



An Introduction To Parkinson's Disease

By Joseph H. Friedman, MD

Director, NeuroHealth Parkinson's Disease and Movement Disorders Center

JOSEPH H. FRIEDMAN, MD

What is Parkinson's Disease?

Parkinson's disease (PD) is an illness that affects a person's ability to move. It causes tremors, slowness, stiffness, poor balance, speech changes, stooped posture, and changes in walking. It does not shorten lifespan and usually does not affect memory or the ability to think.

We do not yet know what causes this disease, but many scientists are actively working on this problem. We do, however, know a lot about the illness. In a very small region of the brain that is important in coordinating movements, the brain cells, called neurons, die. As a result, the chemicals made by these cells become depleted, causing problems with the brain's ability to control movements. The name of the most important chemical that is in very short supply in PD is dopamine (chemical shorthand for L-dihydroxyphenylalanine). Thus, in PD, there is an imbalance of the normal chemicals in the brain.

Dopamine replacement therapy and dopamine agonist treatment are two ways that effective dopamine levels can be restored in PD patients. These treatments and their side effects are discussed in further detail below.

Who gets PD?

In most cases PD does not run in families. Brothers, sisters, children and grandchildren are not significantly more likely to develop PD than anyone else.

The disease tends to affect older people. About half the people who get PD have their first symptom before the age of 60 and the other half begin at the age of 60 or older. Since PD does not shorten lifespan very much, most people who have PD tend to be old, some because onset occurred later in life, but most because they grew old with the disease.

Of the people who develop PD before the age of 60, the majority are in their 50s, some are in their 40s, and very few are younger than 40. Still, cases have been documented at very young ages. There was even a child under the age of 10 diagnosed with the disorder, but this early onset is extremely rare.

How do you know if you have it?

There is no test to diagnose PD. Results from a brain wave (EEG), CAT scan, MRI, blood tests and spinal fluid tests are normal in PD. Sometimes doctors request these tests to rule out other illnesses which present with similar symptoms. The diagnosis of PD is made on the basis of the patient's medical history and neurological examination.

The usual history for someone with PD is characterized by a gradually increasing tremor, increasing slowness, loss of mobility, or shuffling while walking that has developed over the last six months to two years.

Based on ongoing research and autopsy findings over time, we have developed have new criteria that we use to diagnose this illness, but we are still not 100% accurate.

What is the tremor of PD like?

The tremor typically affects the fingers of the hands but may affect the jaw or feet. It may occur on one side or both and be stronger on one side or the other. The tremor occurs when the limb is at rest or held out in a fixed position. For reasons not yet understood, the tremor varies during the day. It usually becomes stronger when the person is nervous and may even go away completely when the person is very relaxed. It

is amplified when the patient holds a large, lightweight object such as a newspaper so it is very common for the tremor to be first noticed while reading the newspaper or a magazine. Tremors can interfere with falling asleep either because the movement is annoying or because of the sound caused by the shaking.

Why are people with PD so slow?

For those with PD, slowness is often the biggest problem, although it is not always clear to others. One of the first things family members notice is that the person with PD takes longer to do everything—bathing, dressing, cooking meals, writing checks, etc. When the patient is older, everyone simply blames the aging process. “Of course Grandpa is slow, he’s getting old.”

Walking problems are often blamed on arthritis. But this slowness gets worse rather quickly, in most cases, quicker than simply growing old. The reason for this is that those with PD lose some of the automaticity for movement that normal people have. If a normal person wants to button his shirt he simply “does it.” A person with PD must guide their fingers through this process, in some ways like a robot or a piece of machinery, step by step. For example, a patient who was affected by PD on only one side of his body explained to me, “When I use my good hand it does everything by itself. When I use my other hand, I have to consciously control it and tell it what to do.” This loss of automatic, or unconscious control of movements explains why those with PD are akinetic, that is, lacking in movements or statue-like. Those with PD blink less than other people so they seem to be staring. They swallow less than others so they may drool due to the accumulation of saliva in the mouth. When seated they stay in one position, like a statue, whereas other people tend to shift position, cross their legs, scratch their face and perform other little movements.

What about stiffness and postural changes in PD?

Stiffness is another feature of PD. The person with PD may or may not feel this but the doctor will test the arms, legs and neck for this in the office. The face also becomes stiff and looks somewhat frozen. It is not known if the stiffness of PD causes the abnormal posture of those with PD. PD patients tend to be stooped. They tend to bend forwards a little bit at the hip and a bit more at the shoulders. This makes them look older than they really are when they stand up. While seated there is a tendency to have the head bent and the shoulders rounded.

How is walking affected in PD?

The walk or gait of a person with PD looks like that of an elderly person. The shoulders are stooped, the arms are held at the side or swing only to a small degree, and the heels often scuff the floor causing a shuffling walk. Turning is altered as well. Those with PD generally turn in a series of steps rather than by pivoting. Balance may also be impaired, causing the person to fall forward or backwards sometimes. Sometimes they start to run forward uncontrollably, as if pushed.

Are there other symptoms?

In addition to the above features, other changes occur as well. Handwriting suffers. Not only is there a problem due to slowness and tremor, but the writing becomes small as well. The best way to see this is to compare signatures on recent checks with those from a few years ago. Speech often changes too. The voice becomes soft and sometimes a stutter develops. Depression occurs in a large percentage of those diagnosed with PD and some also develop memory problems. Fatigue is a big problem that is generally not recognized by either the patient or the doctor, but it affects about half of the people with PD, generally right at the start of the disease.

How quickly does PD progress?

PD is a very variable illness, but it never goes away or gets better by itself. In all cases the illness progresses but in some people it appears to be stable because the progression is so slow. In most cases the slowness caused by the disease forces changes in lifestyle within five years. It is impossible to predict the future. The best guide for gauging what life will be like in the future is to look back six months or a year to see what changes have occurred during that time. The same degree of change will probably occur during the next time period.

Parkinson's disease does not suddenly worsen. Unlike other conditions, like strokes or multiple sclerosis, PD has a steady, slow course without sudden dramatic changes. When patients suddenly get worse, there is usually another explanation such as pneumonia, bronchitis, a bladder infection or a new medication.

How do the medications help?

It is important to understand that there currently is no cure for PD. The brain cells that produce dopamine have died and cannot be replaced (that is the goal of stem cell therapy). New brain cells unfortunately do not grow to replace the old.

Treatment can be divided into two aspects: slowing the progression of the disease, and relieving the symptoms (tremor, stiffness, slowness and walking problems).

Is there anything to slow down the PD?

No medication has yet been shown to slow the progression of PD. Early studies suggested that **selegiline (Eldepryl)** might do this, but follow-up in these patients indicated that this was probably not the case. However PD experts have differing opinions on this. Vitamin E has been tested and was found to have no effect on disease progression. Other antioxidants, such as vitamin C, have not been tested. Some medications are currently being tested to see if they will slow disease progression.

Can other medications make me function better?

The other medications for PD are all intended to improve function by partly correcting the chemical imbalance caused by the death of neurons that produce the chemical dopamine. Since none of these medications for the symptoms (tremor, stiffness, slowness and decreased mobility) alter the progression of the disease, it is important for patients to understand that a medicine should only be taken if it helps in some clear-cut fashion. If a drug for the symptoms of PD does not improve some function, then either a higher dose of the drug is required, or the drug should be stopped and replaced by a different medication. Very often, those with PD need two, three, or even more drugs to treat the symptoms. This does not count the medicines that might also be needed for other medical conditions.

Do most people still take L-Dopa?

Levodopa (L-Dopa) is the single most important medication in the treatment of PD. Levodopa is a chemical normally found in the brain and used by the brain cells to make dopamine. However, the chemical dopamine cannot pass directly into the brain from the blood supply. The brain has a protective mechanism known as the blood-brain barrier that prevents chemicals such as dopamine from entering. In the treatment of PD, that protective mechanism forces the use of an alternative chemical (e.g., a dopamine precursor), which can enter the brain.

With the help of a precursor, we can administer more levodopa, enabling the brain cells to make more dopamine and thus help to partly compensate for the diminished amount of this chemical.

By itself levodopa causes nausea, but when combined with **carbidopa** this side effect is eliminated. The brand name of the combination drug is **Sinemet** (meaning without vomiting) but there are also generic versions available, such as **Atamet**. The original form is available in 10/100, 25/100 and 25/250 dosages. **Sinemet CR** is a long acting form available in 25/100 or 50/200 strengths.

Unfortunately, levodopa does not usually make a patient completely normal, and, over several years, it can cause side effects (discussed below). Many doctors avoid using levodopa when the symptoms are mild and only begin treatment when symptoms interfere with lifestyle or job performance.

What are dopamine agonist drugs?

Pramipexole (Mirapax), ropinerole (Requip), bromocriptine (Parlodel) and pergolide (Permax) are medications that act like dopamine and are therefore helpful in overcoming problems caused by too little dopamine. Unfortunately, dopamine by itself cannot be given because it cannot pass directly into the brain from the blood supply. For unknown reasons, patients who do respond to levodopa rarely improve on

a dopamine agonist. Therefore, if a patient doesn't improve on levodopa, they are likely to improve on a dopamine agonist.

What other medications are available?

Tolcapone (Tasmar) and entacapone are drugs that are used in conjunction with carbidopa/levodopa in people who have "on" and "off" or clinical fluctuations that have not responded to other interventions. There are special warnings regarding possible liver damage with tolcapone and blood monitoring is needed. However, most authorities believe that the risks have been exaggerated. **Entacapone** is quite safe, but less effective.

Amantadine (Symmetrel) is another useful drug that appears to work partly by increasing the amount of dopamine released by brain cells to stimulate other brain cells and by blocking another chemical that controls dopamine neurons.

A class of medications called anticholinergics, the only inexpensive drugs for PD, act by blocking a chemical in the brain that is normally controlled by dopamine. When dopamine levels are low, this chemical, **acetylcholine**, becomes unopposed and too strong in its action. These drugs, which include **trihexyphenidyl (Artane)**, **benztropine (Cogentin)**, **procyclidine (Kemadrin)**, as well as **biperiden (Akineton)**, act to partially block this chemical. These medications are most helpful for tremor and stiffness, and less helpful for slowness, balance and walking problems. The other drugs are helpful for all aspects of PD, although tremor may not respond well to anything.

Are there any side effects to the medications?

Like all drugs, these medications may produce unwanted side effects. **Levodopa** can have early side effects or late side effects and will be discussed last. Since PD is a disorder of the brain, all the drugs for PD must act on the brain. Unfortunately the brain chemicals involved in PD are also involved in memory, thinking, dreaming and emotions so that occasionally people suffer medication side effects in these areas. All side effects go away when the medication is stopped, but this may take a few days.

Bromocriptine (Parlodel), **pergolide (Permanx)**, **pramipexole (Mirapex)** and **ropinerole (Requip)** can cause nausea, vomiting, lightheadedness (dizziness especially on standing), pedal edema (fluid accumulation in the legs), confusion or hallucinations.

Amantadine (Symmetrel) can cause leg swelling, purple blotching of legs, confusion or hallucinations.

The **anticholinergics** may cause dry mouth, constipation, memory problems, blurred vision, confusion and hallucinations. Since these drugs can worsen certain forms of glaucoma, an eye condition, their use may need to be discussed with an eye doctor.

Levodopa, when first started, may cause nausea, sleepiness, visual hallucinations, confusion and personality changes. One of its peculiar effects may be to make dreams very realistic. After a few years, many PD patients develop a new movement disorder called dyskinesia, in which the head, hands or feet begin to dance without the patient's control. This development is usually not a problem for the patient, but occasionally patients do develop problems from these movements.

Tolcapone (Tasmar) can cause serious liver problems. It may still be used, but monthly blood tests need to be ordered by the physician. Other side effects may include diarrhea and some side effects of excess dopamine. **Entacapone** is safer but weaker than **tolcapone**. **Stalevo** is a medication that combines levodopa, carbidopa and entacapone.

For those suffering from medication-induced hallucinations, paranoia or other symptoms of temporary psychosis, atypical antipsychotics such as **quetiapine fumarate (Seroquel)** or **clozapine (Clozaril)** may be useful when the PD medications cannot be reduced sufficiently to eliminate the psychiatric problems.

Is surgery helpful?

Neurosurgical procedures are available for people suffering from severe “on-offs” or disabling dyskinesias and for the rare individual with disabling, severe tremors that have not responded to medication. These procedures are available locally, but are only attempted after extensive medical interventions. Such surgeries do not slow the progression of the disease and should not be considered cures. In some cases the results are almost miraculous, but results may be disappointing as well.

Do other types of therapy help too?

There are other therapies in addition to medications that also will help you function better with PD. Exercise is very important. There are two sayings that we like to use, “rest and rust” and “use it or lose it.” Walking, stretching, exercycling, swimming, and other activities can make you feel better. PD does make you tired, so do not be afraid to rest for a short time and to pace out your exercise program.

Health professionals such as physical therapists, occupational therapists, speech pathologists, counselors, and nurses may also be able to help you learn to cope and be more independent with PD. Marriage or family counselors may sometimes be helpful as PD always upsets the normal functioning of the family. Community resources such as those sponsored by the Department of Elderly Affairs may also “ease the burden” of living with PD.

What can I do to help myself?

Learning about PD and its treatment helps you to communicate more effectively with your doctor. The medications are supposed to make you feel or perform better. If a new medication fails to do this, the doctor should be notified to either increase the dose or stop the drug. Many patients do not do this and simply keep taking medications that are not helping. It is also important to tell the doctor about uncomfortable side effects. If side effects occur, the doctor should be notified. Many patients stop their medicine because of side effects without telling anyone. On the other hand, some patients experience problems caused by new medical problems and blame them on the PD or the PD medication. Therefore, it is important to have an honest relationship with your doctor.

Since medications for PD neither cure nor slow disease progression all medications are intended to make patients feel and function better now. What patients can do to help themselves in the future is to keep (or become) active: active physically (walk 30 minutes each day), mentally and socially. All three spheres are crucially important for long term quality of life, for both the patient and the family.

What can I do to help other people with PD?

New treatments for PD depend on clinical research, which is research performed on people with Parkinson’s disease. The medications we have now were developed only because thousands of PD patients volunteered for testing. Many research projects for advancing our knowledge of PD are available but patients must volunteer. Without their support little progress will be made.

Can the American Parkinson Disease Association in Rhode Island help?

The American Parkinson Disease Association (APDA) Information and Referral Center and the Rhode Island Chapter of the APDA would like to help. They do not provide direct services but are committed to helping those living with PD, and their family members. They are also dedicated to helping community and health professionals learn about PD, its treatment, and the local resources available to support those living with PD. The APDA provides education and support programs to help individuals with PD and their family members learn about the disease, medication management, and ways to maintain independence. They can also steer you to local resources, research opportunities and keep you apprised of the latest developments in PD. The RI Chapter of the APDA also offers opportunities to become active in the Parkinson’s community in the areas of advocacy, public awareness, support and fundraising.

To learn more about PD and how to face its challenges, contact the APDA I&R Center at (401) 736-1046. Coordinator Irene Dupont, RN, MS is happy to answer your questions over the phone or in person. You may schedule an appointment with her to come to the center to discuss PD. There is no fee for this educational session.