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Parkinson disease and polyneuropathy

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WHAT WAS THE STUDY ABOUT? In their article, “Neuropathy in Parkinson disease: Prevalence and determinants,” Rajabally and Martey¹ take a closer look at a problem that has been discussed for several years.^{2,3} The problem is very specific. Some people with Parkinson disease (PD) develop something called a polyneuropathy. This is a problem of the nerves in the feet and hands. It starts gradually, and over a long period of time, gets worse. When it happens, it usually affects the feet first, and later, the hands. Both are affected equally. One concern is that the medication that is used most often for PD may be the cause of the nerve problem. This medication is called levodopa. In other words, the treatment of one illness may be the cause of a second illness. Because this association is unclear, the authors decided to look more closely at the relationship between levodopa and polyneuropathy.

HOW WAS THE STUDY DONE? Between October 2010 and February 2011, Rajabally and Martey searched for 2 groups of patients. The first were people with PD. The second group included people who had other neurologic illnesses (like migraines or seizures). The reason they needed to select 2 groups was for comparison.

There are many causes for polyneuropathy. The most common causes are diabetes and long-term alcohol use or abuse. In addition, vitamin deficiencies (especially vitamin B12) can cause a polyneuropathy. As the authors were searching for people to study, they excluded those who had diabetes, alcoholism, or a known vitamin (B12) deficiency. In this way, they were able to minimize other factors which might make the results more confusing.

Rajabally and Martey identified 37 people with PD. They matched these people with 37 people who were the same age and gender. Both groups were studied in exactly the same way. The participants had blood testing to look for vitamin levels, possible diabetes (which had previously not been diagnosed or they would not have been able to be in the study), and other medical illnesses. Each person had a detailed nerve test called an electromyogram. This test is one way to measure the severity of the nerve problem. Since levodopa was a possible cause of the polyneuropathy,

the authors carefully measured the time that the people with PD had been taking this medication.

They tried to make the groups as similar as possible for comparison. The groups ate about the same kinds of foods, and were not taking vitamin supplements. None had had previous stomach surgery, which can cause certain kinds of vitamin deficiencies. The average age of the PD group was 68. They had had PD for almost 6 years (5.95 years). The comparison group had other neurologic illness. Ten had migraines, 8 had epilepsy, and 7 had myasthenia gravis. The rest had other neurologic illnesses.

WHAT WERE THE RESULTS? There was a big difference between the groups. In the PD group, 37.8% had a polyneuropathy, compared to 8.1% in the comparison group. Another way of saying this is that if a person had PD, they were 7 times more likely to have a polyneuropathy than if they had another kind of neurologic illness. There was a big difference in the vitamin B12 levels in each group. In people with PD, the average B12 level was 286.8 ng/L compared to 413.2 ng/L in the comparison group.

WHAT DOES THIS MEAN? Rajabally and Martey found that people with PD were more likely to have a polyneuropathy than people with other neurologic illnesses. There was a relationship between low vitamin B12 levels and the presence of the nerve problem. There also seemed to be a relationship between the duration of PD and the neuropathy. However, they did not find a clear link between the duration of treatment with levodopa and the occurrence of the neuropathy. Because of this, they were unable to conclusively prove that levodopa causes a polyneuropathy. However, their findings are very important because they showed that more people with PD have polyneuropathy and low vitamin B12 levels. This suggests that doctors need to check vitamin B12 levels in each person with PD.

WHAT IS POLYNEUROPATHY? Polyneuropathy is a neurologic illness. It affects the peripheral nerves. That means that it is an illness that affects the nerves in the arms and legs, and not the nerve cells in the brain. In most people, the feet are affected before the hands. Most polyneuropathies occur slowly and gradu-

ally. At first, they may cause no symptoms. The person is unaware that a problem is happening until it becomes more severe. At this point, the person may develop numbness or tingling in the feet and hands. Later, the tingling may become more painful, feeling like a burning sensation. In some people, weakness also occurs.

There are many different kinds of neuropathies. There are many different causes such as autoimmune reactions, toxins, certain drugs, and cancer. The most common causes are diabetes mellitus or the excessive use of alcohol. Less common causes like nutritional deficiencies (especially low vitamin B12 levels) and liver or kidney failure may cause a polyneuropathy.

The initial evaluation of a polyneuropathy occurs in the doctor's office. He or she may ask questions about how long the problem has been present and

what part of the body is most affected. The doctor will look carefully for possible causes of the problem such as exposure to toxins or alcohol. Next, the doctor may order serum testing, looking for causes of the polyneuropathy. Because there are so many possible causes, if the history does not point to a specific one, the doctor may need to request a long list of blood tests. In addition, he or she may order an electromyogram, which is a specialized test designed to evaluate nerve damage (among other things).

Once the cause of the polyneuropathy has been found, the treatment is directed to the cause. Medications to treat the burning sensation may also be needed. There are several medications that can help, and the doctor will help to select the best one for the person with the polyneuropathy.

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About Parkinson disease

WHAT IS PARKINSON DISEASE? Parkinson disease is named after James Parkinson. He first described the illness in 1817. PD mostly causes problems with moving around. It can cause a person to move very slowly. A person with PD appears stiff or rigid. At times, a person with PD may appear to suddenly “freeze up” or be unable to move for a short period of time.

A tremor of the hands is common. It is called a “pill-rolling” tremor because of how it looks. Many years ago, pharmacists used to make their own tablets. In order to make the medications into a tablet, they would “roll” the medicine into a small ball. The motion that it takes to roll a small ball looks very similar to the tremor in PD. When a person has PD, they often will have one or more of these symptoms.

WHAT CAUSES PD? In PD, the underlying problem has to do with a neurotransmitter called dopamine. A few very specific brain cells make dopamine. Though only a few cells make dopamine, these cells send the neurotransmitter to many different regions of the brain. Changes in dopamine levels can have widespread effects within the brain.

When we are young, our brains make plenty of dopamine. As we get older, this amount decreases. In PD, the amount of dopamine becomes critically low. In PD, the amount of dopamine changes very slowly over time. This causes the very gradual worsening of movement. In early PD, as in this study, the symptoms may be mild.

TREATMENT OF PD Understanding the link between dopamine and PD has led to the development of many treatments. The answer seems simple enough: take dopamine. Unfortunately, the body does not allow dopamine to cross over into the brain where it is needed. This is why people with PD take levodopa. Levodopa can cross over into the brain. The brain converts the medication into dopamine.

There are many other treatments for PD. For the most part, these treatments are aimed at increasing the amount of dopamine in the brain. Other treatments help to keep the dopamine where it is needed most. These treatments maintain the levels of dopamine. By keeping the levels constant, these treatments prevent the motor symptoms from returning.

A physician may not know which treatment is best for a specific person. Every person is different. Some people may require only 1 medication. Others may need 2 or more medicines. Physicians must therefore tailor the treatment to the individual.

Although studies can tell us which medicines work, they do not tell us which ones work best for a specific person. Sometimes, more than one medicine must be tried before the best treatment plan can be found. A person with PD can become frustrated if the first treatment does not work. By talking honestly with your doctor, the best treatment can be found.

FOR MORE INFORMATION

AAN Patients and Caregivers site, American Academy of Neurology

<http://patients.aan.com>

American Parkinson Disease Association

<http://www.apdaparkinson.org>

National Parkinson Foundation

<http://www.parkinson.org>

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