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# A case of Parkinson's disease mild cognitive impairment (PD-MCI) treated with amantadine

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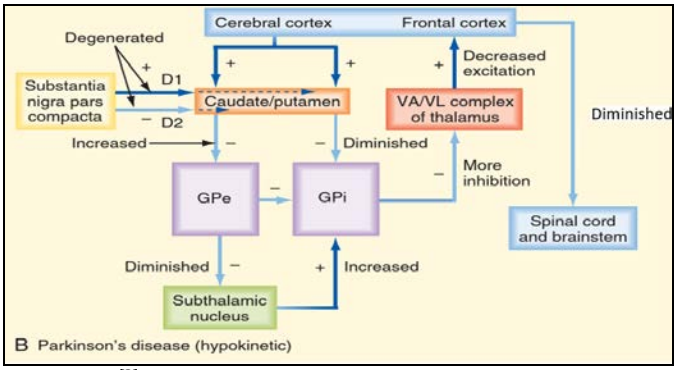
**Abstract**
Parkinson's disease a neurodegenerative disorder can be manifested with mild cognitive impairment. Clinically, it is often misdiagnosed as Parkinson's disease with neuropsychiatric complication which may be treated with neuroleptics and results in progression of the disease. We report a case of 60 year old female who is already diagnosed as Parkinson's disease presenting with sleep disturbances and abnormal behaviour. Patient improved with administration of dopamine facilitator amantadine.

**Keywords:** Parkinson's disease, mild cognitive impairment, amantadine

## Introduction

Parkinsonism is a neurodegenerative disorder of dopaminergic neurons in the substatia nigra pars compacta of basal ganglia characterized by tremor, rigidity and bradykinesia which manifest in middle or late life and leads to progressive disability with time. In contrast to cerebellar lesion where there is intention tremor, in Parkinsonism due to feedback circuit oscillations in basal ganglia the tremor is a kind of involuntary resting tremor [1].

Psychic drive for motor activity is reduced so that akinesia results in Parkinsonism. This is due to decreased dopamine secretion in limbic system mainly in nucleus accumbens. This can be contributed to more distressing symptoms because even to perform simplest movement the patient has to exert the highest degree of concentration. The result of which can be expressed as cognitive decline in the form of mental anguish when there is a failure to make a desired movement [2].




**Reference:** [2]

**Fig 1**

Cognitive impairment in Parkinson's disease is characterized by executive deficits and ranges from Parkinson's disease mild cognitive impairment (PD-MCI) to Parkinson's disease dementia (PDD) former of which normally does not affect the patients' daily operations whereas the latter hits more than one area of cognition and is severe enough to impair social or working functions [3, 4].

Non-motor features of PD include cognitive impairment and dementia. These non-motor features have been associated with increased disability and reduced quality of life and don't respond to levodopa or dopaminergic therapies [3, 4].

## Case Report

60 year old female came to OPD with history of headache, sleep disturbances for past 2 weeks. She was known case of hypothyroidism and hypertension and under treatment. No history of Diabetes mellitus. Patient was under treatment from psychiatrist with mirtazepine 5 mg at night for depression. But the symptoms are not subsiding. On examination vitals are stable; face appears to be mask like facies, bilateral upper and lower limb rigidity and cogwheel rigidity of both wrists joint was present. Resting tremors were present with head nodding. Patient was diagnosed to be Parkinson's disease using UK Parkinson's disease society brain bank clinical diagnostic criteria. Patient was found to have minimal cognitive impairement (MCI) using neuropsychological testing.

Past medication history revealed taking of tab levodopa 100mg for Parkinsonism that doesn't relieved symptoms completely including cognitive impairement. Considering Parkinsonism with cognitive impairment amantadine 1OO mg at night was started. Patient responded to amantadine within 2 weeks. Mask like facies started disappearing, rigidity reduced and resting tremors and head nodding become absent. Sleep disturbances were improved and there were no signs and symptoms of depression. Mirtazapine was stopped.

## Discussion

Most common drug used to manage the symptoms of Parkinsonism is levodopa. But it has been shown that motor and psychiatric side-effects are associated with the drug. So some scientists turned to alternative drugs to improved side-effect so that levodopa can be replaced or its action can be augmented. Amantadine, originally used as an antiviral drug, has been shown to improve the symptoms of Parkinson's disease [5]. Amantadine which was used for prophylaxis of influenza A2 was found to be useful for the symptoms of

Parkinsonism. Even though its efficiency is lower than that of levodopa it acts rapidly. Synthesis of dopamine from synaptic terminals is promoted by amantadine. Prolonged use of levodopa can result in dyskinesias and changes in behavioural effects like mild anxiety to depression. Amantadine is commonly given to alleviate L-DOPA-induced dyskinesia of Parkinson's disease (PD) patients. Amantadine protects dopamine neurons by a reducing activation of microglia and inducing expression of GNDF in astroglia [6].

It is now well recognized that lot of patients with Parkinsonism may turn up in cognitive and intellectual impairment following the onset of the disease and the impairment progress with the duration of disease [7]. Symptoms include depression, executive dysfunction, memory impairment, slowed information processing. Even though language abilities appear to be relatively spared dementia may occur as a symptom in Parkinsonism. So many of the symptom complex point to a subcortical origin which include limbic system.

It has been hypothesized that stable mild cognitive deficits in PD may represent a frontostriatal syndrome secondary to dopaminergic deficiency [8], while progressive cognitive decline may be related to nondopaminergic (including cholinergic) [9], nonstriatal neuropathophysiologic changes.

Pathogenesis of Cognitive deficits in non-demented PD have been frequently attributed to neurochemical alterations in dopaminergic, cholinergic, and other systems and neuropathological contributions of limbic and cortical Lewy bodies and neurites, amyloid deposition, neurofibrillary tangles, and cerebrovascular disease [9].

Amantadine is NMDA glutamate antagonist by which it can influence nigrostrial dopaminergic pathways. It can be prescribed for to suppress motor fluctuations and abnormal movements associated with the disease. Amantadine, either alone or combined with an anticholinergic agent, is sometimes helpful for mild Parkinsonism and acts by potentiating the release endogenous dopamine [10].

On the other hand mirtazapine is an antidepressant which is a noradrenergic and specific serotonergic antidepressant (NaSSA) that acts by antagonizing the adrenergic α2-autoreceptors and α2-heteroreceptors as well as by blocking 5-HT2 and 5-HT3 receptors. Further it enhances the release of norepinephrine and 5-HT1A-mediated serotonergic transmission [10].

## Conclusion

Even though Parkisonism is neurodegenerative disease with motor symptoms cognitive decline like mild cognitive impairment (MCI) should be kept in mind while treating the disease. Misdiagnosis of PD-MCI as depression may delay the management and can progress to dementia in Parkinson's disease. Use of amantadine alone or as an adjuvant with levodopa can reduce distress due to CMI for patient.

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