Progressive Supranuclear Palsy

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Contributor: Rita Xu

Progressive supranuclear palsy is a brain disorder that affects movement, vision, speech, and thinking ability (cognition). The signs and symptoms of this disorder usually become apparent in mid- to late adulthood, most often in a person's 60s. Most people with progressive supranuclear palsy survive 5 to 9 years after the disease first appears, although a few affected individuals have lived for more than a decade.

genetic conditions

1. Introduction

Loss of balance and frequent falls are the most common early signs of progressive supranuclear palsy. Affected individuals have problems with walking, including poor coordination and an unsteady, lurching gait. Other movement abnormalities develop as the disease progresses, including unusually slow movements (bradykinesia), clumsiness, and stiffness of the trunk muscles. These problems worsen with time, and most affected people ultimately require wheelchair assistance.

Progressive supranuclear palsy is also characterized by abnormal eye movements, which typically develop several years after the other movement problems first appear. Restricted up-and-down eye movement (vertical gaze palsy) is a hallmark of this disease. Other eye movement problems include difficulty opening and closing the eyelids, infrequent blinking, and pulling back (retraction) of the eyelids. These abnormalities can lead to blurred vision, an increased sensitivity to light (photophobia), and a staring gaze.

Additional features of progressive supranuclear palsy include slow and slurred speech (dysarthria) and trouble swallowing (dysphagia). Most affected individuals also experience changes in personality and behavior, such as a general loss of interest and enthusiasm (apathy). They develop problems with cognition, including difficulties with attention, planning, and problem solving. As the cognitive and behavioral problems worsen, affected individuals increasingly require help with personal care and other activities of daily living.

2. Frequency

The exact prevalence of progressive supranuclear palsy is unknown. It may affect about 6 in 100,000 people worldwide.

3. Causes

In most cases, the genetic cause of progressive supranuclear palsy is unknown. Rarely, the disease results from mutations in the *MAPT* gene. Certain normal variations (polymorphisms) in the *MAPT* gene have also been associated with an increased risk of developing progressive supranuclear palsy.

The *MAPT* gene provides instructions for making a protein called tau. This protein is found throughout the nervous system, including in nerve cells (neurons) in the brain. It is involved in assembling and stabilizing microtubules, which are rigid, hollow fibers that make up the cell's structural framework (the cytoskeleton). Microtubules help cells maintain their shape, assist in the process of cell division, and are essential for the transport of materials within cells.

The signs and symptoms of progressive supranuclear palsy appear to be related to abnormalities in the tau protein. In people with *MAPT* gene mutations, genetic changes disrupt the protein's normal structure and function. However, abnormal tau is also found in affected individuals without *MAPT* gene mutations. The defective tau protein assembles into abnormal clumps within neurons and other brain cells, although it is unclear what effect these clumps have on cell function and survival. Progressive supranuclear palsy is characterized by the gradual death of brain cells, particularly in structures deep within the brain that are essential for coordinating movement. This loss of brain cells underlies the movement abnormalities and other features of progressive supranuclear palsy.

This condition is one of several related diseases known as tauopathies, which are characterized by an abnormal buildup of tau in the brain.

Researchers suspect that other genetic and environmental factors also contribute to progressive supranuclear palsy. For example, the disease has been linked to genetic changes on chromosome 1 and chromosome 11. However, the specific genes involved have not been identified.

The Gene Associated with Progressive Supranuclear Palsy

- MAPT

4. Inheritance

Most cases of progressive supranuclear palsy are sporadic, which means they occur in people with no history of the disorder in their family. However, some people with this disorder have had family members with related conditions, such as parkinsonism and a loss of intellectual functions (dementia).

When progressive supranuclear palsy runs in families, it can have an autosomal dominant pattern of inheritance. Autosomal dominant inheritance means one copy of an altered gene in each cell is sufficient to cause the disorder.

5. Other Names for This Condition

- progressive supranuclear ophthalmoplegia
- PSP
- Richardson's syndrome
- Steele-Richardson-Olszewski syndrome
- supranuclear palsy, progressive

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