

PARKINSON'S DISEASE- A REVIEW**Sandeep Prakash*, Rohit Mohan, Gulab Chandra, Pritt Verma and O. P. Verma**

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ABSTRACT

It is the foremost common neurodegenerative disease within the elderly person, with a better prevalence in men, independent of race and social class; it affects approximately 1.5 to 2.0% of the elderly population over 60 years and 4% for those over 80 years age. Parkinson's disease is caused by the necrosis of dopaminergic neurons within the Substantia Nigra, which is that the brain region liable for the synthesis of the neurotransmitter dopamine, leading to its decrease in the synaptic cleft. The MAO-B (monoamine oxidase B) degrades dopamine, promoting the glutamate accumulation and oxidative stress with the discharge of free radicals, causing excitotoxicity. The Parkinson's symptoms are progressive physical limitations like rigidity, bradykinesia, tremor, postural instability and disability in functional performance. Considering that there are not any laboratory tests, biomarkers or imaging studies to verify the disease, the diagnosis of Parkinson's is formed by analyzing the motor features. Due to the importance and increasing prevalence of Parkinson's within the world, this study reviews information on the pathophysiology, symptomatology also because the most current and relevant treatments of Parkinson's patients.

KEYWORDS: Parkinson's disease, neuronal degeneration, dopamine, dopaminergic agonists, pharmacological treatment, pathophysiology, symptomatology.

INTRODUCTION

Parkinson's disease is a movement and neurodegenerative disorder with progressive dopaminergic neuron loss in the substantia nigra along with Lewy body formations in the central, enteric, and peripheral nervous systems. These motor symptoms are considered fundamental for the diagnosis of PD: tremor, rigidity, slowness of movement, and postural instability. There are a number of other nonmotor symptoms that can accompany PD and can precede the manifestation of motor symptoms by years, and they can be the most prevalent aspect of PD in later stages. These include sensory symptoms, psychiatric symptoms such as anxiety, depression, sleep disorders and apathy, and cognitive abnormalities. Cognitive problems, which affect about 30% of PD patients, range from memory loss, executive abilities, and attention wandering. Neuropsychiatric problems in PD also affect cognitive function. these include anxiety, depression, visual hallucinations, and daytime sleepiness and have a very strong effect on the patient and the families of patients and caregivers.^[1-7]

CLINICAL FEATURES

- In Parkinson's Motor symptoms commonly include-bradykinesia, resting tremor, rigidity and postural instability in later stages. Micrographic is also seen.
- And Non-motor symptoms are common in early Parkinson's but also progress and become more

challenging to manage. Early non-motor symptoms include impaired olfactory ability, autonomic dysfunction (orthostatic hypotension), pain, fatigue, sleep disorders, and cognitive and psychiatric disturbances. They have a significant impact on the patient's quality of life.

- Urinary incontinence and constipation are common, and dementia occurs in 83% of patients with PD after 20 years of diagnosis.

Epidemiology

Incidence and prevalence of Parkinson's Disease increases with advancing age, being present in 1% of people over the age of 65 years. EOPD (Early-onset Parkinson's disease) is defined as the onset of parkinsonian features before the age of 40 years. It accounts for 3-5% of all PD cases. It is classified into the 'juvenile' (occurring before the age of 21 years) and 'young-onset' PD (YOPD, occurring in the age range of 21- 40 years). In this disease the presence of gender associated genetic mechanisms or/and gender-specific differences in exposure to environmental risk factors might explain this male preponderance. There is no homogenous and large epidemiological data on PD from India. The Research scientist Razdan et al., reported a crude prevalence rate of 14.1 per 100,000 amongst a population of 63,645 from rural Kashmir in the northern part of India. The prevalence rate over the age of 60 years was 247/100,000. A low prevalence rate of 27/100,000

was reported from Bangalore, in the southern part of India, and 16.1/100,000 from rural Bengal, in the eastern part of India.^[8-15]

PARKINSON'S SYMPTOMS

Two type symptoms in Parkinson's first motor and another non – motor. In addition to these four cardinal motor symptoms there are many others which are also considered in the diagnostic process. The non-motor symptoms are more challenging for the person living with Parkinson's. Nonmotor symptoms such as pain, depression and problems with memory and sleep can also occur and have an impact on the day-to-day life of the person with Parkinson's.^[16,17] The Four main symptoms of Parkinson's disease affect physical movement:

Tremor: The most common symptom of Parkinson's disease is the unilateral, typically resting tremor in body parts, most commonly in the upper extremities. In the tremor finding can spread to the other parts of the body like lips, chin, jaw and tongue during the course of the disease. It is an early symptom and is seen in about 70% of people presenting with Parkinson's. The tremor of PD is a rest tremor-the shaking occurs when the patient is not trying to use the limb, and diminishes when the limb is in use. Tremor is related to an imbalance of neurotransmitters, dopamine and acetylcholine, for this reason, tremor may be the least responsive symptom to dopamine replacement therapy. This usually begins in the hand or arm and is more likely to occur when the limb is at rest.^[18,19]

Slowness of movement (bradykinesia): Bradykinesia can be the most disabling symptom of the condition and refers to slowness, decreased movement amplitude, and dysrhythmia. Physical movements are much slower than normal, which can make everyday tasks difficult and can result in a distinctive slow, shuffling walk with very small steps.^[20-24]

Muscles stiffness (rigidity): Parkinson's disease can create greater tension in the tendon, leading to structural adjustment and an increase in tendon stiffness. In The Muscle rigidity/stiffness may not be apparent to the person with Parkinson's but is felt by the medical practitioner in limb muscles when they are passively moved. Stiffness and tension in the muscles, which can make it difficult to move around and make facial expressions and can result in painful muscle cramps (dystonia).^[25]

Postural Instability: Postural instability is one of the most disabling features of Parkinson's disease. Postural instability is often experienced in the late stages of PD and is a marker of disease progression. Little information is available on the role of visual inputs as an adaptive strategy to compensate for postural instability in PD. Postural instability and gait disturbances often develop later in the progression of the condition. If a loss of postural reflexes and resulting falls occur early, it is not

suggestive of typical Parkinson's. Postural instability is a disabling feature of Parkinson's disease (PD), contributing to recurrent falls and fall-related injuries. In early Parkinson's the posture may show a slight flexion of the neck or trunk with a slight lean to one side.^[26-30]

Other Symptoms: Anosmia, Anxiety, Constipation, Depression, Fatigue, Festination of speech, Postural hypotension and Micrographic.^[31]

PARKINSON'S DIAGNOSIS

It is not easy to diagnose Parkinson's. In this case not available any laboratory test like as a blood test or brain scan, so it is important that the diagnosis is made by a specialist, such as a neurologist. The practitioner is related this disease will examine the person for any physical signs of Parkinson's and take a detailed history of the symptoms they're experiencing. Early detection would help in initiating treatment and leading a healthier life. Having just one symptom as listed below doesn't call for immediate concern. However, if you have two or more of the following symptoms, Such as Small crowded handwriting, Loss of smell/Anosmia, Facial Masking, Stooped posture, Slowed and stiff movements, Tremor, Frozen Shoulder, Change in voice and Sleep disturbances. It would be advisable to take an appointment with a neurologist.^[32-35]

Diagnostic Investigations: Brain scans may help in detecting the loss of dopamine in the brain and reduce misdiagnosis. Neuro imaging that may be done might include:

MRI Scan (Magnetic Resonance Imaging): This uses magnetic currents to create images of the brain. This gives a better view of the deep structures of the brain. MRI scans are usually normal in Parkinson's but are useful at times in identifying conditions that can mimic Parkinson's and helps in distinguishing Parkinson's from other forms of Parkinsonism (like Progressive Supranuclear Palsy (PSP) or Multiple System Atrophy (MSA)).^[36,37]

CT scan (Computerized Tomography): This includes a series of X rays that are passed through different directions that provide an anatomical view of the brain This helps in excluding blood diseases and brain tumours which can mimic Parkinson's. Computerized tomography (CT) does not reveal any Parkinson's related changes but will rule out structural abnormalities which may result in Parkinson's-like symptoms.^[38]

TREATMENT

Parkinson disease is the second foremost common neurodegenerative disease within the world, there is currently no cure for Parkinson's disease, but treatments are available to help relieve the symptoms and maintain your quality of life. Current treatments only alleviate some of the symptoms for a few years, but they become ineffective in the long run and do not stop the disease.

Therefore, it is of outmost importance to develop therapeutic strategies that can prevent, stop, or cure Parkinson disease. As Parkinson's progresses, an increased amount of care and support may be required, although many people maintain a good quality of life with limited care or treatment.^[39-41]

Supportive therapies

There are several therapies that can make living with Parkinson's disease easier and can help you deal with your symptoms on a day-to-day basis. Whether art therapy can be an effective rehabilitative treatment for people with brain or mental diseases (e.g., dementia, Alzheimer's disease, Parkinson's disease) is a long-standing and highly debated issue. There are efforts underway to try and increase the availability of these supportive therapies for Parkinson's patients.^[42-44]

Physiotherapy

A physiotherapist can work with you to relieve muscle stiffness and joint pain through movement (manipulation) and exercise. They also try to improve your fitness levels and your ability to manage things for yourself.^[45-48]

Occupational therapy

An occupational therapist can identify areas of difficulty in your everyday life, for example dressing yourself or getting to the local shops. They can help you to work out practical solutions and ensure your home is safe and properly set up for you. This will help you maintain your independence for as long as possible.^[49]

Speech Therapy

This therapy focuses on improving the clarity and volume of speech and provides tips for better communication.^[50-52]

Medication

Medication can be used to improve the main symptoms of Parkinson's disease, such as tremors (uncontrollable shaking) and movement problems. However, not all the medications available are useful for everyone, and the short- and long-term effects of each are different. It is primarily related to a lack of dopamine as a result of degeneration of dopamine producing neurons within the mid-brain. Dopamine is a neurotransmitter which conveys messages between neurons to ensure effective planning, initiation and maintenance of movement. Most pharmaceutical treatment options focus on restoring the balance of dopamine and other neurotransmitters by several means: Three main types of medication are commonly used. These are levodopa, dopamine agonists and monoamine oxidase-B inhibitors.^[53-55]

Levodopa

Most people with Parkinson's disease will eventually need to have a medication called levodopa. Levodopa is absorbed by the nerve cells in your brain and turned into the chemical dopamine, which is used to transmit messages between the parts of the brain and nerves that

control movement. Increasing the levels of dopamine using levodopa usually improves movement problems. Levodopa is usually taken as a tablet, Capsule (Sinemet®) or liquid and is often combined with other medication, such as benserazide or carbidopa. These additional medications stop the levodopa being broken down in the bloodstream before it has a chance to get to the brain.^[56-60] They also reduce the side effects of levodopa, which include feeling sick (nausea), vomiting, tiredness and dizziness. At first, levodopa can cause a dramatic improvement in the symptoms. However, its effects can be less long lasting over the following years because, as more nerve cells in the brain are lost, there are fewer of them to absorb the medicine. This means that the dose may need to be increased from time to time. Long term use of levodopa is also linked to problems such as uncontrollable, jerky muscle movements (dyskinesias) and 'on off' affects-where the person suddenly switches between being able to move (on) and being immobile (off).^[61,62]

Surgery

Most people with Parkinson's disease are treated with medication, although a type of surgery called deep brain stimulation is used in some cases.^[63] The three most common forms of surgery for Parkinson's disease are:

Thalamotomy: The surgeon makes a lesion (cut) on part of the brain to alleviate some forms of tremor.

Pallidotomy: The surgeon makes a lesion on a different part of the brain to alleviate dyskinesia (wriggling movements).

Deep brain stimulation: The surgeon places an electronic deep-brain stimulator in the brain to control specific symptoms. This device is sometimes called a brain pacemaker. Although surgery does not cure Parkinson's disease, it can ease the symptoms for some.^[64]

OTHERS

Duo dopa, Dopamine agonists, Monoamine oxidase-B inhibitors, Amantadine, Anticholinergic medicines.

CONCLUSION

Parkinson's disease is a neurological disorder that is mainly characterized by problems with body movements, although other symptoms can also occur. Currently there is no known cause of understanding of why a person develops Parkinson's. There are many theories as to the causes and it is generally thought that multiple factors are responsible. No, there is currently no cure for Parkinson's disease. However, there are medicines that can help to treat the symptoms of the disease. Research is ongoing to find new treatments for Parkinson's disease. Gene therapy, which involves delivering normal genes directly to your brain to help prevent the death of brain cells, is one example. Other research is looking at whether nerve cells that are lost in people with Parkinson's disease can be replaced with new healthy cells from stem cells grown in the laboratory.

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