



Review Article

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DOPAMINERGIC AGENTS: BACK TO THE BASICS – A SMALL REVIEW

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ABSTRACT

Parkinson's disease is one of the most common neurodegenerative diseases. The motor system is eventually damaged which affects the voluntary movements in a patient. It leads to the death of vital nerve cells in the brain. Women have lesser prevalence due to the hormone called Estrogen which has been playing a significant role in human body. Most of the treatments focus on the balance of Dopamine in the brain which is done with the help of levodopa but the side effects seen in the patients were mild nausea, loss of appetite, heart burn, diarrhea, and many more. The cause of the disease is still unknown but its occurrence is mainly because of genetic and environmental factors. This review focuses on the combination therapy of levodopa and Carbidopa to treat the symptoms of Parkinson's disease.

INTRODUCTION

Parkinson's mainly affects the old population. It is a voluntary movement motor neuron disorder which leads to tremor, rigidity, hypokinesia and later leads in the development of secondary manifestations for example dementia, defective posture, and trouble while speaking.

The neurons in the substantia nigra are destroyed which leads to the decrease in dopamine levels in the brain which controls all the voluntary movements and muscle tone of the body. Levodopa is a dopamine precursor while Carbidopa is a peripheral decarboxylase inhibitor. Both levodopa and

Carbidopa are used in combination for better results in treating the symptoms of Parkinson's disease [1].

The enzyme L-aromatic amino acid decarboxylase converts levodopa into dopamine. Being a peripheral decarboxylase inhibitor, Carbidopa, does not allow dopamine formation from levodopa in the bloodstream. Due to this, more amount of dopamine can be made available in the brain [2].

PATHOLOGY & ETIOLOGY OF PARKINSON'S DISEASE

The symptoms of Parkinson's disease start with the death of dopaminergic neurons which almost destroys half of the brain.

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The primary symptoms affect the medulla oblongata and the olfactory bulb, followed by secondary symptoms which directly affect the substantia nigra and the areas of the forebrain [3].

According to the researchers, the start of the symptoms sometimes can be non motor instead of motor for example sleeping disorders, depression and mental changes. The reason can be genetic disorders like mutations or environmental factors like cigarette smoking and exposure to pesticides [4].

MECHANISM OF ACTION OF LEVODOPA & CARBIDOPA

Levodopa is very effective and one of the widely used drug for the treatment of Parkinson's disease [5]. Levodopa is used in combination with Carbidopa, since levodopa cannot cross the blood brain barrier but Carbidopa can easily cross the blood brain barrier without affecting the levels of plasma concentrations. Carbidopa also helps in increasing the bioavailability of levodopa [6].

Aromatic-L-amino acid decarboxylase helps in catabolizing levodopa in the blood. The dopamine which is obtained from levodopa is stored in the dopamine receptors and then is utilized when required [7]. With the combination of levodopa and Carbidopa, more concentration is available in the brain. Aromatic-L-amino acid decarboxylase is found in many cells in the body but not in the dopaminergic neurons, because of the low affinity [8].

ON GOING STUDIES

Levodopa-Carbidopa intestinal gels (LCIG) have been developed to treat the patients. But the complications seen in the patients were vitamins deficiency, abdominal pain, procedural pain and many more. However, it showed more effect as compared to the orally administered levodopa. The intestinal gel is effective apart from the machines and equipments complications. The bioavailability was seen to be doubled and unaffected [9].

The LCIG is available in Europe for the patients experiencing severe motor dysfunctions. Used mainly in the patients with advanced dyskinesia. The dose the gel is titrated according to the patient's condition and is given three times a day, which include a morning dose, the next dose is given approximately at night and the last dose is an extra dose which can be used in

emergencies. LCIG can be given as a single dose or with the combination of levodopa and Carbidopa oral administration for slow release and improved sleep for the patient at night [10].

CONCLUSION

There are various categories of therapies and combination therapies available to treat the symptoms of Parkinson's disease. But the widely used therapy is the combination therapy of levodopa and Carbidopa because of the artificially synthesized dopamine from levodopa. Though there are no medications available to treat the disease.

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Nil

CONFLICT OF INTEREST

The authors declare no conflict of interest

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