Original Article

Clinical Differences between Vascular Parkinsonism and Parkinson's Disease- a Study in a Tertiary Hospital.

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ABSTRACT:

Objective: *Parkinson's disease is a neurodegenerative disorder while vascular Parkinsonism (VP) is a form of secondary Parkinsonism resulting from ischaemic cerebrovascular disease. For treatment purpose, risk stratification and prognosis, these two conditions must be differentiated clinically. This study was done to clinically differentiate Parkinson's disease (PD) and vascular Parkinsonism.* ***Materials and Methods:*** *This observational study was done in the neurology department of Dhaka Medical College and Hospital from January 2014 to December 2015. Fifty patients with Parkinson's disease and 30 patients with vascular Parkinsonism were included in the study.* ***Results:*** *Patients with vascular Parkinsonism were on an average of 8 years older than patients with Parkinson's disease. Male patients were more common than females in both groups. Risk factors like hypertension, stroke and dyslipidaemia (90%, 86.7% and 63.3% respectively) were found in higher proportion in VP group than in PD group (52.0%, 8.0% and 10.0% respectively). Onset of vascular Parkinsonism was sudden combined with a rapidly progressive clinical course, in contrast to a gradual onset and a slowly progressive course in Parkinson's disease. Abnormal postural instability (86.7%), gait abnormality (90.0%), lower body predominant findings (63.3%), urinary incontinence (76.7%), corticospinal findings (76.7%), pseudobulbar palsy (78.0%) and dementia (53.3%) were more common in vascular Parkinsonism than in PD group (16.0%, 62%, 8.0%.12.0%, 8.0%, 2.0% and 14.0% respectively). Both patient groups presented with asymmetric involvement but marked asymmetric involvement was present in the PD group. Presentation with resting tremor was the main feature of patients with Parkinson's disease. No significant difference was seen in rigidity, orthostatic hypotension and psychiatric symptoms.*

Conclusions: *Parkinson's disease and vascular Parkinsonism can be differentiated by clinical features.*

Keywords*: Parkinsonism, Parkinson's disease, Vascular Parkinsonism.*

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INTRODUCTION:

Parkinson's disease (PD) is a chronic, progressive, neurodegenerative disorder with an estimated prevalence of 31 to 328 per 100,000 people worldwide.[1] Age of onset of Parkinson's disease is between 40-70 years. Incidence and prevalence of

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PD increase with age. All races and ethnic groups are affected. The highest reported prevalence is in Caucasians and the lowest in Asians and African blacks.[2]

The pathogenesis of PD is believed to be multifactorial, caused by environmental factors acting on genetically susceptible individuals.[3,4] The clinical constellation of resting tremor (3-6 Hz), cogwheel rigidity, and bradykinesia are the hallmarks of Parkinsonism.[5] A fourth "cardinal sign" is postural reflex compromise or gait instability which usually occurs later in the disease.[5,6] PD usually presents asymmetrically, although symptoms eventually become bilateral.[5] Non-motor symptoms of PD such as depression, seborrhoeic dermatitis, olfactory dysfunction, and autonomic nervous system dysfunction (including constipation, urinary frequency, and orthostatic hypotension) may occur for years prior to the onset of overt motor symptomatology.[7] Psychiatric symptoms are important contributors to the morbidity and mortality of PD.[8] The diagnosis of Parkinson's disease is made clinically. There is no specific diagnostic test for Parkinson's disease. Sometimes CT scan and MRI of the brain are done to investigate patient to exclude other causes of Parkinsonism.

Vascular parkinsonism (VP) is a form of secondary Parkinsonism resulting from ischaemic cerebrovascular disease. For a clinician, the most important aspect of VP should be its differentiation from Parkinson's disease (PD). The clinical features of VP are most helpful in making this distinction. The clinical picture is heterogeneous, characterized by rigidity, pseudobulbar effects, dementia, urinary incontinence, short-stepped gait in an elderly hypertensive individual with multiple ischemic insults in the basal ganglia.
Vascular parkinsonism accounts for 2.5–5% of Parkinsonism cases.[9] Patients with Vascular parkinsonism are, on average, 4–10 years older than patients with Parkinson's disease at symptom onset. Age of onset can vary from 40-80 years in VP.

Conventional risk factors, particularly hypertension, diabetes mellitus, stroke, dyslipidaemia are more common in vascular parkinsonism. Patients with vascular parkinsonism present with lower body predominance, gait disorder, postural instability and falling; while tremor, asymmetry of involvement, upper body predominance are features of the idiopathic group. Dementia, incontinence, corticospinal tract findings and emotional labiality are more common in Vascular parkinsonism. Radio imaging (Brain MRI) is consistently the most widely used supportive method for the diagnosis of vascular parkinsonism by demonstrating diffuse white matter lesions or strategic sub-cortical infarcts.

Many clinical features of Parkinson′s disease correlate with those of vascular parkinsonism. The goal of this study is to differentiate the clinical features of vascular parkinsonism and Parkinson's disease so that vascular parkinsonism can be diagnosed earlier. Distinguishing vascular parkinsonism from Parkinson's disease is of paramount importance due to therapeutic and prognostic implications. Levodopa unresponsiveness and the rapid speed of progression associated with a higher incidence of dementia in vascular parkinsonism make treatment difficult and worsen prognosis. As vascular parkinsonism is levodopa unresponsive and rapidly progressive, the progression can be halted by modification of risk factors and providing secondary preventive measures. So, early identification of vascular Parkinsonism is essential for both therapeutic purposes as well as prognostic assessment. Moreover, information regarding treatment and prognosis can be given to the patients that will be helpful in counselling of the patients.

METHODS AND MATERIALS:

This is an observational study conducted in the neurology department of Dhaka Medical College and Hospital. Eighty consecutive patients (50 PD and 30 VP) were enrolled in this study. Mean age of the study populations were 63.5±7.5 years in VP and 55.5±6.4 years in PD groups. Fifty patients with Parkinson's disease and 30 patients with vascular parkinsonism, diagnosed clinically and supported by radio imaging, were admitted in or attending to

the neurology ward and out-patient departments of neurology and medicine of Dhaka Medical College and Hospital.

Patients with Parkinson's disease and vascular Parkinsonism with age ≥40 years and both gender, were included in the study. Patients who were suffering from both vascular Parkinsonism and Parkinson′s disease, patients with Parkinson's disease taking antipsychotic drugs, patients having other causes of gait impairment and patient or attendant unwilling to give consent, were excluded from the study. Demographic variables clinical features and risk factors were recorded in a structured questionnaire. Findings of CT scan or MRI of the brain were also recorded after confirmation by a consultant radiologist. The clinical features between vascular Parkinsonism and Parkinson′s disease were compared. Standard statistical procedures were followed in making a comparison between the variables. Statistical analyses were carried out by using the Statistical Package for Social Sciences version 16.0 for Windows (SPSS Inc., Chicago, Illinois, USA). Continuous variables are expressed as mean, standard deviation, and categorical variables as frequencies and percentages. The differences between groups are analyzed by unpaired t-test or chi-square (χ^2) test. A p-value <0.05 is considered as significant.

RESULTS:

Eighty patients were enrolled in this study. Among them, 30 patients with vascular parkinsonism were included in group-I, and 50 patients with Parkinson's disease were included in group-II. (Table-I).

Table I: Distribution of the patients between group I and Group II

Patients	Group-I (n=30)		Group-II (n=50)		P value
	N	%	N	%	
Male	21	70	27	54	0.265^{ns}
Female	9	30	23	46	

Group I= Vascular Parkinsonism, Group II= Parkinson's disease

Majority of the patients (63.4%) in group I (VP) were over age 60 years and 19(38.0%) patients belonged to age 51-60 years in group II (PD). The mean age was found 63.5±7.5 years in group I (VP) and 55.5±6.4 years in group II (PD). (Table-II)

Table II: Age distribution of the patients

Particular of the patients	Group-I (n=30)	Group-II (n=50)	P value
	N (%)	n (%)	
Age (in years)			
40-50	4 13.3	10 20.0	
51-60	7 23.3	19 38.0	
>60	19 63.4	21 42.0	
Mean±SD	63.±7.55	55.±6.45	0.001^{s}
Range (min-max)	40.0-69.0	40.0-68.0	

Group I= Vascular Parkinsonism , Group II= Parkinson's disease

Regarding residence of the patients, it was observed that 16 (53.3%) patients came from rural area in group I and 28(56.0%) in group II. The difference was not statistically significant (p>0.05) between two groups.

Table III: Distribution of the total study patients by risk factors (n=80)

Particulars of the patients	Group I (VP)		Group II (PD)		P value
	n	%	n	%	

Sex	21	70	27	54	0.265
Smoking	9	30	5	10	0.226
Hypertension	27	90	26	52	0.001
Diabetes	17	56.7	22	44	0.272
Stroke	26	86.7	0	0	0.001
Dyslipidaemia	19	63.3	10	20	0.001

Comparison of clinical features of Vascular Parkinsonism and Parkinson's disease showed significant differences between the two groups. (Table-IV)

Table IV: Distribution of the patients by clinical features (n=80)

Clinical features	Group I (VP)		Group II (PD)		P value
	N	%	n	%	
Mode of onset					
Sudden	26	86.7	2	4.0	0.001[s]
Gradual	4	13.3	48	96.0	
Clinical course					
Slowly progressive	5	16.7	47	94	0.001
Rapidly progressive	25	83.3	3	6	
Tremor	2	6.7	42	84	0.001
Rigidity	16	53.3	36	68	0.090
Postural instability	26	86.7	8	16.0	0.001
Gait abnormality	27	90	31	62	0.006
Body predominance	2	6.7	31	62	0.001
Upper body predominant	19	63,3	4	8	0.001
Lower body predominant					
Urinary incontinence	23	76.7	6	12	0.001
Corticospinal findings	23	76.7	4	8	0.001
Pseudobulbar palsy	5	16.7	0	0	0.25
Dementia	16	53.3	7	14	0.001

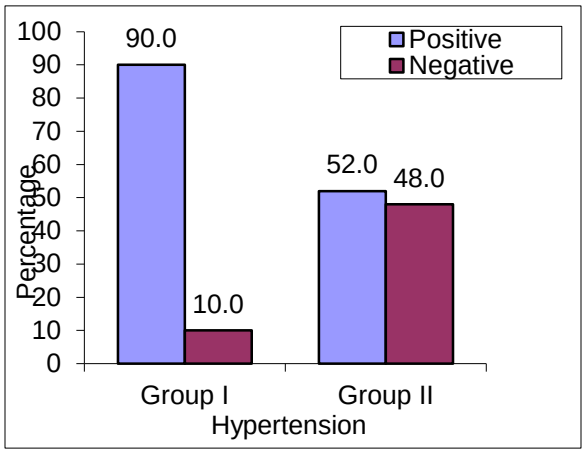

Figure I: Hypertensive patients between Group I and Group II

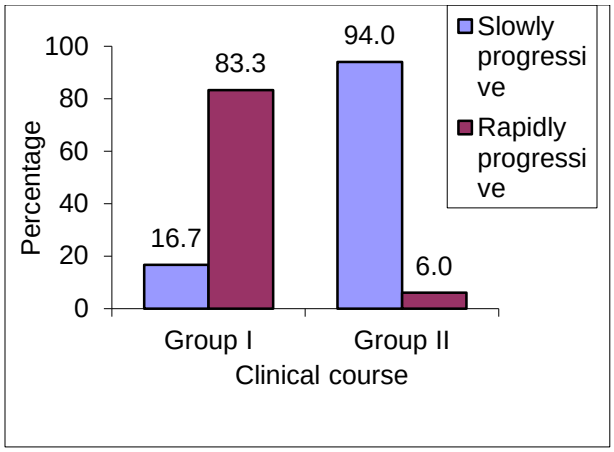

Figure II: Clinical course of the patients between group I and group II

DISCUSSION:

In this study different clinical features and risk factors were compared between patients with Parkinson's disease and vascular Parkinsonism. Mean age of the study populations was 63.5±7.5 years in VP and 55.5±6.4 years in PD groups. Patients with Vascular Parkinsonism were on an average of 8 years older compared with patients with Parkinson's disease. The age distribution was statistically significant between the two groups. The age distribution was similar to many of the previous studies.[10.11.12.13] Male (VP 70%, PD 54%) were more common than females (VP30%, PD 46%) in both groups. But this difference is not statistically significant.

Majority of the study population were from a rural area (VP 53.3%PD 56%) but there was no statistically significant difference found between the groups.

Vascular risk factors like hypertension, diabetes mellitus, stroke and dyslipidaemia (90%, 56.7%, 86.7% and 63.3% respectively) were found in higher proportion in VP group than PD group (52.0%, 44.0%, 0.0% and 10.0% respectively). Hypertension, stroke and dyslipidaemia were statistically significant (p<0.05) between the two groups. But the difference of diabetes mellitus was not statistically significant (p=0.272). Thiago Cardoso Valle et al also found similar risk factors in their study.[10]

Comparison of clinical features of vascular Parkinsonism and Parkinson's disease showed significant differences between the two groups. Onset of vascular Parkinsonism was sudden (VP 86.7% vs PD 4%) and associated with a rapidly progressive clinical course, (VP 83.3% vs PD 6.0%) in contrast to a gradual onset (PD 96.0% vs VP 13.3%) and a slowly progressive course (PD 94.0% vs VP 16.7%) in Parkinson's disease. The difference was statistically significant (p<0.05) between the two groups. (Table-IV)

Twenty-six patients (86.70%,) with VP had either an ischemic stroke or focal sign and symptoms (dysarthria, hemiparesis, hemiparesthesia) consistent with stroke preceding the onset of parkinsonism; whereas only 4 (8.0%) patients with PD had a history of ischemic stroke after the onset of parkinsonism. Four patients with VP had no focal sign or symptoms, but MRI showed relevant cerebrovascular disease. (Table-III) So features of stroke are more common in vascular parkinsonism.

Both patient groups presented with asymmetric involvement but marked asymmetric involvement was present in Parkinson's disease group (PD 96.0 % vs VP 14.0%). Presentation with rest tremor (PD 84.0% vs VP 6.7%) was the main feature of a patient with Parkinson's disease. The difference was statistically significant (p<0.05) between two groups.

Other distinguishing clinical features observed more in patients with Vascular parkinsonism were postural instability (VP 86.7%vs PD 16.0%), gait abnormality(VP 90.0% vs PD 62.0%), urinary incontinence (VP 76.7% vs PD 12.0%) and corticospinal findings (VP 76.7% vs PD 8.0%). Lower body predominance (VP 63.3% vs PD 8%) was another important feature of Vascular Parkinsonism patient group. The difference was statistically significant (p<0.05) between the two groups. (Table-IV)

Pseudobulbar palsy (VP 16.7% vs PD 0.0%) and dementia (VP 53.3% vs PD 14.0%) were also more common in vascular Parkinsonism group. The difference was statistically significant (p<0.05) between the two groups. No significant difference

was found regarding rigidity, orthostatic hypotension and psychiatric symptoms.

These differences in clinical features were similar to most of the previous studies.[10,11,12,13]

CONCLUSION:

Parkinson's disease and vascular Parkinsonism are two similar conditions with overlapping clinical features. This study shows that the clinical features of vascular Parkinsonism differ from those of Parkinson's disease. These two conditions can be differentiated clinically by meticulous history and physical examinations. This differentiation is very important for proper patient management, risk assessment and prognosis.

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