

PARKINSON'S DISEASE

Abstract

Parkinson's disease is a chronic disorder of the brain and the nervous system that is progressive and irreversible. Neurologic changes that are characteristic of Parkinson's disease include slow, progressive damage to parts of the brain and nervous system that control movement. Currently, the cause of Parkinson's disease is not known and the disease cannot be detected in the early stages of its development. While treatment can slow the progression of Parkinson's disease, there is no cure. Eventually, the patient who has Parkinson's disease will develop permanent complications and disabilities, and ambulation and self-care will not be possible. Various degrees of assistance by healthcare workers are needed, such as help with activities of daily living and physical therapy, occupational therapy, and speech therapy.

Learning Goals:

1. Identify the basic definition and causes of Parkinson's disease.
2. Identify the common signs and symptoms of Parkinson's disease.
3. Identify the common treatments for Parkinson's disease.
4. Know the special concerns and responsibilities when caring for a patient with Parkinson's disease.

Introduction

Parkinson's disease is caused by slow, progressive damage to parts of the brain and nervous system that control movement. Parkinson's disease cannot be detected in the early stages of its development and at this time what causes the disease is not known. Treatment can slow the progression of Parkinson's disease but there is no cure. Eventually the patient who has Parkinson's disease will develop permanent complications and disabilities, and ambulation and self-care will not be possible.

The Nervous System and Parkinson's Disease

The nervous system consists of the brain, the spinal cord, and the nerve fibers. The nervous system is responsible for initiating and controlling all bodily functions and activities, conscious and unconscious, voluntary and involuntary.

The brain can be thought of as the command center of the nervous system. The brain sends out nerve impulses to specialized areas within the brain and to the organs and muscles. The nerve impulses - which are essentially information or messages - move from one part of the nervous system to another by way of nerve fibers. The nerve impulses are the way the brain controls conscious and unconscious behavior. For example, breathing, heart rate, and digestion are controlled by the brain but all of these are done without our conscious control. Muscle movements such as walking are done consciously.

The nerve fibers are similar to wires in an electrical system. The "messages" that control and regulate conscious and unconscious behavior travel along these nerve fibers, much as electrical wires carry

current to and from the brain. Unlike electrical wires, nerve fibers are not continuous. This is an important point. At various intervals along the nerve fibers and at the point where nerve fibers meet organs and muscles there is a break, a gap, called a *synapse*.

The nerve impulses by themselves cannot cross a synapse. The transmission must be done by a *neurotransmitter*. Neurotransmitters are specialized substances that are made and stored in nerve fiber endings. When a nerve impulse reaches a synapse, a neurotransmitter is released into the synapse and effectively "carries" the nerve impulse along the nerve fiber or to an organ, *i.e.*, the heart, the lungs, or a muscle. There are many different neurotransmitters such as acetylcholine, epinephrine, and serotonin. The neurotransmitter that is involved in Parkinson's is called dopamine. Parkinson's disease causes irreversible damage to specific parts of the brain that depend on dopamine.

Cause and Statistics of Parkinson's Disease

Parkinson's disease is a chronic disorder of the brain and the nervous system. It is one of the most common neurological diseases in people over the age of 60. Approximately 1.5 million Americans suffer from Parkinson's disease, 60,000 new cases are diagnosed each year, and it is the second-most common neurodegenerative disorder after Alzheimer's disease.

Parkinson's disease is characterized by progressive, irreversible neurologic changes and by two basic pathologic processes; damage to the substantia nigra and the formation of Lewy bodies.

The substantia nigra is an area of the brain that helps control involuntary and voluntary movement. The substantia nigra uses the neurotransmitter dopamine to transmit the nerve impulses that initiate and inhibit movement but Parkinson's disease destroys the cells in the substantia nigra that make dopamine. Because of this absolute or relative lack of dopamine, nerve signals from the substantia nigra cannot cross synapses or can only do so weakly and ineffectively, so the intended movements either cannot occur or are weak and ineffective. In a sense, the loss of dopamine in Parkinson's disease represents a "broken connection" between the part of the brain that helps control movement and the involuntary and voluntary muscles that carry out movement.

The other pathologic process that occurs in Parkinson's disease is the formation of Lewy bodies. Lewy bodies can best be described as clumps of abnormal proteins that accumulate inside brain cells and interfere with normal cell functioning. The Lewy body protein clumps are present in patients who have Parkinson's disease, and are also present in other neurological disorders such as Alzheimer's disease. These pathologic changes in Parkinson's patients have been well-documented and, although it is not completely understood how they are responsible for the clinical presentation of Parkinson's disease, it seems clear that damage to the substantia nigra and the formation of Lewy bodies are the primary reasons for the signs and symptoms.

How damage happens, why it happens, and who is at risk is not clear, and so the *specific* cause or causes of Parkinson's disease are not known. A person's age is by far the biggest risk factor for Parkinson's disease and after age 60 the chances of developing the disease

increases dramatically. Yet a great majority of the elderly do not develop Parkinson's disease so other factors are clearly involved, and most of the evidence suggests that a combination of genetic and environmental factors is the cause of Parkinson's disease.

Genetic Factors

The tendency to inherit Parkinson's or a susceptibility to the disease can be inherited but it is not clear for whom this is important. It has been estimated that there are over 25 genetic mutations that increase the risk for developing Parkinson's disease and there are 15 genes that may cause Parkinson's. However, the exact contribution of genetic factors as a cause for Parkinson's disease is not known, and cases of Parkinson's disease that are clearly caused by genetic mutations represent a very small percent of the total number of patients who have the disease. There is evidence that people who develop Parkinson's disease at a relatively early age and who have a severe form of the disease may have a higher genetic risk profile.

Environmental Factors

Exposure to heavy metals such as lead and manganese has been implicated as a risk factor for Parkinson's, as has environmental or occupational exposure to solvents and welding fumes, and chronic ingestion of well water. Perhaps the most investigated environmental risk factor is exposure to pesticides. Although it is not known how or why pesticides may increase the risk for developing Parkinson's disease, there are many studies that show an association between pesticide exposure and the disease. In some cases, the risk for Parkinson's disease is dramatically increased when exposure to pesticides is increased.

It is well-accepted that Parkinson's disease is caused by a combination of genetic and environmental factors but exactly how the genes and the environmental exposures interact to cause the disease is not clear. This is not unusual. Many chronic diseases are thought to be partly inherited and partly the result of an environmental factor, and it may be that many people have susceptibility genes for Parkinson's disease but never have an exposure to a causative agent for the disease. Approximately 10% of all cases of Parkinson's disease have a clear genetic basis but none of the environmental factors that are suspected of contributing to Parkinson's disease has been proven to be a cause.

Physical Manifestations of Parkinson's Disease

The onset of Parkinson's disease is usually at 60 years of age or older and men are 1.5 times more likely to develop Parkinson's disease than women. Early onset (age 40 or younger) is unusual. Parkinson's disease develops slowly. People with Parkinson's disease may initially notice that their sleep is disturbed, that they have a slight tremor in their hands or their coordination has become worse. Depression and a lack of energy are also common complaints.

In many patients, these initial signs and symptoms can be mild and subtle. People can easily ignore them or decide that these changes are just part of the normal aging process. Early signs and symptoms of Parkinson's disease are also quite different than the later ones that are commonly associated with the disease. Unfortunately, there is evidence that by the time someone with Parkinson's disease begins to develop the characteristic signs and symptoms of the disease, extensive and irreversible damage to the dopamine-dependent nerve

fibers has already occurred. The signs and symptoms of Parkinson's disease can be usefully separated into two categories, non-motor and motor.

Motor refers to signs and symptoms involving the muscles or movement and non-motor refers to factors such as forgetfulness, or excessive salivation. The non-motor signs and symptoms (listed below) are usually the first to develop but they can also persist as the disease progresses. Many of these are quite common in Parkinson's disease but signs and symptoms such as constipation, sleep disturbances, and urinary urgency are non-specific; they can be caused by many diseases, and it is the motor signs that are the hallmark of Parkinson's disease. However, as previously mentioned, the non-motor signs and symptoms are no less serious than the motor signs; they are simply less visible and dramatic.

Non-Motor Signs and Symptoms of Parkinson's Disease

Changes in voice, *i.e.*, decreased tone and volume
Constipation
Depression
Decreased facial expressions
Decreased sense of smell
Dementia
Excessive salivation
Forgetfulness
Orthostatic hypotension
Sexual dysfunction
Sleep disturbances
Speech disturbances
Sweating
Urinary urgency
Weakness

There are many motor signs associated with Parkinson's disease but there are four that are the cardinal signs of Parkinson's: bradykinesia, muscular rigidity, postural instability, and resting tremor. Each of these will be explained in detail and the neurological tests that are

used to detect their presence and evaluate their severity will be explained, as well.

Bradykinesia

Bradykinesia is a medical term that means slow or decreased speed of movement. It is one of the most common signs of Parkinson's disease. Patients who have Parkinson's disease with bradykinesia are unable to quickly and completely make voluntary movements and because of this, the activities of daily living such as eating, dressing, and personal hygiene take much longer. In addition, bradykinesia affects the patient's ability to complete voluntary movements and many patients have a decreased number of spontaneous movements. The last point is illustrated by imagining a person sitting in a chair or on a couch who may often cross the legs, shift from side to side, and adjust position, but the patient who has Parkinson's disease has a noticeable lack of these spontaneous adjustments of position and posture.

Muscular Rigidity

Muscular rigidity exists in people who have Parkinson's disease. They show stiff and rigid muscle tone. However, unlike bradykinesia, postural instability, and tremor, muscle rigidity is not a sign that is visible. Muscular rigidity can only be detected by an examiner performing passive range of motion of the patient's arms and legs.

Postural Instability

Postural instability is a very dramatic sign of Parkinson's disease and it is one of the most serious consequences of the disease, accounting for many falls and injuries. Maintaining a stable posture, especially while walking, is an intricate activity that requires coordination of muscles,

joints, nerves, and reflexes. Each time a person takes a step the person must temporarily balance on one leg, move the other leg a certain distance forward, plant a foot, shift weight, bend the knees, flex the ankles, accommodate changes in the walking surface, and hold the spine in a certain position.

Walking and maintaining a normal posture seems very simple but, when closely examined, it's clear they are quite complex and the damage to the substantia nigra from Parkinson's disease causes postural instability. Patients with Parkinson's disease do not have the muscle control to maintain normal posture while walking. Postural instability is a late sign of Parkinson's disease; once it has developed the patient is typically in an advanced stage.

Resting Tremor

Resting tremor is defined as a rhythmic, involuntary shaking at rest that stops during movement. A patient with Parkinson's disease who has resting tremor will typically have the tremor in one arm or hand but over time the resting tremor will happen to other parts of the body. The tremor may only happen when the patient is stressed or tired and it can be slight or quite exaggerated.

One of the resting tremors often associated with Parkinson's disease is called pill rolling tremor. Pill rolling tremor is characterized by the tip of the thumb and the tip of the forefinger being constantly rubbed together, a motion that is similar to someone who is feeling the texture of something.

Tests for Motor Signs and Symptoms

There are many ways to assess for the presence and severity of Parkinson's disease. Many clinicians use a series of tests called the Unified Parkinson's Disease Rating Scale (UPDRS). The UPDRS assesses a person's: 1) mental health and mood, 2) abilities at performing activities of daily living, and 3) motor skills. The complete UPDRS is somewhat lengthy and will not be included here; however, many websites are available to view the UPDRS. Some of the tests from the UPDRS are described below; these are ones that are used to determine the presence and severity of the four cardinal signs of Parkinson's disease.

Bradykinesia

There are many tests that are used to detect the presence of bradykinesia and to evaluate its severity. Two of these are explained here, and performing them can help a person understand how the severity of Parkinson's disease is assessed and why it affects the activities of daily living. The first is the rapid alternating hand movement and the second is leg agility.

The *rapid alternating movements of the hands test* is done by having the patient hold out both hands, fingers together and with the thumbs pointing up. The patient is then asked to quickly rotate and change the position of the hands in the following way: palms facing down, return to the starting position of the hands vertical, palms down again, return to the starting position and so on. The person will be able to do this quite rapidly, at least one movement per second. The person who has Parkinson's disease can only move the hands slowly and with hesitation and occasionally will stop midway through the movement.

The *leg agility test* is performed by having the patient sit in a chair, lift one leg up 3 inches from the ground, tap the floor with a heel, and repeat. Again, this test will be able to be performed rapidly and easily. The patient who has Parkinson's disease may not be able to lift the leg 3 inches or the up and down movement will be slow and will start and stop.

Obviously these tests are not realistic in what they require the patient to do, but they illustrate how the bradykinesia of Parkinson's disease prevents normal movements. Bradykinesia is also assessed and evaluated by forming a general impression of the patient's body movements, paying special attention to see if the movements are slow, hesitant, interrupted, or the range of motion is decreased.

As mentioned previously muscular rigidity can only be detected by an examiner performing passive range of motion of the patient's arms and legs. One way of doing this is to hold the patient's elbow in the palm of the hand, grasp the patient's wrist with the other and then bend the arm back towards the shoulder - arm flexion. In someone who does not have Parkinson's disease the arm flexion movement will be smooth, fluid, and easy. If the patient has Parkinson's disease the arm flexion movement will be slow, stiff, and difficult because of muscular rigidity. The results are rated from no difficulty in flexion (Score 0) to severe (Score 4) in which flexion is achieved only with significant difficulty.

Postural instability is assessed by examining the patient's gait. It can also be assessed by the *pull test*. In the pull test the patient is

standing and the examiner is positioned behind the patient. The examiner puts his or her hands on the patient's shoulders and then pulls backwards, quickly and suddenly on the patient's shoulders. If the Parkinson's disease is advanced the patient will lose balance and will not be able to stay erect.

There is no specific test for resting tremor nor does there need to be one as it can easily be observed. In patients who have Parkinson's disease the tremor can be mild or quite severe. In patients who have advanced Parkinson's disease the tremor can be very significant; the patient's hands may flap uncontrollably and continually and the tremor will prevent self-care activities such as feeding.

It is not critically important for the CNA to have a detailed knowledge of how Parkinson's disease is assessed and evaluated. An understanding of the impairments and limitations caused by Parkinson's disease, however, can be helpful when working with a patient diagnosed with the disease.

Progression and Prognosis of Parkinson's Disease

Parkinson's disease is a chronic disease and it is progressive. The patient's condition slowly worsens over time and the disease is typically described as having five stages.

Stage 1

Patients at this stage have mild signs and symptoms but they are prominent enough that the patient, family, and friends can notice the changes and the activities of daily living may be affected. Tremor is

present but only on one side. There may be voice changes as the patient's voice may be noticeably softer. Gait abnormalities are possible, and muscular rigidity and some level of bradykinesia are usually present. However, at this stage the level of impairment is often manageable and the patient may not seek help. Also, because Parkinson's disease usually affects people who are 60 years and older the first stage of Parkinson's may be dismissed as normal aging.

Stage 2

The tremor, bradykinesia, and muscular rigidity become worse and bilateral in nature. The patient may have a decreased ability to change facial expressions, *i.e.*, the "mask-like" facial feature that is common to Parkinson's disease. The patient's posture may become stooped. Performing activities of daily living becomes more challenging, and walking and maintaining balance are difficult.

Stage 3

The decrease in motor abilities continues at stage 3. The patient's movements are noticeably slow, and he/she cannot walk in a straight line. Maintaining balance is difficult and at this stage the patient will have an abnormal pull test so falls are possible. However, despite these difficulties the patient should still be able to complete activities of daily living and perform self-care.

Stage 4

At this stage, the impairments in motor abilities are so severe that the patient cannot function independently. Walking unassisted is still possible but the patient is not able to live alone.

Stage 5

The patient cannot walk unassisted and cannot perform self-care, and is dependent on others for eating, dressing, hygiene, *etc.* Parkinson's dementia may begin at this stage and this complication affects approximately 20%-40% of all patients who have the disease. People who have reached this stage of Parkinson's disease require constant one-on-one care.

There is no cure for Parkinson's disease. The progression of the disease is individualized; some patients deteriorate very quickly while for others the impairments develop slowly. Male gender, an older age at the onset of the disease, early onset of cognitive decline, and a poor response to drug therapy are signs that the patient's condition may worsen comparatively faster. Most patients will live for 10-20 years after Parkinson's disease has been diagnosed.

Diagnosis of Parkinson's Disease

There is no screening test that can help physicians identify people who are at risk for developing Parkinson's disease. Laboratory tests, X-rays, and diagnostic procedures such as computerized tomography (CT) scan or magnetic resonance imaging (MRI) may be done to make sure the patient does not have comorbidities or if the signs and symptoms are nonspecific, but there are no tests that can be reliably used to detect and diagnose Parkinson's disease.

Parkinson's disease is diagnosed by a physician following a patient's medical examination and by interviewing the patient and family. If the

patient has two of the four cardinal signs of the disease (bradykinesia, muscular rigidity, postural impairment, and tremor), if these signs have been progressing in intensity and frequency, and the signs and symptoms cannot be accounted for by other diseases or illnesses, then the patient has Parkinson's disease.

Once the diagnosis has been made patients will be evaluated for their cognitive abilities and level of mental health, their ability to perform the activities of daily living such as dressing, eating, speech, swallowing, toileting, walking, *etc.*, and motor impairments; these are the three assessment categories of the UPDRS. When assessing the patient's cognitive abilities and mental health the clinician should pay attention for the presence of dementia and depression. Dementia affects approximately 20%-40% of all patients who have Parkinson's disease, and the risk of developing dementia is increased 2-6 times by the presence of Parkinson's disease. Depression and other mood disturbances are also very common in patients who have Parkinson's disease and the patient should be screened for mood disorders at the time of diagnosis.

Treatment of Parkinson's Disease

The treatments for Parkinson's disease are intended to control the signs and symptoms and maintain quality of life for the patient. Some of the available therapies are unproven and some will only be effective for a small number of patients. None will provide a cure and even the most commonly used treatment, the anti-Parkinson's medications, will only be effective for a relatively short period of time, 4 to 6 years. Regardless of which therapies are chosen, they must be carefully

tailored for each patient and the patient must be carefully monitored for side effects.

The available therapies for treating Parkinson's disease can be divided into four categories: 1) drug therapy, 2) experimental therapies, such as gene therapy, stem cell therapy, and transplant therapy, 3) deep brain stimulation, and 4) surgery. Drug therapy is by far the most commonly used treatment and it will be discussed in a separate section. The other therapies are used much less often and they will be only briefly discussed.

Surgery

Surgery is an option for treating patients who have Parkinson's disease and there are three procedures that can be done: pallidotomy, thalamotomy, and subthalamotomy. The names of the procedures describe the specific part of the brain that is operated on but despite these differences the therapeutic goal is the same for all three procedures. The area that has been damaged by Parkinson's disease is removed by thermocoagulation through application of a heated probe with the hope that the removal will provide symptomatic relief.

These procedures are typically used for patients who have advanced Parkinson's disease and serious impairments and who have not, or are no longer responding to drug therapy. They can be successful but there are serious post-operative complications and the number of patients who are considered suitable candidates is relatively small. Because of these issues the surgical procedures are seldom done and have largely been replaced with deep brain stimulation.

Deep Brain Stimulation

Deep brain stimulation (DBS) was first used in the 1970s. However, performing the procedure with the unsophisticated technology available at the time was very difficult, there were also serious complications, and DBS was essentially abandoned. Today, however, DBS is one of the most effective treatments for patients with advanced Parkinson's disease. DBS involves placing a wire with an electrode into the affected area of the brain. The wire is attached to an electrical pulse generator, and the generator acts in the same way as a pacemaker for the heart. It sends out a regular, intermittent electrical signal that stimulates the specific part of the brain that is no longer functioning properly because of Parkinson's disease.

Although DBS can be quite successful for the right patient it is not exactly understood how it works. However, for some patients it can be very effective and unlike the traditional surgical options it is reversible as brain tissue does not have to be destroyed. DBS is also used because the pulse can be easily adjusted for the patient's needs, and the wire can be removed if DBS is not working or there is a complication. DBS is very expensive and because it involves surgery, infection is a possibility.

Experimental Therapy

Transplant therapy has been tried as a treatment for Parkinson's disease but at this point it has not been very successful. Some researchers have tried genetic manipulation and stem cell therapy as possible treatments for Parkinson's disease but these approaches are still experimental.

Drug Therapy

Treating patients with medication is still the cornerstone of therapy for Parkinson's disease. These drugs are very helpful, but they do not change the course of the disease, slow down its progression, or provide a cure. There are several different classes of drugs used, but the drugs that are most commonly used and most effective are the ones that provide a supply of dopamine or prevent the breakdown of dopamine. The generic name of each drug is provided below (brand names are in parentheses), and these drugs are useful to know.

Dopamine Pro-drugs

A pro-drug is a medication that is converted by the body into its active form and the pro-drugs used to treat Parkinson's disease are converted to dopamine after they have been absorbed.

Carbidopa/levodopa (Sinemet) is a dopamine pro-drug, and it is perhaps the most commonly prescribed anti-Parkinson's medication. The levodopa is converted to dopamine; the carbidopa prevents side effects that can occur from excess conversion of levodopa to dopamine and it allows for a higher brain concentration of the levodopa. The dopamine pro-drugs are the most effective anti-Parkinson's medication for controlling the signs and symptoms of Parkinson's disease and they have the fewest side effects.

Anticholinergic Drugs

Anticholinergic drugs such trihexyphenidyl (Artane) and bentsropine (Cogentin) work by affecting the activity of the neurotransmitter acetylcholine. The drugs can be effective at reducing the tremor associated with Parkinson's disease; they are not effective for

controlling bradykinesia or muscular rigidity. Dizziness, drowsiness, and dry mouth are common side effects of the anticholinergic drugs.

MAO-B Inhibitors

The MAO-B inhibitors rasagiline (Azilect) and selegiline (Anipryl) decrease the activity of an enzyme that breaks down dopamine and by doing so they increase the amount of circulating dopamine. These drugs are often used in addition to Sinemet and other drugs of that class when the patient is not responding fully to the dopamine agonists. Dizziness, headache, and nausea are common side effects.

Dopamine Agonists

The dopamine agonists directly stimulate the parts of the brain and the nerve fibers that use dopamine. Carbidopa/levodopa is considered a dopamine agonist and other commonly used dopamine agonists are ropinirole (Requip), pramipexole (Mirapex), and amantadine.

Acetylcholinesterase Inhibitors

Donepezil (Aricept), rivastigmine (Exelon), and galantamine (Razadyne) are acetylcholinesterase inhibitors that decrease the activity of an enzyme that breaks down the neurotransmitter acetylcholine. This effect increases the amount of acetylcholine in the brain and these drugs can improve cognitive functions such as memory and learning. Abdominal cramping and diarrhea are common side effects of the acetylcholinesterase inhibitors.

Patients are usually started on a dopamine pro-drug and other medications are added as needed. Drug therapy is often initially very

effective at controlling the signs and symptoms of Parkinson's disease. However, as mentioned previously the available medications do not slow the progression of the disease or provide a cure. In addition, drug therapy typically works for a relatively short period of time, 4 to 6 years, the side effects of the medications are unpleasant, and patient compliance is an issue. For example, carbidopa/levodopa can cause a serious movement disorder called *dyskinesia*, which is abnormal and involuntary muscles movements that can be distressing and uncomfortable for the patient. The acetylcholinesterase inhibitors can cause gastrointestinal distress such as abdominal cramping and diarrhea, and the anticholinergic medications can cause dry mouth, dizziness, and drowsiness.

Caring for Patients With Parkinson's Disease

Medications and surgery are used to treat people with Parkinson's disease but more supportive measures are also needed. Because of their disabilities, various degrees of help with activities of daily living (ADL) such as eating, bathing, dressing, walking, *etc.*, are needed. Physical therapy, occupational therapy, and speech therapy are useful, and a caregiver may be asked to accompany the patient to these therapy sessions and to help and encourage the patient during the sessions; however, the day-to-day responsibility of assisting the patient will be the CNAs responsibility. The CNA will need to focus on the following areas.

Nutrition

Dysphagia (difficulty swallowing) can be a sign of Parkinson's disease. Because of this, the patient may have excessive drooling and be unable to swallow. The patient with dysphagia is at risk for

malnutrition and can also aspirate food or liquid into the lungs - a very serious problem. The patient's diet will be ordered by the physician. Following these orders is important and should not be deviated from, such as food consistency in the diet (*i.e.*, some patients can only eat soft or pureed food) or the size of each bite (some patients can only tolerate very small pieces). The patient should never be rushed through a meal to avoid the chance of aspiration. Standard aspiration precautions should be used.

Skin Care

People with advanced Parkinson's are less mobile and may be incontinent of urine and/or feces. Because of this, they can develop bed sores. The patient should be encouraged to move, the skin should be kept clean and dry, and if the patient is immobile, frequent position changes are needed.

Ambulation

The patient with Parkinson's disease cannot maintain a normal posture; simply standing upright without assistance can be impossible. These people cannot walk normally; they can only take small steps and usually shuffle rather than walk. Independence is limited by gait impairments and patients are at risk for falls. The level of ambulation assistance needs to be determined. The physical therapy department will usually provide some direction in terms of how often and for how long the patient should walk, and how to help them.

Many patients find it helpful to do some slow, gentle stretching before they walk. Also, many patients with Parkinson's experience a "lag time" with physical activity. The patient may decide to move but it

takes them far longer after the decision to move. Giving them extra time to get ready to ambulate helps, and the caregiver should encourage them to focus and to "visualize" the activity by looking at each of their feet and legs.

Summary

Parkinson's disease is a chronic disorder of the brain and the nervous system. It is the second-most common neurodegenerative disorder after Alzheimer's disease and one of the most common neurological diseases in people over the age of sixty.

Progressive, irreversible neurologic changes are characteristic of Parkinson's disease, and patients develop slow, progressive damage to parts of the brain and nervous system that control movement.

Currently, the cause of Parkinson's disease is not known and the disease cannot be detected in the early stages of its development.

Treatment can slow the progression of Parkinson's disease but there is no cure. Eventually the patient who has Parkinson's disease will develop permanent complications and disabilities, and ambulation and self-care will not be possible. Medications and surgery, however, are used to treat people with Parkinson's disease and drug therapy is often initially very effective at controlling the signs and symptoms of Parkinson's disease. Carbidopa/levodopa (Sinemet) is a dopamine pro-drug, and perhaps the most commonly prescribed anti-Parkinson's medication. Various degrees of assistance with activities of daily living, and helping Parkinson's patients to attend physical therapy, occupational therapy, and speech therapy are also useful to treat symptoms.