

Neurogenic Orthostatic Hypotension in Parkinson's Disease

If you are experiencing symptoms of low blood pressure upon standing, you may have neurogenic orthostatic hypotension (NOH), which affects about 30%-50% of people with Parkinson's disease (PD). In this fact sheet, you will learn what NOH is, how it is diagnosed, and how it is treated to help lessen the symptoms and improve quality of life.

What Is NOH?

NOH (neurogenic orthostatic hypotension) is a neurologic condition that prevents your body from properly regulating your blood pressure when you change position, particularly when you go from lying down to sitting to standing up. "Neurogenic" means related to the nervous system, "orthostatic" means standing upright, and "hypotension" means low blood pressure.

What Are the Symptoms of NOH?

NOH can cause:

- Dizziness
- Lightheadedness
- Blacking out or fainting

Other symptoms may include headache, difficulty concentrating, impaired vision, neck and shoulder pain, shortness of breath, chest pain, weakness, fatigue, and nausea.

Symptoms typically begin within a few seconds to a few minutes of standing upright. Not everyone with NOH has symptoms, and symptoms may vary from person to person and from day to day.

In addition, not everyone with these kinds of symptoms has NOH. An accurate diagnosis is important for determining the right treatment.

What Causes NOH?

Blood pressure is the pressure exerted by the blood within the blood vessels, like the water pressure in the pipes of your house. When you stand, gravity tends to pull blood toward your lower extremities, depriving your brain of the blood it

needs to function, which can cause lightheadedness and other symptoms.

To prevent that, your autonomic nervous system, the part of the nervous system that controls the body's automatic functions, releases a chemical called norepinephrine that constricts the blood vessels, increasing pressure and delivering more blood to the brain. The nerves of the autonomic nervous system can degenerate in PD, which in turn means that norepinephrine is not released when necessary, causing blood pressure to fall. In addition, medications used to treat PD can lower blood pressure, thereby compounding the problem.

How Is NOH Diagnosed?

Blood pressure is described by two numbers, called systolic and diastolic (the unit of measurement of blood pressure is "millimeters of mercury," or mm Hg). The "systolic" number represents the pressure in your arteries when your heart beats. The heart contracts, which pushes out blood and raises pressure. The "diastolic" number refers to the pressure in the arteries between beats when the heart relaxes. Normal resting systolic blood pressure is less than 120 mm Hg, and normal resting diastolic blood pressure is less than 80 mm Hg. This is written as 120/80 and read as "120 over 80."

NOH is a reduction in the systolic pressure of at least 20 mm Hg or a reduction in the diastolic pressure of at least 10 mm Hg within 3 minutes of standing up.

In order to diagnose NOH, your doctor will check your blood pressure after you have been lying down for about 5 minutes, then again 1 and 3 minutes after standing, to determine how it changes. They will ask you about your medical history and your symptoms, including when they occur and how often they occur. You may be asked to keep a symptom diary, to record what you were doing just before each episode occurs.

Some people develop a delayed form of NOH, where the drop in blood pressure occurs after more than 3 minutes of standing, and diagnosing this may require a specialized test called tilt-table testing.

Of note, in the past you may have been diagnosed with high blood pressure and prescribed medication to lower blood pressure. Therefore, if you now have NOH as a non-motor symptom of PD, you may need to discuss with your healthcare team the possibility of stopping medication that lowers your blood pressure. There are also other medications that you might be on that lower blood pressure (including diuretics, some anti-depressants, and alpha-blockers) that may also require you to consult with your healthcare team regarding whether they can be stopped or lowered in the face of NOH.

In addition, there are causes of low blood pressure that are not directly related to PD, but that need to be treated to maintain blood pressure. These include dehydration, diabetes, particular heart disorders, and certain vitamin deficiencies. Your doctor may therefore order blood tests and cardiac tests to rule out other causes of low blood pressure.

What Are the Consequences of NOH?

Because it can cause episodes of dizziness and other symptoms, NOH can reduce your ability to perform the normal activities of daily living, including exercise, hobbies, and housework. Blood pressure can fall to the point that it causes fainting, which can cause injury. Treatment may help to lessen the effects of NOH.

How Is NOH Treated?

The goal of treating NOH is to reduce your symptoms and improve your quality of life. Treatments may include non-drug approaches as well as prescription medications.

Non-drug approaches are designed to increase your blood pressure, minimize the changes in blood pressure when you stand, and reduce the effects of NOH. Methods include:

- Staying hydrated! Drink fluids throughout the day, especially in hot weather. Aim for about 6-8 glasses of fluid daily unless your doctor advises otherwise.
- Increasing dietary salt. Salty foods may include salted crackers, pretzels, or nuts, as well as prepared soups. Salt tablets are also available. An increase in salt must be accompanied by an increase in fluid and vice versa. Do not increase salt intake without discussing it with your doctor.



- Avoiding substances that may lower blood pressure, including caffeine, carbohydrate-rich meals, and alcohol
- Wearing compression stockings or an abdominal binder, which reduce the amount of blood that can flow to your lower extremities
- Avoiding standing for long periods, which can cause blood to pool in your legs
- Avoiding hot environments, including hot showers, which expand blood vessels and lower blood pressure
- Rising slowly when standing, to allow more time for blood pressure to adapt to your new position
- Raising the head of your bed, to reduce blood pressure changes upon standing
- Getting regular exercise, to improve general health and performance of the autonomic nervous system



If despite these steps you experience an episode of dizziness, sit or lie down, drink fluids, and eat a salty snack to prevent you from passing out. Then tell your doctor about the episode.

Medications that may improve NOH symptoms include:

- Fludrocortisone (Florinef®), which increases sodium retention, thereby increasing blood volume and raising blood pressure
- Midodrine (ProAmatine®), which causes blood vessels to contract, increasing blood pressure
- Droxidopa (Nothera®), which the body converts into norepinephrine, increasing blood pressure
- Pyridostigmine, which reversibly inhibits the enzyme acetylcholinesterase, increasing blood pressure

All medications have side effects. In some people with NOH, the side effects of these drugs may not be tolerated or may worsen other conditions. Because these drugs can also cause supine hypertension (high blood pressure while lying down), blood pressure should be checked both standing and lying down, and doses should generally be avoided close to bedtime. Talk with your doctor about what combination of medications and non-drug approaches is right for you.

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