



3-2021

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Recommended Citation

Anis, Anam; Athar, Iqra; and Badshah, Mazhar (2021) "Association of supine hypertension in patients with Parkinson's disease," *Pakistan Journal of Neurological Sciences (PJNS)*: Vol. 16 : Iss. 1 , Article 4.
Available at: <https://ecommons.aku.edu/pjns/vol16/iss1/4>

ASSOCIATION OF SUPINE HYPERTENSION IN PATIENTS WITH PARKINSON'S DISEASE

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Date of submission: July 18, 2020 Date of revision: October 29, 2020 Date of acceptance: November 07, 2020

ABSTRACT

INTRODUCTION: Parkinson's disease is a neurodegenerative disease affecting older age populations. There is variable evidence of its relationship with hypertension. To date most of the studies have targeted orthostatic hypotension, however, rare data regarding supine hypertension has been witnessed so far. This study aimed at determining the association of supine hypertension with Parkinson's disease.

Methodology: A retrospective observational study was conducted at the Department of Neurology, Pakistan Institute of Medical Sciences, Islamabad. Medical records of 32 patients with Parkinson's disease were reviewed. Data included baseline, clinical and therapy information along with presence of supine hypertension. Ethical clearance was taken and administrative permission was granted by HOD. Study outcome was measured in terms of relationship of supine hypertension with Parkinson's disease.

Results: Male gender (75.0%) and older age than 60 years (56.2%) was predominantly affected with PD. Almost one third patients had known hypertension 9 (28.1%) out of which 7 (21.9%) are on ARBs. There were 5 (15.6%) patients on beta blocker, 1 (3.1%) was having calcium channel blocker and 2 (6.2%) diuretics. Out of total 68.9% patients had supine hypertension. Duration of PD was found greater in patients with supine hypertension.

Conclusion: Supine hypertension is significantly associated with Parkinson's disease, especially found in patients with longer duration of disease.

Keywords; Parkinson's disease, supine hypertension, duration of PD.

INTRODUCTION

Parkinson's disease is not very common but affected patients have progressive decline in their quality of life and became dependant for activities of daily living.¹ The status of supine hypertension and its association with clinical features of hypertension are still to be elucidated in detail.² The prevalence of this neurodegenerative disorder is rising rapidly in older ages affecting more than 1.7% of the population over the age of 65 years.³ It is estimated that by 2030 the current incidence of PD will double as the populations age globally.⁴ The causes of PD are mostly not well-known, which hampers the proper therapeutic programs and preventive measures to combat neurodegeneration. PD is a multifactorial brain disorder. The inherited forms of PD account for only 10–15% of all cases, and the majority of PD cases are

likely due to different combinations of environmental exposures and genetic susceptibility.⁵⁻⁶ Possible environmental exposures including alcohol intake, coffee, vitamin E intake and use of nonsteroidal anti-inflammatory drugs could reduce the PD risk;⁷⁻¹⁰ although, pesticide exposure and milk intake could increase its risk.¹¹⁻¹³ Nevertheless, at present, the environmental risk factors for developing PD are still not fully known. Hypertensive abnormalities can occur due to autonomic dysfunction, even before the onset of the classic motor symptoms of PD.¹⁴ In addition to orthostatic and postprandial hypotension, PD patients also experience nocturnal and supine hypertension, which suggests that BP regulation is impaired to great extent in these patients. The report by Tsukamoto found that nocturnal hypertension exists in up to 64.9%

of PD patients.¹⁵ In Pakistan, around 1 million elder population is living with PD and the trend is on a rise. Another local study estimated around half million people afflicted with PD.¹⁶ There seems limited data on the epidemiology of the disease, similarly, more deep insight into the causes, prevention or interventions for improving quality of life of these patients is required. The current study is aimed at establishing the risk of supine HTN in PD so that with early identification of HTN, proper management can be started. We plan to assess the association of supine hypertension and Parkinson's Disease in patients presenting to the neurology clinic of a tertiary care level hospital.

METHODOLOGY:

This retrospective observational study was conducted in the Neurology Department, Pakistan Institute of Medical Sciences. The medical records of PD patients who came to the department over a period of 2 years from 2018 to 2020 was reviewed. There were 32 patients whose medical information was complete and they were selected in the study. The ethical clearance was taken from the hospital ethics committee and consent and permission of the head of the department was taken to use the medical record of patients for this research. The study parameters included the baseline information of patients in terms of age and gender, moreover clinical information was based on the duration of disease, presentation and management of patients. The presence of supine hypertension was recorded. Data was analyzed in SPSS version 20.0 and the categorical variables such as gender, clinical presentation of hypertension, ARBs and ACEs, medical therapy and supine hypertension were analyzed as frequency and percentages. The continuous numerical variables like age and duration of PD were measured as mean and standard deviation. Further analysis was done to associate the baseline and clinical parameters with presence of supine hypertension using chi-square in case of categorical variable and student's t-test in case of continuous numerical variables.

RESULTS:

In this study a total of 32 patients of Parkinson's Disease were enrolled. Males were in majority 24 (75.0%) and most of them were above 60 years of age and females were 8 (25.0 %). The average age of patients was 62.5 years. (Table 1) The mean duration of the PD disease was 3.4 years. Nine (28.1%) had known hypertensive whereas 7 (21.9%) were taking ARBs. Moreover, none of the patients had taken ACE inhibitors. (Table 2) There were 5 (15.6%) patients on beta blocker therapy in this study. One (3.1%) was

taking calcium chain blocker whereas diuretics were being taken by 2 (6.2%) . (Table 3) Supine hypertension was present in a significant proportion of PD cases in the current study 22 (68.7%) and this signifies its association with PD.(Figure 1) Supine hypertension was found both in both genders (90.% vs 68.2%) and the difference in incidence could not be proven statistically significant (p-value, 0.18). The association of age distribution of PD patients and supine hypertension was not significant. The greater the duration of PD more isn the risk of supine hypertension (3.8 versus 2.4 years), however, this was borderline statistically significant (p-value, 0.09). Table 4

Table 1: Baseline characteristics

	Number of cases	%age
Gender		
Male	24	75%
Female	8	25%
Age (years)		
40-50	7	21.9%
51-60	7	21.9%
61-70	9	28.1%
71 or above	9	28.1%
Mean \pm SD	62.56 \pm 12.33	

Table 2: Clinical presentation of patients

	Number of cases	%age
Duration of PD		
Mean \pm SD	3.42 \pm 2.22	
Known Hypertension		
Yes	9	28.1%
No	23	71.9%
ARBs		
Yes	7	21.9%
No	25	78.1%
ACE inhibitors		
Yes	0	0.0%
No	32	100%

Table 3: Therapies given to patients

	Number of cases	%age
Beta blocker	5	15.6%
Calcium chain blocker	1	3.1%
Diuretics	2	6.2%

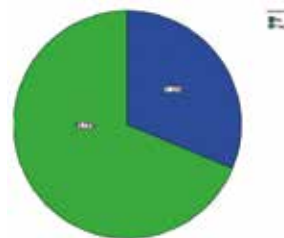


Figure 1: Supine Hypertension in the study

Table 4: Association of baseline and clinical features with supine hypertension

	Supine hypertension (n=24)	No supine hypertension (n=10)	p-value
Gender			
Male	15 (68.2%)	9 (90.0%)	
Female	9 (31.8%)	1 (10.0%)	0.18
Age (years)			
40-50	4 (18.2%)	3 (30.0%)	0.40
51-60	5 (22.7%)	2 (20.0%)	
61-70	8 (36.4%)	1 (10.0%)	
71 or above	5 (22.7%)	4 (40.0%)	
Age (Mean \pm SD)	62.3 \pm 11.1	63.0 \pm 15.3	0.89
Known hypertension	6 (27.3%)	3 (30.0%)	0.87
ARBs	4 (18.2%)	3 (30.0%)	0.45
Duration of PD (Mean \pm SD)	3.8 \pm 2.1	2.4 \pm 2.1	0.09

DISCUSSION:

This study highlights a significant proportion of PD patients having supine hypertension and proving an association of the two conditions. As previous scientific evidence suggests a controversy and no clear picture of hypertension and PD this study validates some investigator's points and proofs regarding correlation of hypertension with these patients.¹⁷ In this study almost 70.0% patients were found to have supine hypertension, whereas their known condition was only in one-third of this proportion. Goldstein DS and colleagues in a previous study reported that pure autonomic failure, multiple system atrophy and Parkinson's disease all featured supine hypertension, which was equivalent in severity with essential hypertension.¹⁸ Many others have also found presence of supine hypertension in PD. A review study by Espay A et al disclosed that autonomic dysfunction is present in most of PD patients, this dysfunction is related to hemodynamic abnormalities.² Another study by Kaufmann H and Goldstein DS also proved that supine hypertension is related with autonomic dysfunction in Parkinson's disease.¹⁹ Another study by Berganzo K and colleagues also confirmed the relationship of supine hypertension and Parkinson's Disease.²⁰ This proves and validates the findings of current study. Continued with previous literature, in the present study male gender and older age than 60 years was predominantly affected by PD. The study by Goldstein DS had also found male preponderance.¹⁸ Another study by Ejaz and colleagues also witnessed male majority and elder ages in PD.²¹ PD is an old age neurodegenerative disorder which has been proven many times, moreover, male affliction has also been witnessed.²² In the present

study when further analysis was done to see any association between demographic and clinical features of PD patients with presence of supine hypertension, no significant variation was noted. Nonetheless, the longer duration of PD was found to be related with supine hypertension. There are few studies on the mechanisms of supine hypertension. Theoretically, supine hypertension could result from excessive cardiac output or from inappropriately high systemic vascular resistance.² On the other hand many studies have proven the link between orthostatic hypotension and Parkinson's Disease.²³ In brief, it can be argued that males of older ages are more likely to get affected by PD and supine hypertension is significantly related to the condition. Moreover, the longer duration of PD has been witnessed in the patients. The current study has many advantages, firstly it highlighted the significance of early diagnosis of HTN in supine position when autonomic disturbances and orthostatic hypertension hide its presence. Secondly, the quantification of hypertension in PD patients is an additional advantage, specially keeping in mind the lack of evidence on these patients. One of the limitations was absence of long term outcome of these patients and role of supine hypertension on the overall condition and its response to treatment. Further data on these missing loops need to be gathered and disseminated.

CONCLUSION:

Supine hypertension is significantly associated with Parkinson's disease, especially when the duration of disease is already long. In this study male gender and older ages were found more afflicted with the disease. Further studies from other parts of country and worldwide are needed to validate the findings of this study. Long term outcome and role of supine hypertension towards drug therapy response also needs to be elucidated.

References:

- Kouli A, Torsney KM, Kuan WL. Parkinson's Disease: Etiology, Neuropathology, and Pathogenesis. In: Stoker TB, Greenland JC, editors. *Parkinson's Disease: Pathogenesis and Clinical Aspects* [Internet]. Brisbane (AU): Codon Publications; 2018 Dec 21. Chapter 1. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK536722/> doi: 10.15586/codonpublications.parkinsonsdisease.2018.ch1
- Espay A, Peter L, Robert H, Aristide M, Mario M, Anthony L. Neurogenic orthostatic hypotension and supine hypertension in Parkinson's disease and related synucleinopathies: prioritisation of treatment targets. *The Lancet Neurology* 2016; 15: 954-66
- Di Giovanni G, Di Matteo V, Esposito E. Birth, life and death of dopaminergic neurons in the substantia nigra. *J Neural Transm Suppl* 2009; 73:1
- Achey M, Aldred JL, Aljehani N, Bloem BR, Biglan KM, Chan P, et al. The past, present, and future of telemedicine for Parkinson's disease. *Mov Disord* 2014; 29(7):871–83.
- Fleming SM. Mechanisms of gene-environment interactions in Parkinson's disease. *Curr Environ Health Rep* (2017) 4(2):192–9.
- Wirdefeldt K, Adami HO, Cole P, Trichopoulos D, Mandel J: Epidemiology and etiology of Parkinson's disease: a review of the evidence. *Eur J Epidemiol* 2011; 26(suppl 1):S1–S58.
- Liu R, Guo X, Park Y, Wang J, Huang X, Hollenbeck A, Blair A, Chen H: Alcohol consumption, types of alcohol, and Parkinson's disease. *PLoS One* 2013; 8:e66452.
- Zhang D, Jiang H, Xie J: Alcohol intake and risk of Parkinson's disease: a meta-analysis of observational studies. *Mov Disord* 2014; 29: 819–822.
- Etminan M, Gill SS, Samii A: Intake of vitamin E, vitamin C, and carotenoids and the risk of Parkinson's disease: a meta-analysis. *Lancet Neurol* 2005; 4: 362–365.
- Gagne JJ, Power MC: Anti-inflammatory drugs and risk of Parkinson disease: a metaanalysis. *Neurology* 2010; 74: 995–1002.
- Li AA, Mink PJ, McIntosh LJ, Teta MJ, Finley B: Evaluation of epidemiologic and animal data associating pesticides with Parkinson's disease. *J Occup Environ Med* 2005; 47: 1059– 1087.
- Priyadarshi A, Khuder SA, Schaub EA, Priyadarshi SS: Environmental risk factors and Parkinson's disease: a metaanalysis. *Environ Res* 2001; 86: 122–127.
- Jiang W, Ju C, Jiang H, Zhang D: Dairy foods intake and risk of Parkinson's disease: a doseresponse meta-analysis of prospective cohort studies. *Eur J Epidemiol* 2014; 29: 613–619.
- Asahina M, Vichayanrat E, Low DA, Iodice V, Mathias CJ. Autonomic dys-function in parkinsonian disorders: assessment and pathophysiology. *J Neurol Neurosurg Psychiatry* (2013) 84(6):674–80.
- Tsukamoto T, Kitano Y, Kuno S. Blood pressure fluctuation and hypertension in patients with Parkinson's disease. *Brain Behav* (2013) 3(6):710–4.
- Imtiaz N, Mehreen S, Saeed K, Akhtar N, Hameed Ur Rehman, Amin S et al. Study of prevalence of Parkinson's disease in elderly population in Rawalpindi, Pakistan. *Journal of Entomology and Zoology Studies*. 2016; 4(6): 845-847
- Chen J, Zhang C, Wu Y, Zhang D. Association between Hypertension and the Risk of Parkinson's Disease: A Meta-Analysis of Analytical Studies. *Neuroepidemiology*. 2019;52(3-4):181-92.
- Goldstein DS, Pechnik S, Holmes C, Eldadah B, Sharabi Y. Association between supine hypertension and orthostatic hypotension in autonomic failure. *Hypertension* 2003; 42: 136–42.
- Kaufmann H, Goldstein DS. Autonomic dysfunction in Parkinson disease. *Handb Clin Neurol* 2013; 117: 259–78.
- Berganzo K, Diez-Arrola B, Tijero B, et al. Nocturnal hypertension and dysautonomia in patients with Parkinson's disease: are they related? *J Neurol* 2013; 260: 1752–56.
- Ejaz AA, Sekhon IS, Munjal S. Characteristic findings on 24-h ambulatory blood pressure monitoring in a series of patients with Parkinson's disease. *Eur J Intern Med* 2006; 17: 417–20
- Fengler S, Liepelt-Scarfone I, Brockmann K, Schaffer E, Berg D, Kalbe E. Cognitive changes in prodromal Parkinson's disease: a review. *Mov Disord* (2017) 32(12):1655–66.
- Hou L, Li Q, Jiang L, Qiu H, Geng C, Hong JS, Li H, Wang Q. Hypertension and diagnosis of Parkinson's disease: a meta-analysis of cohort studies. *Frontiers in neurology*. 2018 Mar 19;9:162.

Conflict of interest: Author declares no conflict of interest.

Funding disclosure: Nil

Author's contribution:

Anam Anis; data collection, data analysis, manuscript writing, manuscript review

Iqra Athar; data collection, data analysis, manuscript writing, manuscript review

Mazhar Badshah; concept, data analysis, manuscript review