia nigra resulting in loss of the normal D1-mediated inhibition of micturition. Lower urinary tract symptoms (LUTS) may represent the most disturbing symptoms experienced as the disease progresses leading to a decrease in patient's quality of life (QoL).* <u>Aim of the study</u>: *to analyze the prevalence of LUTS and their impact on QoL in patients with IPD. We analyzed the possible association between these symptoms and patients' age, disease duration and severity, non -motors symptoms such as depression and cognitive involvement. In addition, we aimed to investigate whether LUTS differ among clinical subtypes of PD.*

Materials and Methods: *30 IPD patients (fulfilled the UK Parkinson's Disease Society Brain Bank criteria): 21 men and 9 women (mean age: 66.6±10.1 years). All patients underwent neurological and urological assessment. Exclusion criteria: cognitive impairment (MMSE <26, MOCA <24); an age above >80 years old. Testing: The unified Parkinson's disease rating scale (UPDRS) motor section part III and Hoehn-Yahr (H&Y) scale to assess motor symptoms and the stage of disease severity (Table 1). Cognitive function was assessed using Mini Mental State examination (MMSE) and Montreal Cognitive Assessment (MOCA). Patients were divided into tremor-dominant type (TDT), akinetic-rigid type (ART), and mixed type (MXT) PD subgroups using part III of the Unified Parkinson's Disease Rating Scale. Urinary symptoms have been investigated with 3- day voiding diary, uroflowmetry and a standardized questionnaire on incontinence (Incontinence-QoL); psychological status with "Hamilton Anxiety Scale" (HAM-A) and "Hamilton Depression Scale" (HAM-D). All patients were assessed during ON-phase. Informed consent was obtained from all participants following full explanation of the study.*

Results: *All patients investigated complained of overactive bladder symptoms. The most common urinary symptoms were urgency (27 pts), increased day-time and night-time urinary frequency (24 pts), urge urinary incontinence (16 pts; Table 2). Old age, longer disease duration and higher H&Y stage were significantly related with reduction in HAM-A scores (mean ±SD: 16.3±5.8; p<0.002); urinary incontinence was significantly associated with higher H&Y stages (p<0.005) and frequency of nocturia with higher UPDRS scores (p<0.003) and also post- void residual volume was related with an increase in HAM-D scores (p<0.005). The I-QoL scores (mean± SD: 62.4±26.2) were significantly associated with the MMSE scores (mean±SD: 2.4±0.7; p<0.01). UPDRS scores related inversely with MOCA scores (p<0.01) and H&Y scores related with MMSE (p<0.01). No significant differences in the urinary functions were found between the three clinical subtypes of PD patients. Statistical Analysis: all values presented in the text and tables are means±SD. All statistical analyses were performed with McNemar test. Correlation were calculated with Spearman's correlation coefficients.*

Interpretation of Results: *To our knowledge, there are few studies on the association of urinary dysfunction with other disease variables. An important aspect of this study is that all patients investigated were affected by overactive bladder symptoms, possibly reflecting the known role of the decline in nigrostriatal dopaminergic function in bladder dysfunction associated with PD and patients' age.*

Conclusion: *Our findings, in line with previous studies, suggest that the presence of LUTS in PD patients are strictly related to age, disease duration and the severity of motor impairment. To our knowledge this is the first study showing a positive correlation between urinary symptoms, neuropsychological status and QoL.*

Table 1 – Demographic and Clinical data

Patients	30
M/F	21/9
Age (yrs; mean±SD)	66.6 ± 10.1
Disease duration (yrs; mean±SD)	9.9 ± 6.9
UPDRS (ON; mean±SD)	23.5 ± 4.6
H&Y (mean±SD)	2.4 ± 0.7

Table 2 – Urinary Symptoms

Urinary Symptoms	Patients (n.)
Presence of urinary symptoms	30/30
Increased day- time and night- time urinary frequency	24/30
Urgency	27/30
Urge urinary incontinence	16/30

Table 3 – Correlations

	Age (yrs; mean±SD)	Disease duration (yrs; mean±SD)	Nocturia (episods for night; mean±SD)	Urinary incontinence (episods for day; mean±SD)	Post- void residual volume (ml; mean±SD)
H&Y (mean±SD)				3.2±2.3 2.4±0.7 (p<0.005)	
UPDRS (mean±SD)			2.4±6.9 30.5±13 (p<0.003)		
HAM- A (mean±SD)	66.7±10.1 16.3±5.8 (p<0.002)	9.9±6.9 16.3±5.8 (p<0.002)			
HAM- D (mean±SD)					31.5±17.6 15.2±7.4 (p<0.005)

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