Hallucinations in Parkinson’s Disease — A Study of Forty Three Patients

Meena Gupta*, G Singh**, Geeta A Khwaja***, MM Mehndiratta***

Abstract

Objective: To see the prevalence of hallucinations in patients with Parkinson’s disease and to compare the various parameters between hallucinators and non-hallucinators.

Methods: Forty-three patients of Parkinson’s disease were included. Detailed motor assessment was done with UPDRS scales. Assessment was done for the presence of depression and sleep disturbances. The patients were enquired for the presence of depression and sleep disturbance. The patients were enquired for the presence of hallucinations. Hallucination types and associated emotional experience were probed into. Comparative analysis was subsequently done between hallucinators and non-hallucinators.

Results: The mean age of the patients was 61.47 years while mean duration of symptoms of PD was 4.30 years. The mean UPDRS II and III scores were 15.18 and 38, respectively. Fifteen patients (34.9%) had experienced hallucinations. The hallucinations described were visual as well as auditory in nature. Majority of these patients (12 out of 15, 80%) had not volunteered about their hallucinations on their own. On analysis of various parameters between the hallucinators and non-hallucinators, it was observed that hallucinators were older and had a higher mean duration of symptoms of PD. The patients with hallucinations had a higher severity of motor symptoms and signs. Hallucinators more commonly had depression and sleep disturbances. Mean dosage of L-dopa equivalent dose was higher in patients with hallucinations as compared to those without hallucinations. On statistical analysis, however, only two parameters were found to be different in a statistically significant manner. These were the duration of illness and the Hoen and Yahr scale (p < 0.05). Also, hallucinations occurred independent of dopaminergic drugs.

Conclusion: Hallucinations are common source of distress but are often neglected. One should always probe actively into the presence of hallucinations.

INTRODUCTION

Psychiatric disturbances occur frequently in patients with Parkinson’s disease (PD) but generally little attention is paid to them. Hallucinations are one of the important mental disturbances occurring in patients with PD but are often neglected. Hallucination, as defined in DSM IV is a sensory perception without external stimulation of the relevant sensory system. Parkinson’s disease is one of the commonest neurological conditions associated with hallucinations, although this is more often than not neglected. Though generally considered to be related to dopaminergic therapy, the hallucinations may occur even without any dopaminergic therapy. It is important to give adequate attention to these hallucinations as they may compromise on the overall quality of life. Also, they have been shown to be associated with higher mortality rate as compared to non-hallucinators. New agents are now available for treatment of these hallucinations without risk of aggravations of the motor symptoms and timely intervention can thus be fruitful.

Various factors have been implicated in the causation of these perceptual abnormalities. Dopaminergic therapy has been shown to be important predisposing factor for hallucinations. Cognitive impairment is associated with higher risk of developing hallucinations. Other factors implicated in the pathogenesis of hallucinations include severity of motor symptoms, sleep disorders and depression. There have been only few studies on this important aspect of PD but data is available.

* Director, IHBAS; Ex Professor of Neurology; ** Senior Resident; *** Professor, Department of Neurology, GB Pant Hospital, Delhi 110 002.
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mainly from the Western countries. The present study from India is an attempt to explore the correlation with various factors.

**Material and Methods**

This study was carried out in Neurology Department of G.B. Pant Hospital, Delhi, India. Ours is a tertiary care super-specialty hospital, providing free health care to general population. Patients were diagnosed as having Parkinson’s disease on the basis of UK Parkinson’s disease society brain bank criteria. The assessment of the motor status was done using Unified Parkinson’s Disease Rating Scale II and III (UPDRS II and III). An axial score was also calculated and included five items from UPDRS III (Speech, rising from chair, posture, postural stability and gait). This was calculated separately because this had been correlated with cognitive impairment and also has been found to be higher in patients with hallucinations. If patient had significant fluctuations, best performance of the day was considered for evaluation.

In addition to the motor symptoms, patients were assessed for the presence of depression. Beck depression inventory was used which is a 21 items scale (each item being graded as 0-3; maximum score is 63 and minimum is 0. Depression was graded as mild with score 10-16, moderate with 17-29 and severe with ≥ 30).

The patients were assessed for the presence of sleep disturbances based on the presence of any of the following:

i) Difficulty in falling asleep
ii) More than one awakening during sleep
iii) Early morning awakening
iv) Nocturnal agitation
v) Vivid dreams
vi) Daytime somnolence

The patients were considered to have minor sleep disturbance if they had any one of the above while major sleep disturbance if more than one of the above were present. The antiparkinsonian treatment was recorded and the total daily dose of L-dopa was calculated for each patient. The L-dopa equivalent dose was calculated using the following algorithm: 10mg bromocriptine = 1 mg lisuride = 4 mg ropinirole = 100 mg L-dopa = 100 mg piribedil.

The patients were enquired if they had any hallucinations. If the patients had hallucination, they were questioned for the type (auditory, visual formed or unformed, presence etc) and any associated emotional experience (e.g. frightening). They were enquired for the time of the day when these were felt. Presence of associated delusions was enquired into. The patients were interrogated if they were stressed due to these hallucinations and if any treatment was being taken for the same.

**Results**

A total of 43 patients (10 female, 33 males) were included in the study. The mean age of the patients was 61.47 years while mean duration of symptoms of PD was 4.30 years. The mean UPDRS II and III scores were 15.18 and 38 respectively. The mean axial score was 6.26 while mean BDI score was 18.58. Out of 43 patients, 15 (34.9%) had experienced hallucinations. Eleven of the 15 patients had formed visual hallucinations (comprising of persons in acquaintance, animals, frightening faces, and monsters from mythology). Three patients had hallucinations of presence of someone near them. Six patients had auditory hallucinations out of which four felt that people were plotting against them. One of these patients used to pass significant amount of the day with his ear directed against the wall of the room to hear these voices. Fear of spouse infidelity was seen in two patients and it was interfering significantly with their adjustment at home.

Surprisingly, majority of these patients (12 out of 15, 80%) had not volunteered about their hallucinations on their own; only three patients had conveyed themselves. The patients either had a fear of embarrassment or they felt that these were not important enough to be revealed to the treating physicians. Majority felt that these were distressing (10 out of 15) and in four these were interfering with their daily life significantly. All the patients felt that these were commoner in the evenings.

On analysis of various parameters between the hallucinators and non-hallucinators, it was observed that hallucinators were older than non-hallucinators and mean duration of symptoms of PD was higher in patients with hallucinations (5.87 years vs. 3.46 years). The patients with hallucinations had a higher score on UPDRS II and III scale as compared to those without hallucinations (16.6 and 43.6 vs. 14.3 and 35). Similarly, the axial score was found to be higher in patients with hallucinations (7.4 vs. 5.64). Hence, the motor disability was higher in patients with hallucinations as compared to those without hallucinations.

The associated neuropsychiatric disturbances were also higher in patients with hallucinations. Out of 15 patients, 11 had sleep disturbances (73.3%) and of these, six had major sleep disturbances. On the contrary, out of 28 patients without hallucinations, 19 had sleep disturbances of which nine had major sleep disturbances. Hence, major sleep disturbances were seen in 40% (6/15) of hallucinators and 32.14% (9/28) of non-hallucinators.

Similarly, more patients with hallucinations were depressed as compared to those without hallucinations. Among 15 patients with hallucinations, 10 (73.3%) had depression (BDI ≥ 10%) out of these, eight had moderate to severe depression (8/15; 53.3%). On the contrary, among 28 non-hallucinators, 17 had depression (60.7%). Among these, 13 had moderate to severe depression (13/28; 46.4%).

On comparative study of mean dopaminergic dosage of these two groups, it was evident that mean dosage of L-dopa equivalent dose was significantly higher in patients with hallucinations as compared to those without hallucination (213.3 mgs vs. 100 mgs). However, it was noted that six patients had hallucinations even without the initiation of the
dopaminergic therapy.

**DISCUSSION**

Parkinson’s disease is a common neurodegenerative disorder, with primary manifestation pertaining to the extrapyramidal system. However, important aspect of this illness, which is more often than not ignored, is the quantum of psychiatric morbidity associated with this illness. Hallucinations are one of the important components of the spectrum of psychiatric illnesses encountered in PD patients. There have not been many studies on this aspect and these are generally from European or American countries. Ours is a study from north India, with an attempt to see the frequency of hallucinations in our set of patients with PD.

In literature, the prevalence rates of hallucinations and delusions have been reported to be ranging from 6-40%. Study by Holroyd et al in a tertiary care center found the prevalence to be almost 30%. Hence, our findings match with the previous findings. However, the important point to highlight in our study is high degree of non-disclosure of these complaints. Hence, it is important to probe for presence of these complaints as patients might not come out with these on their own.

The majority of individuals had formed visual hallucinations which comprised either of the people in their acquaintance or animals, monsters and mythological figures. The visual hallucinations are the predominant form of hallucinations in PD, as described in the literature. Also, these are experienced while alert and with eyes open in dim surroundings. Barnes and David had suggested that visual hallucinations in PD are very similar to those in neurologically normal patients with visual impairment (Charles Bonnet Syndrome). However, in all of our patients with hallucinations, corrected visual acuity was normal.

Fenelon et al had described hallucinations of presence to be the most common type in his study of 216 patients. In a study by Graham et al, probably one patient out of the 129 patients had hallucination of presence. In our study, 20% of hallucinators had such hallucinations.

In a study of 121 patients of PD by Inzelberg et al, 8% of the total and 28.5% of hallucinators had auditory hallucinations. All patients with auditory hallucinations also had visual hallucination in his study while in our study, five out of six patients had both. On the other hand, in a study by Moscowitz et al, 9.7% of the patients were reported to have pure auditory hallucinations. In our study, only one patient had pure auditory hallucinations. Hence, we wish to highlight that pattern of hallucinations might differ among different population subsets.

Of the six patients with auditory hallucination, four also had paranoid delusions comprising of spouse infidelity (2) and neighbors and relatives conspiring against them (4 out of 4; 100%). These delusions are important since they might have a bearing on the overall compliance with the treatment (as patient might refuse to accept the treatment due to paranoia).

Comparing the various parameters among hallucinators and non-hallucinators in our study, it was observed that hallucinators were older, had longer duration of symptoms, higher severity of motor symptoms, more likely to have depression and sleep disturbances and were on higher mean dosage of dopaminergic drugs. In previous studies, it has been shown that age is a risk factor for presence of hallucinations and patients with hallucinations are older as compared to those without hallucinations. However, it has also been proposed that age might be a surrogate or proxy marker of the disease duration. In our study, also, the hallucinators were older.

The mean duration of symptoms was higher in hallucinators. In a multivariate analysis, duration of PD was an independent predictor of visual hallucinations. Sanchez Ramos et al also found an association between duration of disease and occurrence of hallucinations. Duration of illness has been considered to be a proxy measure of disease severity. There have also been attempts to classify hallucinators into early and late hallucinators and then to correlate them with motor and cognitive impairment. However, in our study, this could not be done because patients did not remember the exact date of onset of hallucinations and hence the data might not have been representative.

Motor status is said to be more severely affected in hallucinators than non-hallucinators. In our study, the patients had a higher severity in all three scores i.e. UPDRS II, III and axial score. This could be due to correlation with the duration of illness, which has been shown to be important predictive factor in multivariate analysis.

The patients with hallucinations had higher mean score on BDI than non-hallucinators. Depression has been considered as a predisposing factor for hallucinations with possible substrates being use of drugs and involvement of limbic system. Conflicting results have been reported about the link between hallucinations and depression. In our study, the hallucinators more commonly had depression and that too of higher severity. Mean BDI score was also found to be higher among hallucinators. Similar results were observed for sleep disturbances. It has been proposed that more common occurrence of hallucinations in evening could be due to alteration of arousal than due to effect of ambient light. Moskowitz and Colleagues suggested that symptomatology in PD progressed from vivid dreams to hallucinations to delusions and finally to confused state, this being linked to a kindling mechanism. Pappert and Colleagues have shown 82% of PD patients with hallucinations had sleep disorder. In our patients, 73.3% of hallucinators had sleep disturbances. Also, major sleep disturbances were commoner in patients with hallucinations. The mean dosage of L-dopa among hallucinators with sleep disturbances was lower (127.27 mg) as compared with those without sleep disturbances (450 mg). Hence, it cannot be correlated with dopaminergic drug intake alone and we feel that sleep wake disturbances have important role to play in the pathogenesis of hallucinations.
The hallucinations of PD are commonly considered to be side effect of dopaminergic therapy, the incidence being higher with dopamine receptor agonists than with L-dopa. However, others feel that hallucinations are not a simple dopaminergic adverse event. There are patients in which hallucinations appear even before introduction of dopaminergic therapy. Also, there is no simple dose effect relationship between dopaminergic treatment and the development of hallucinations; and hallucinations do not occur in all patients on dopaminergic therapy. In our study, however, the mean dopaminergic drug dose was significantly higher in hallucinators as compared to non-hallucinators. (213.3 mgs vs 100 mgs). However, we observed that among 15 patients with hallucinations, six patients had experienced hallucinations without any dopaminergic drug. We feel that hallucinations may occur independent of dopaminergic drugs and that dopaminergic drugs may have a facilitatory or triggering effect on the hallucinations. Similar results have been shown by Fenelon et al; while Inzelberg et al did not find treatment with dopaminergic drugs to be important for hallucinations.

**CONCLUSIONS**

To conclude, we wish to highlight that hallucinations are common in PD and are source of distress to the patient. Visual hallucinations are commonest but auditory hallucinations can also occur, that too in isolation. The patients with hallucinations have longer duration and higher severity of illness. The patients have more commonly depression and sleep-wake disturbances and are on higher dosage of dopaminergic drugs. There is high degree of non-disclosure resulting in failure to recognize them. Hence, one should always be alert and actively probe to recognize their presence.

**REFERENCES**