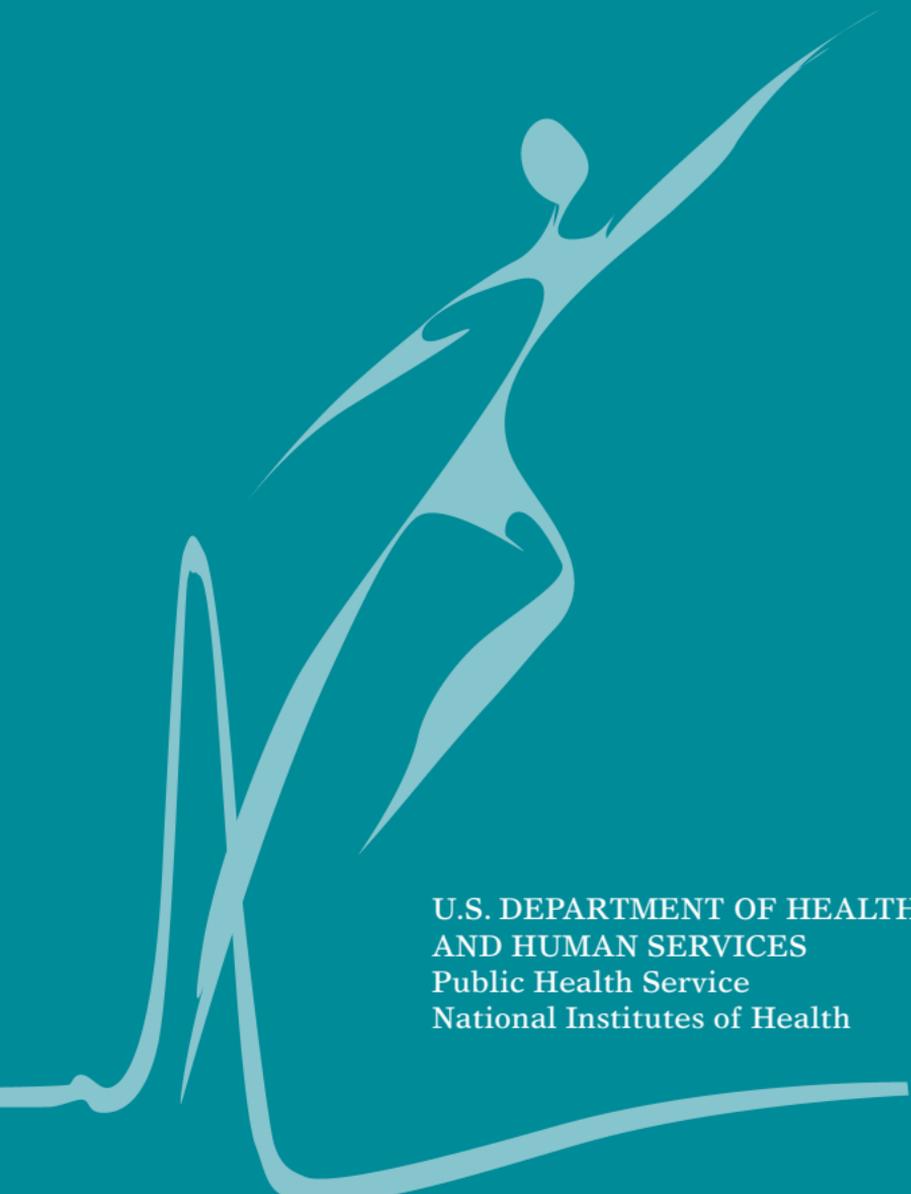


Multiple System Atrophy



U.S. DEPARTMENT OF HEALTH
AND HUMAN SERVICES
Public Health Service
National Institutes of Health



Multiple System Atrophy

What is multiple system atrophy?

Multiple system atrophy (MSA) is a progressive neurodegenerative disorder characterized by a combination of symptoms that affect both the autonomic nervous system and movement. Symptoms of autonomic nervous system failure include fainting spells and problems with heart rate and bladder control. Motor control (movement) dysfunction may feature symptoms such as tremor, rigidity, and loss of muscle coordination. Some of these symptoms are similar to those seen in Parkinson's disease.

MSA affects both men and women primarily in their 50s. The disease tends to advance rapidly over the course of 9 to 10 years, with progressive loss of motor skills, eventual confinement to bed, and death. There is no remission from the disease and there are currently no cures.

What causes MSA?

The cause or causes of MSA are unknown. The symptoms reflect the dysfunction and eventual loss of nerve cells in several different areas in the brain and spinal cord that control the autonomic nervous system and coordinate muscle movements. The loss of nerve cells may be due to the buildup of a protein called alpha-synuclein in the cells that produce dopamine, a neurotransmitter that relays motor commands in the brain. The buildup also occurs in other cells called oligodendroglia, which help transmit nerve signals. MSA, along with Parkinson's disease and some other neurodegenerative conditions, are called synucleinopathies because they share a buildup of alpha-synuclein in brain cells.

What are the common signs or symptoms?

The initial symptoms of MSA are often difficult to distinguish from the initial symptoms of Parkinson's disease and include:

- decreased spontaneous movement, tremor, or rigid muscles;
- clumsiness, loss of balance, and frequent falls;
- slurred speech, a croaky, quivering voice, or difficulty swallowing;
- fainting or lightheadedness due to orthostatic hypotension, a condition in which blood pressure drops rapidly when rising from a seated or lying down position; and
- bladder control problems, such as a sudden urge to urinate or difficulty emptying the bladder completely.

Doctors divide MSA into two different types, depending on the most prominent symptoms at the time an individual is evaluated:

- the *parkinsonian type* (MSA-P) has primary characteristics of Parkinson's disease, such as moving slowly, stiff muscles, and tremor, along with problems of balance, coordination, and autonomic nervous system dysfunction; and
- the *cerebellar type* (MSA-C), with primary symptoms featuring difficulty swallowing, slurred speech, or a quavering voice, along with ataxia (problems with balance and coordination).

Some people with MSA may start out with the symptoms of one type and then develop increasingly more severe symptoms of the other type as the disease progresses. Most people with MSA will require an aid for walking, such as a cane or walker, within a few years after symptoms begin.

Additional symptoms of MSA include:

- contractures (chronic shortening of muscles or tendons around joints, which prevents the joints from moving freely) in the hands or feet;
- Pisa syndrome, an abnormal posture in which the body appears to be leaning to one side like the Leaning Tower of Pisa;
- disproportionate antecollis, in which the neck bends forward and the head drops down;
- deep, uncontrollable sighing or gasping;
- inappropriate laughing or crying.

How is MSA diagnosed?

Making a positive diagnosis of MSA is difficult, particularly in the early stages, because it so closely resembles Parkinson's disease.

After taking a clinical history and performing a brief neurological examination, a doctor may order a number of tests to help make the diagnosis. These tests include autonomic function tests, urine analysis (and other tests to assess bladder function), and neuroimaging. An MRI (magnetic resonance imaging) of the brain is done since there are some changes that seem to be specific for MSA. MRI uses computer-generated radio waves and a powerful magnetic field to produce detailed images of body structures including tissues, organs, bones, and nerves. A research PET scan (positron emission tomography, which allows doctors to see how organs and tissues are functioning) is sometimes used to see if metabolic function is reduced in specific parts of the brain that are associated with MSA. A DaTSCAN measures dopamine transporter cells and can help physicians determine if the condition is caused by a dopamine system disorder (such as Parkinson's disease or essential tremor). Individuals with MSA typically have no improvement in their symptoms with levodopa, a drug used to treat Parkinson's disease, although this lack of response is not diagnostic of MSA.

How is it treated?

There is no cure for MSA. Currently, there are no treatments to delay the progress of neurodegeneration in the brain. There are ongoing treatment trials to evaluate drugs that could potentially help delay progression. These include rifampicin and rasagiline. There are treatments available to help people cope with some of the more disabling symptoms of MSA.

The fainting and lightheadedness from orthostatic hypotension is often treated successfully with simple interventions such as adding extra salt to the diet and avoiding heavy meals and alcohol. Some people with MSA sleep with the head of the bed tilted up or use a compression body stocking. The drugs fludrocortisone (for those on a high salt diet) and midodrine are sometimes prescribed to increase blood volume and narrow blood vessels. Drinking a glass or two of water before getting out of bed in the morning can also help raise blood pressure.

Bladder control problems are treated according to the nature of the problem. Anticholinergic drugs, such as oxybutynin, may help reduce the sudden urge to urinate. Limiting fluid intake after the evening meal and taking desmopressin at night can reduce episodes of night-time bedwetting.

Difficulties with swallowing and breathing eventually require that people with MSA use an artificial feeding tube or breathing tube.

Muscle spasms and contractures usually benefit from physical therapy that builds strength and encourages people to remain mobile for as long as possible.

What research is being done?

The National Institute of Neurological Disorders and Stroke (NINDS), a part of the National Institutes of Health, supports research on MSA through grants to major medical institutions across the country. In 2007, the NINDS sponsored a consensus conference that brought together experts from around the world to review and update the diagnostic criteria for MSA. These new diagnostic guidelines are helping doctors make quicker and more accurate diagnoses of MSA. A great deal of research is ongoing to learn why synuclein buildup occurs in MSA and Parkinson's disease, and how to prevent it.

Where can I find more information on MSA and Parkinson's disease?

For more information on neurological disorders or research programs funded by the National Institute of Neurological Disorders and Stroke, contact the Institute's Brain Resources and Information Network (BRAIN) at:

BRAIN

P.O. Box 5801
Bethesda, MD 20824
800-352-9424
www.ninds.nih.gov

The following organizations support MSA research and in some cases may be able to provide additional information:

CurePSP (Foundation for PSP|CBD and Related Brain Diseases)

30 E. Padonia Road
Suite 201
Timonium, MD 21093
410-785-7004
800-457-4777
www.curepsp.org

Dysautonomia Foundation

315 West 39th Street
Suite 701
New York, NY 10018
212-279-1066
www.familialdysautonomia.org

Familial Dysautonomia Hope Foundation, Inc.

121 South Estes Drive

Suite 205D

Chapel Hill, NC 27514

919-969-6636

www.fdhope.org

National Dysautonomia Research Foundation

P.O. Box 301

Red Wing, MN 55066-0301

651-267-0525

www.ndrf.org

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