

Alzheimer's Disease: Causes Symptoms Diagnosis and Management

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Abstract

Alzheimer's disease is a progressive neurodegenerative disorder and the most common cause of dementia among older adults. It affects memory, thinking, and behavior, gradually interfering with daily activities and independence. The disease is characterized by abnormal protein deposits in the brain, including amyloid plaques and neurofibrillary tangles, which lead to the loss of neurons and brain function. With the global increase in aging populations, Alzheimer's disease has become a major public health concern. Although there is currently no cure for the disease, early diagnosis and appropriate management strategies can help slow the progression and improve quality of life for affected individuals. This research article explores the causes, risk factors, symptoms, diagnosis, and treatment approaches associated with Alzheimer's disease. It also discusses preventive strategies and the importance of public awareness in addressing this growing neurological disorder.

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Introduction

Alzheimer's disease is a chronic and progressive brain disorder that gradually destroys memory, thinking ability, and the capacity to perform everyday tasks. It is the most common form of dementia, accounting for approximately 60–70% of dementia cases worldwide. The disease primarily affects older adults, although early-onset forms may occur in individuals younger than 65 years.

The condition was first described in 1906 by the German physician Alois Alzheimer, who identified abnormal brain changes in a patient suffering from memory loss and cognitive decline. Since then, extensive research has been conducted to understand the biological mechanisms behind the disease.

As global life expectancy increases, the number of people affected by Alzheimer's disease is expected to rise significantly. According to global health estimates, millions of individuals worldwide currently live with dementia, and Alzheimer's disease represents the majority of these cases [1].

Causes and Risk Factors

The exact cause of Alzheimer's disease is not fully understood, but it is believed to result from a combination of genetic, environmental, and lifestyle factors. Certain genetic mutations are associated with an increased risk of developing Alzheimer's

disease. Individuals with a family history of the disease may have a higher likelihood of developing it later in life. Age is the most significant risk factor. The risk of Alzheimer's disease increases substantially after the age of 65. Factors such as poor diet, lack of physical activity, smoking, and chronic stress may contribute to the development of Alzheimer's disease. Conditions such as hypertension, diabetes, obesity, and high cholesterol are associated with increased risk of cognitive decline and Alzheimer's disease.

Pathophysiology of Alzheimer's Disease

Alzheimer's disease is characterized by specific changes in the brain that lead to the loss of neurons and communication between brain cells. Amyloid plaques are abnormal deposits of beta-amyloid protein that accumulate between brain cells, disrupting cell communication. Neurofibrillary tangles are twisted fibers made of tau protein that build up inside neurons, causing cell damage and death. As the disease progresses, brain tissue shrinks due to the loss of neurons. Areas responsible for memory and learning, such as the hippocampus, are particularly affected [2].

Symptoms of Alzheimer's Disease

The symptoms of Alzheimer's disease develop gradually and worsen over time.

Severe memory loss

Loss of ability to communicate

Difficulty swallowing and walking

Complete dependence on caregivers

Diagnosis

Early diagnosis of Alzheimer's disease is important for effective management and care planning. Doctors evaluate symptoms, medical history, and cognitive abilities through various memory and thinking tests. Imaging techniques such as MRI and CT scans can help detect structural changes in the brain. Blood tests and other medical evaluations help rule out other conditions that may cause similar symptoms. Advances in research are improving diagnostic tools that may allow earlier detection of the disease [3].

Treatment and Management

Currently, there is no cure for Alzheimer's disease, but treatments can help manage symptoms and improve quality of life. Certain medications may temporarily improve memory and cognitive function by regulating neurotransmitters in the brain. Cognitive stimulation activities, memory exercises, and structured routines can help maintain mental functioning. Healthy lifestyle practices such as regular exercise, balanced diet, mental stimulation, and social engagement may help slow cognitive decline. Caregivers

play a critical role in supporting individuals with Alzheimer's disease. Counseling and support groups can help caregivers manage stress and provide better care.

Future Research and Challenges

Researchers worldwide are working to develop new treatments and diagnostic tools for Alzheimer's disease. Advances in genetics, neuroscience, and medical technology are improving the understanding of disease mechanisms. However, challenges remain, including the high cost of care, limited treatment options, and the emotional and financial burden placed on families and healthcare systems. Public awareness, early diagnosis, and investment in research are essential for addressing the growing impact of Alzheimer's disease globally [4].

Conclusion

Alzheimer's disease is a serious neurodegenerative disorder that significantly affects memory, cognitive abilities, and daily functioning. With the increasing aging population, the prevalence of Alzheimer's disease is expected to rise in the coming decades. Although there is currently no cure, early diagnosis, appropriate medical care, and supportive interventions can improve the quality of life for patients and their caregivers. Promoting healthy lifestyles, increasing public awareness, and advancing scientific research are key steps toward reducing the global burden of Alzheimer's disease [5].

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