



## “From The Pharmacist” – Serve You’s Educational Series on Disease States

Scott Draeger, PharmD, Manager of Clinical Services

# Parkinson’s: What You Need To Know

### What is Parkinson’s disease?

Parkinson’s disease (PD) is a common movement disorder with an insidious onset associated with worsening of an individual’s mental and physical condition as the disease advances. PD occurs when dopaminergic neurons in a part of the brain called the substantia nigra malfunction and die.<sup>1,2,3</sup> Dopaminergic neurons are responsible for the release of dopamine, a chemical transmitter. Chemical transmitters, also known as neurotransmitters, act as messengers that supply information to different parts of the brain. Under normal conditions, dopamine and acetylcholine, another chemical transmitter, act to control movement and coordination. As the supply of dopamine decreases, its ability to counterbalance acetylcholine also decreases. The low dopamine and high acetylcholine levels lead to slow and uncontrolled movements. Not only do PD patients suffer from movement disorders, but they also often suffer from depression, cognitive dysfunction, and psychosis as the disease progresses.<sup>4</sup>

### What causes Parkinson’s disease?

The true cause of PD is unknown. Research suggests that environmental factors such as rural living, drinking well water, and heavy metal and hydrocarbon exposure may contribute to development of the disease.<sup>5,6</sup> Most likely, there is a complex association between genetic and environmental factors at work.

### Who is affected?

The incidence of PD increases with age. PD affects 100 to 200 per 100,000 people.<sup>4</sup> The average age of onset is approximately 60 years. The number of Americans affected with PD is expected to double in the next 15 to 20 years and create an annual cost of \$11 billion for treatment.<sup>2,4,7</sup> The incidence of PD is higher among men than among women.<sup>8</sup> PD is the second most common neurodegenerative disorder in the elderly after Alzheimer’s disease.<sup>1,2,4</sup>

### How do I know if I have Parkinson’s?

There are no laboratory tests that confirm the presence of PD, so patient history and physical examination are the benchmark tools for diagnosis.<sup>3</sup> The core features of PD are bradykinesia (slowness of movement), akinesia (inability to initiate movement), rigidity, tremor at rest, and postural instability.<sup>2,3,4</sup> Diagnostic criteria specify that at least two of the above features must be present.<sup>2</sup>

### Other effects of Parkinson’s

It is important to take into account the sometimes less visible effects of PD. Approximately 20% to 40% of PD patients will develop cognitive impairment, 30% to 60% will develop depression, and 11% go on to develop dementia.<sup>4</sup> It is also common for PD patients to suffer psychosis, sleep disorders, urinary retention or incontinence, constipation, or intolerance to hot or cold.<sup>4</sup> All of these symptoms can have a tremendous impact on the overall quality of life.

### Treatment

The goal of PD treatment is to improve quality of life. Occupational therapists, speech therapists, and psychologists often play an active role in PD treatment. The diagnosis of PD does not necessarily mean drug therapy should begin; drug therapy is only warranted if the patient is significantly bothered by symptoms.<sup>3</sup> In most cases, a number of different drug therapies will be used at the same time for most PD patients.

There are a variety of different treatment angles (**Table 1**) that practitioners can pursue, but the use of carbidopa plus levodopa appears to be the most common. Levodopa is actually a naturally occurring compound that when broken down in the body forms dopamine. It is combined with a substance called carbidopa, which prevents the breakdown of levodopa before it reaches the brain. Levodopa is considered the most effective antiparkinsonian agent.<sup>3</sup> There are some concerns that the medication may further induce breakdown of

dopaminergic neurons when used long-term, which limits its use by some physicians.<sup>2,4</sup> The medication is generally dosed three times a day and can cause nausea, vomiting, psychosis, or dizziness.

Dopamine agonists such as Mirapex, Permax, and ReQuip are also common choices. These drugs are often added when patients are experiencing a deteriorating response from levodopa.<sup>2</sup> They work by directly binding to the dopamine receptor, thus mimicking dopamine's effects. New research suggests that it might be appropriate to start patients on dopamine agonists first, which will prolong the time prior to starting levodopa therapy. The most common adverse effects with these medications are nausea, vomiting, and mental status changes. They are generally dosed three times a day.

Anticholinergic medications such as Artane and Cogentin have a role in the treatment of PD but are somewhat limited. These drugs are generally not the first choice for elderly patients because of the associated side effects. Artane and Cogentin have been successfully used to treat tremors when other therapies have failed.<sup>2,3</sup>

Naturally-occurring dopamine is broken down by two different enzymes in the body: monoamine oxidase type B (MAO-B) and catechol O-methyltransferase (COMT). Researchers have found that if they prevented the enzymes from breaking down dopamine, levels of dopamine in the brain increased. That is precisely how

Eldepryl (MAO-B inhibitor), Tasmar (COMT inhibitor), and Comtan (COMT inhibitor) work. These drugs are generally used in combination with other antiparkinsonian drugs.

It was discovered that PD patients who received Symmetrel to treat influenza achieved better control of their movement disorder.<sup>4</sup> That discovery led to Symmetrel's use in PD patients with akinesia or rigidity.<sup>4</sup> The use of Symmetrel is somewhat limited since most studies show that it is effective for only a short period of time. Researchers believe Symmetrel works by increasing the release of dopamine from neurons. It should be used in the elderly population with caution, since it appears to have a higher incidence of cognitive dysfunction.<sup>4</sup>

### The on-off effect

The on-off effect, characterized by unpredictable, rapid swings between mobility and akinesia, is often seen in patients receiving chronic levodopa therapy. For unknown reasons, this phenomenon is more likely to happen to patients who initially respond well to treatment. Patients may benefit from taking their medication at more frequent intervals in smaller doses or by adding a controlled release dopamine precursor, dopamine agonist, COMT inhibitor, or an MAO-B inhibitor. A reduction of dietary protein to the minimum recommended daily allowance may also be helpful.

**Table 1**

Brand Name	Generic Name	Mechanism of Action	Available Generically
Sinemet	Carbidopa plus Levodopa	Dopamine precursor	Yes
Sinemet CR	Carbidopa plus Levodopa	Dopamine precursor	Yes
Stalevo	Carbidopa plus Levodopa plus entacapone	Dopamine precursor plus COMT inhibitor	No
Mirapex	Pramipexole	Dopamine Agonist	No
ReQuip	Ropinirole	Dopamine Agonist	No
Permax	Pergolide	Dopamine Agonist	No
Artane	Trihexyphenidyl	Anticholinergic	Yes
Cogentin	Benzotropine	Anticholinergic	Yes
Eldepryl	Selegiline	MAO-B inhibitor	Yes
Symmetrel	Amantadine	NMDA agonist	Yes

### References

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