The Prevalence of Symptomatic Orthostatic Hypotension in Patients with Parkinson's Disease and Atypical Parkinsonism

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BACKGROUND

- Orthostatic lightheadedness associated with orthostatic hypotension (OH) is one of many symptoms that occur in patients with Parkinson's disease (PD) as a result of autonomic dysfunction [1]
- Dysautonomia may herald the onset of PD even before motor symptoms become manifested and, along with other non-motor features, may gradually and seriously impact the Health-Related Quality of Life (HRQOL)[2,3]
- The presence of OH in patients with PD has been associated with increased postural sway[5] and falls[6].
- Despite the disabling nature of OH, its frequency in patients with PD is not known and previous estimates of the prevalence have varied considerably.
- The objective of this study is to determine the prevalence of symptomatic OH in patients with PD and atypical parkinsonism attending a specialty clinic, and evaluate risk factors for symptomatic hypotension in this population.

METHODS

The medical records of 1,318 patients diagnosed with PD or atypical parkinsonism (PSP, CBD, MSA, Vascular PD, DLB and other forms), who were evaluated between October 2009 and October 2010, were reviewed for:

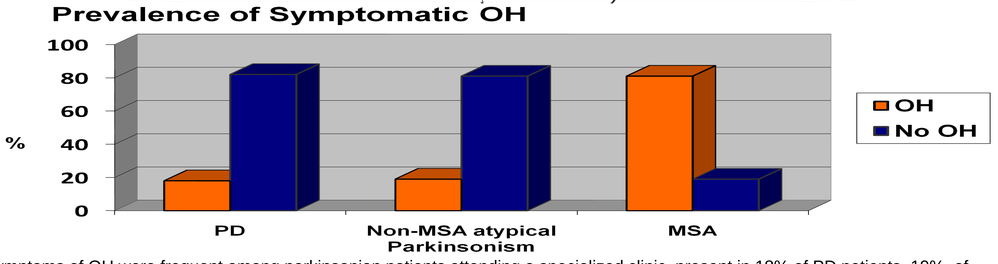
- Age
- Gender
- Symptoms of Orthostatic Hypotenison
- Duration of PD Symptoms
- Hoehn and Yahr stage (H&Y)
- Anti-hypertensive medication use
- Blood pressure (BP) measurements
- Use of medications used to treat OH, including midodrine, fludrocortisione, and the investigational drug L-threo-3,4-dihydroxyphenylserine (Droxidopa)[1,7,8]
- Total daily levodopa equivalent doses, based on published guidelines[9]
- Relevant co-morbidities such as the presence of hypertension, diabetes mellitus, and cardiovascular risk factors

RESULTS

Table 1: Prevalence of OH in PD and Atypical Parkinsonism

Diagnosis (N)	Symptomatic OH (%)	No Symptomatic OH (%)
Idiopathic PD (1125)	18	82
MSA (26)	81	19
DLB (32)	31	69
VP (38)	26	74
Other (57)	12	88
PSP (26)	11	89
CBD (14)	7	93

RESULTS (continued…)

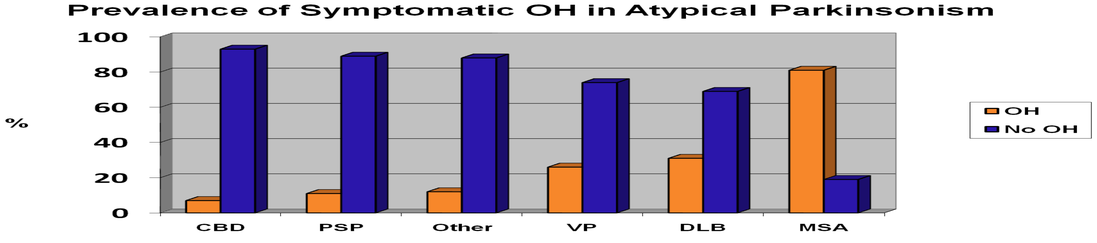


- Symptoms of OH were frequent among parkinsonian patients attending a specialized clinic, present in 18% of PD patients, 19% of patients with non-MSA atypical parkinsonism, and in 81% of patients with MSA.

Table 2: Patient Demographics in PD, Non-MSA Atypical Parkinsonism and MSA

Demographics	PD (n=1125) [mean [SD] or %]			Atypical Parkinsonism w/o MSA (n=167) [mean [SD] or %]			MSA (n=26) [mean [SD] or %]		
	OH	No OH	p value	OH	No OH	p value	OH	No OH	p value
Gender (% Male)	67.2%	61.4%	0.127	58.1%	59.6%	0.879	52.4%	20.0%	0.192
Age (years)	71.1 (10.3)	67.2 (31.3)	**0.0001**	75.4 (9.28)	76.6 (48.8)	0.087	62.8 (7.11)	60.6 (13.7)	0.396
Duration (months)	135.2 (81.9)	127.7 (94.9)	**0.031**	98.8 (61.3)	102.3 (102.3)	0.594	80.43 (55.7)	93.0 (79.6)	0.870
H&Y (1-5)	2.61 (0.885)	2.39 (0.859)	**0.007**	3.02 (1.08)	2.90 (1.07)	0.767	3.50 (1.26)	2.80 (1.30)	0.560
Levodopa (daily mg)	847.6 (479.8)	878.8 (547.2)	0.678	738.7 (505.3)	618.3 (506.4)	0.202	1063.1 (948.5)	926.0 (658.5)	1.000
Diabetes Mellitus (% positive)	7.9%	10.7%	0.200	12.9%	13.9%	0.876	16.7%	0.0%	0.619
#Antihypertensives (0-4)	0.75 (0.991)	0.73 (0.974)	0.998	1.16 (1.44)	0.94 (1.02)	**0.043**	0.14 (0.359)	0.800 (0.837)	**0.035**
Systolic Range (mmHg)	37.5 (24.4)	26.3 (16.5)	**0.0001**	27.6 (17.8)	23.9 (18.2)	0.336	31.4 (33.2)	19.3 (5.03)	0.763
Diastolic Range (mmHg)	15.7 (14.6)	10.9 (8.9)	**0.0001**	10.9 (7.08)	9.68 (7.83)	0.263	22.4 (22.4)	6.67 (6.51)	0.063

- Logistic regression analysis revealed that systolic BP range was the strongest predictor for symptomatic OH in PD patients, above and beyond that of duration, H&Y, levodopa equivalents, diastolic BP range and age (p=0.0001).



DISCUSSION

- The current study is one of the largest to date designed to examine the prevalence and risk factors of OH in PD and atypical parkinsonism.
- Our findings are consistent with the published estimates of OH in PD ranging between 14% and 47%[10-12] with the frequency increasing to 48% of patients with advanced PD[4].The overall prevalence of OH has been reported to be as high as 58.2% in one study[13].
- The finding of an association between greater sitting systolic BP variation and the presence of symptomatic OH has not been previously reported.
  - We considered whether this wide range in systolic BP occurred by chance, as a function of having more BP recordings in a patient who has a longer duration of follow-up, and therefore more advanced disease.
  - To address this issue, we analyzed the length of attendance at our center as a covariate with systolic blood pressure range. We found that, independent of duration of follow-up, a greater systolic BP range was still associated with the presence of symptomatic OH.
  - Thus, this new finding suggests that the autonomic dysfunction underlying OH may be reflected by greater systolic BP variation, as measured repeatedly by sitting BP readings.
- Few studies have examined the prevalence of OH in patients with atypical parkinsonism.
  - The PRIAMO study reported the occurrence of postural symptoms due to OH in MSA to be 54.6%.[12] The frequency of postural symptoms in other atypical parkinsonian syndromes varied from 0 in CBD, 13.3% in PSP, 18.3% in VP, to 21.4% in DLB.
  - The reported relative frequencies of symptomatic hypotension in each category of atypical parkinsonism is similar to those in our study and the PRIAMO study.[12]
  - Although the small sample sizes limit definitive conclusions, both studies found that the frequencies of OH symptoms increased in the following ascending order: CBD < PSP < VP < DLB < MSA.

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