
Parkinson's disease dementia

A topic in the Alzheimer's Association® series on understanding dementia.

About dementia

Dementia is a condition in which a person has significant difficulty with daily functioning because of problems with thinking and memory. Dementia is not a single disease; it's an overall term — like heart disease — that covers a wide range of specific medical conditions, including Alzheimer's disease. Disorders grouped under the general term dementia are caused by abnormal brain changes. These changes trigger a decline in thinking skills, also known as cognitive abilities, severe enough to impair daily life and independent function. They also affect behavior, feelings and relationships.

Brain changes that cause dementia may be temporary, but they are most often permanent and worsen over time, leading to disability and a shortened life span. Survival can vary widely, depending on such factors as the cause of the dementia, age at diagnosis and coexisting health conditions.

Parkinson's disease dementia

Parkinson's disease dementia (PDD) is a decline in thinking and reasoning that develops in many people living with Parkinson's at least a year after diagnosis. The brain changes caused by Parkinson's disease begin in a region that plays a key role in movement, leading to early symptoms that include tremors and shakiness, muscle stiffness, a shuffling step, stooped posture, difficulty initiating movement and lack of facial expression. As brain changes caused by Parkinson's gradually spread, they often begin to affect mental functions, including memory and the ability to pay attention, make sound judgments and plan the steps needed to complete a task.

The key brain changes linked to Parkinson's disease and Parkinson's disease dementia are abnormal microscopic deposits composed chiefly of alpha-synuclein, a protein found widely in the brain with a normal function not fully known. The deposits are called "Lewy bodies" after Frederick H. Lewy, M.D., the neurologist who discovered them while working in Dr. Alois Alzheimer's laboratory during the early 1900s.

Lewy bodies are also found in several other brain disorders, including dementia with Lewy bodies (DLB). Evidence suggests that DLB, Parkinson's disease and Parkinson's disease dementia may be linked to the same underlying abnormalities in the brain's processing of alpha-synuclein. Another complicating factor is that many

people with both Parkinson's disease and DLB dementia also have plaques and tangles — hallmark brain changes linked to Alzheimer's disease.

A study published on July 29, 2019 in *Scientific Reports* suggests that Lewy bodies are problematic because they pull alpha-synuclein protein out of the nucleus of brain cells. The study examined cells of living mice and postmortem brain tissue in humans, and revealed that these proteins perform a crucial function by repairing breaks that occur along the vast strands of DNA present in the nucleus of every cell in the body.

Alpha-synuclein's role in DNA repair may be crucial in preventing cell death. This function may be lost in brain diseases such as Parkinson's and DLB, leading to the widespread death of neurons.

A genetic study of DLB, published in February 15, 2021 issue of *Nature Genetics*, found two genes (BIN1 and TMEM175) implicated in DLB were also tied to Parkinson's and Alzheimer's diseases. The researchers also noted that changes in the activity of these genes may lead to dementia.

Prevalence

Parkinson's disease is a fairly common neurological disorder in older adults, estimated to affect nearly 2% of those over age 65. The National Parkinson's Foundation estimates that close to one million Americans are living with Parkinson's disease. Recent studies following people with Parkinson's over the entire course of their illness estimate that 50% to 80% of those with the disease may experience dementia.

Symptoms

Commonly reported symptoms include changes in memory, concentration and judgment; trouble interpreting visual information; muffled speech; visual hallucinations; delusions, especially paranoid ideas; depression, irritability and anxiety; and sleep disturbances, including excessive daytime drowsiness and rapid eye movement (REM) sleep disorder.

Diagnosis

There is no single test — or combination of tests — that conclusively determines whether a person has Parkinson's disease dementia. Guidelines for diagnosing Parkinson's disease dementia and DLB are:

- **The diagnosis is Parkinson's disease dementia when** a person is originally diagnosed with Parkinson's disease based on symptoms related to movement and dementia symptoms don't appear until a year or more later.

- **The diagnosis is DLB when** dementia symptoms consistent with DLB either develop first; are present along with symptoms related to movement; or appear within one year after movement symptoms arise.

Causes and risk factors

An estimated 50% to 80% of those with Parkinson's eventually experience dementia as their disease progresses. Some studies have reported that the average time from onset of Parkinson's to developing dementia is about 10 years.

Certain factors at the time of Parkinson's diagnosis may increase future dementia risk, including advanced age, being in the advanced stage of Parkinson's, being male, greater severity of motor symptoms and mild cognitive impairment (MCI). Additional risk factors may include a family history of dementia; the presence of hallucinations in a person who doesn't yet have other dementia symptoms; excessive daytime sleepiness; and a Parkinson's symptom pattern known as postural instability and gait disturbance (PIGD), which includes "freezing" in mid-step, difficulty initiating movement, shuffling, problems with balancing and falling.

Outcomes

Because Parkinson's disease and Parkinson's disease dementia damage and destroy brain cells, both disorders worsen over time. Their speed of progression can vary widely.

Treatment

There are no treatments to slow or stop the brain cell damage caused by Parkinson's disease dementia. Current strategies focus on improving symptoms. If your treatment plan includes medications, it's important to work closely with your physician to identify the drugs that work best for you and the most effective doses.

- **Cholinesterase inhibitor** — rivastigmine (Exelon®) is the only cholinesterase inhibitor approved by the U.S. Food and Drug Administration (FDA) to treat mild-to-moderate dementia associated with Parkinson's disease.
- **Carbidopa-levodopa** — may be prescribed to treat Parkinson's movement symptoms. However, it can sometimes aggravate hallucinations and confusion in those with Parkinson's dementia or DLB.
- **Deep brain stimulation** — deep brain stimulation (DBS) is currently contraindicated for Parkinson's disease dementia (PDD). However, a few small clinical studies have suggested this treatment may be safe and beneficial for people with PDD. Other research has been mixed on whether the treatment

can actually increase the risk of developing dementia in people with Parkinson's disease. Additional studies must be conducted to confirm DBS' impact in Parkinson's.

- **Selective serotonin reuptake inhibitors (SSRIs) and non-SSRIs** are used to treat depression, which is common in both DLB and Parkinson's disease dementia.
- **Clonazepam and melatonin** may be used to treat REM disorder.

CAUTION: Antipsychotics drugs (such as haloperidol, fluphenazine or thioridazine) that are used to treat behavioral symptoms should be avoided. About 60% of people with DLB experience worsening of Parkinson symptoms, sedation, impaired swallowing or neuroleptic malignant syndrome (NMS). NMS is a life-threatening condition characterized by fever, generalized rigidity and muscle breakdown following exposure to traditional antipsychotics.

Additional resources

National Parkinson's Foundation, Inc.

parkinson.org
800.473.4636

Michael J. Fox Foundation for Parkinson's Research

michaeljfox.org
800.708.7644

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