

PROGRESSIVE SUPRANUCLEAR PALSY (PSP)

Introduction

Steele, Richardson, and Olszewski first described this disease as a distinct clinicopathologic entity in 1964, and established the triad of clinical features still used for diagnosis:

- progressive difficulty with gait and balance resulting in frequent falls
- progressive loss of voluntary control of eye movements (gives the disorder its name)
- dementia

Although these three features are considered to be the hallmarks of PSP, patients with this disorder also experience other symptoms common to degenerative diseases of the brain, including difficulties with movement, changes in behavior and difficulty with speech and swallowing.

In part because it is relatively rare, PSP is frequently misdiagnosed as Parkinson's Disease. However its treatment response and clinical symptoms are different, making an accurate diagnosis important for patient management.

Demographics

PSP occurs primarily in middle-aged adults and the elderly, with slightly more males being affected than females. In the US, approximately 1.39 in every 100,000 individuals is estimated to have PSP, but because the disorder is difficult to diagnose, this is thought to be a considerably underestimated.

Symptoms

Movement and posture

The first and most common symptoms of PSP are postural instability (imbalance on standing) and frequent falls, usually presenting within the first year of onset. Along with this, patients often experience a combination of akinesia (slow movement), rigidity (body stiffness), and dystonia (abnormal, stiff posture) in the neck and trunk.

Many of these symptoms bear a strong resemblance to those of Parkinson's Disease. Difficulties with eye movement include blepharospasm, or forceful involuntary closing of the eyelids, difficulty opening and closing the eyes, and minimized blinking. The decreased blinking, along with a constant raised-eyebrows facial expression, gives the face a fixed stare, characteristic of the disease.

Voluntary eye control

Visual symptoms also present early in the course of the disease, although rarely do they

occur at onset. The earliest of these are slowing of vertical saccades (the quick eye movements we use in redirecting our vision), causing difficulty with changing to a new visual target. As the disease progresses, inability to voluntarily direct the eyes to a target of interest emerges. However, the eyes can still stay passively and reflexively focused on a target as the head is turned horizontally or vertically.

This difficulty with voluntary eye movement represents a failure of the higher centers in the brain to control the basic eye movement nuclei (nuclei are collections of neurons) in the brainstem. This feature, referred to as supranuclear palsy, appears. Its earliest manifestations are often on vertical eye movements.

These gaze difficulties can lead to problems such as difficulty in making eye contact, difficulty in reading (because of inability to scan lines on a page), and difficulty with eating (because of inability to look down at one's food).

Speech and swallowing

Dysarthria (slow or slurred speech) is the second most common symptom in PSP. Patients often find it difficult to carry conversations with others because of the delay of their responses and their difficulties with speech pronunciation. Eventually, difficulties with control of oral movements can progress to the point where swallowing food, and particularly liquids, can be poorly coordinated, leading to the leakage of food into the windpipe (called dysphagia). This can result in pneumonia, the most common cause of death in PSP.

Some warning signs caregivers should look for are drooling, food collecting in the mouth, increased effort in swallowing, chest congestion, trouble talking, and weight loss.

Cognitive and behavioral abnormalities

PSP patients also experience cognitive and behavioral changes suggesting abnormal functions in the frontal lobes. Cognitive changes consist of a decline in frontal lobe functioning, such as slow information processing and retrieval, concrete thinking, impaired reasoning, difficulty planning and shifting between tasks. Behaviorally, patients often exhibit apathy, leading to decreased motivation.

Late in the course of this disease, all these symptoms progress to the point where walking becomes very difficult, if not impossible, eye movement problems get to be more disabling, and cognitive impairment progresses to a frank dementia.

Genetics

Most known forms of PSP are sporadic, but there have been some cases of a genetic

relationship, following an autosomal dominant inheritance pattern with reduced penetrance.

Comparison to Other Disorders

Parkinson's Disease (PD)

In contrast with PSP, in which gait problems and imbalance are among the first symptoms after onset, PD patients don't experience severe balance dysfunction until later in the course of their disease. They also experience shaking, or tremors, that are uncharacteristic of PSP. In PSP the posture is stiff and upright with a tendency to fall backwards, as opposed to the stooped posture seen in PD.

Frontotemporal Dementia (FTD)

The hallmark of FTD is abnormal function in the frontal lobes, resulting in cognitive problems that can be similar to those in PSP. However, the variety and severity of behavioral problems in FTD is much greater. In addition, severe difficulties with balance and movement, especially early in the disease course, are unusual in FTD.

Corticobasal Degeneration (CBD)

Patients with CBD can have many of the movement and balance problems seen in PSP, and some of the cognitive difficulties. However, CBD is classically associated with very asymmetric effects on the brain, resulting in motor impairment initially affecting one side of the body much more than the other, or selective cognitive difficulties that are quite out of proportion to the level of generalized cognitive impairment, or both.

Overlap with Other Disorders

Although PSP differs from disorders such as CBD and FTD, there are also similarities. Many patients present with some features of PSP, but other features that suggest the possibility of FTD or CBD. This is particularly likely if patients do not present with all the classic features of the PSP triad (see introduction above). This is not surprising, given the fact that the microscopic pathology in these three disorders is similar in many ways. All of these disorders are associated with the absence of amyloid plaques in the brain, such as those seen in Alzheimer's disease, and all are associated with the abnormal accumulation of a protein called Tau.

Some researchers have chosen to group PSP along with CBD and FTD under a single term called Pick-complex disorders. It is likely that whether one presents with PSP, CBD or FTD depends largely on the location in the brain of these microscopic changes, although individual differences may play an important role as well.

Evaluation

A clinical evaluation by a neurologist in this rare type of dementia is important in the

diagnosis of PSP, as it is often misdiagnosed and difficult to diagnose early. This involves an interview with the patient and another source, such as a spouse, relative, or close friend, to provide examples of behavior and daily functional activities, physical testing for mobility and vision, and neuropsychological testing for evaluation of cognition. Mandatory clinical criteria for the diagnosis of probable PSP are prominent postural instability, falls, and vertical supranuclear palsy within the first year of onset.

Treatment

Currently, there is no known cure for PSP. There are medications, however, that may relieve some of the symptoms. Mostly, these are medications used for typical Parkinson's Disease (PD). PSP does not respond to these agents as much as typical PD, and the doses may need to be raised to a relatively high level to see any effect.

Simple lifestyle changes may also help alleviate some of the problems associated with PSP. These include use of a walking aid with a heavy front to prevent falling backwards, eating more solid foods and less thin liquids, and physical therapy or exercise programs to improve mobility.

If swallowing problems become more severe, gastrostomy (insertion of a tube directly into the stomach for feeding) can significantly decrease the risk of pneumonia related to dysphagia.

Caregivers

Being a caregiver for someone with PSP can be physically and emotionally demanding. Because PSP is so rare, it is infrequently diagnosed early and not as well understood as other types of dementias. Symptoms are frequently misinterpreted as depression.

Families and caregivers of PSP patients often have feelings of anger, frustration, depression, guilt, and isolation, and are reluctant to share their feelings with others. It is important for caregivers to seek support for these difficulties.