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UNDERSTANDING THE EARLY SIGNS OF ALZHEIMER'S DISEASE AND TREATMENT

Keldiyarova Dinaraxon Otabek daughter

Student of Tashkent State Medical University

Annotation: This articleprovides an insightful overview of the initial symptoms and modern therapeutic approaches for Alzheimer's disease (AD). It emphasizes the importance of early detection, outlining hallmark early signs such as memory loss, difficulty in problem-solving, and confusion with time or place. The article delves into diagnostic advancements, including imaging techniques like PET and MRI and the emergence of blood-based biomarkers that enable earlier and more accurate diagnosis.

Key words: Alzheimer, protein, neurofibrillary, initial, severe, mild stage, donepezil.

Alzheimer's disease (AD) is a progressive, neurodegenerative disorder that affects the brain and leads to the gradual loss of cognitive functions, including memory, thinking, and reasoning. It is the most common cause of dementia, a general term for a decline in mental ability severe enough to interfere with daily life. Alzheimer's disease typically affects people aged 65 and older, though early-onset forms can occur before this age.

The causes of Alzheimer's disease remain poorly understood. There are many environmental and genetic risk factors associated with its development. The strongest genetic risk factor is from an allel of apolipoprotein E. Other risk factors include a history of head injury, clinical depression, and high blood pressure. The progression of the disease is largely characterized by the accumulation of malformed protein deposits

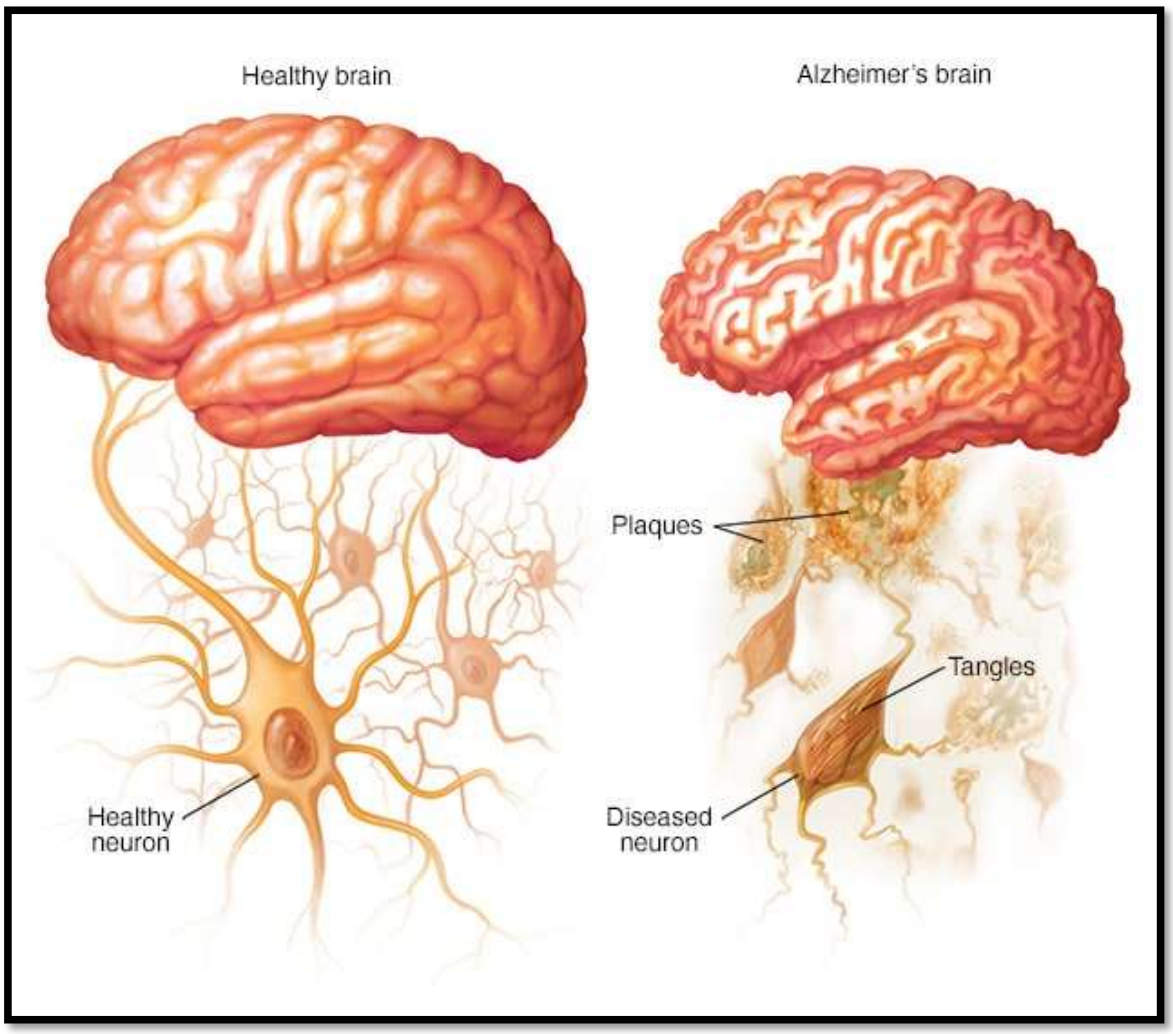
in the cerebral cortex, called amyloid plaques and neurofibrillary tanges. These misfolded protein aggregates interfere with normal cell function, and over time lead to irreversible degeneration of neurons and loss of synaptic connections in the brain. A probable diagnosis is based on the history of the illness and cognitive testing, with medical imaging and blood tests to rule out other possible causes. Initial symptoms are often mistaken for normal brain aging. Examination of brain tissue is needed for a definite diagnosis, but this can only take place after death.

Several factors can increase the risk of developing Alzheimer's disease:

- **Age**: The greatest risk factor, with the likelihood increasing as a person gets older.
- **Genetics**: The presence of certain genes, such as the APOE ε4 allele, increases the risk, though having the gene does not guarantee the disease.
- **Family history**: People with close family members who have Alzheimer's disease are at higher risk.
- **Gender**: Women are more likely to develop Alzheimer's than men.
- **Heart health**: Conditions like high blood pressure, diabetes, and high cholesterol can increase the risk.

Alzheimer's disease is believed to occur when abnormal amounts of amyloid beta (Aβ), accumulating extracellularly as amyloid plaques and tau proteins, or intracellularly as neurofibrillary tangles, form in the brain, affecting neuronal functioning and connectivity, resulting in a progressive loss of brain function. This altered protein clereance ability is age-related, regulated by brain cholesterol and associated with other neurodegenerative diseases. The cause for most Alzheimer's cases is still mostly unknown, except for 1–2% of cases where deterministic genetic differences have been identified. Several competing hypotheses attempt to explain

the underlying cause; the most predominant hypothesis is the amyloid beta (Aβ) hypothesis.



Early Signs and Symptoms

Alzheimer's disease begins with subtle changes, often difficult to notice at first. Early signs include:

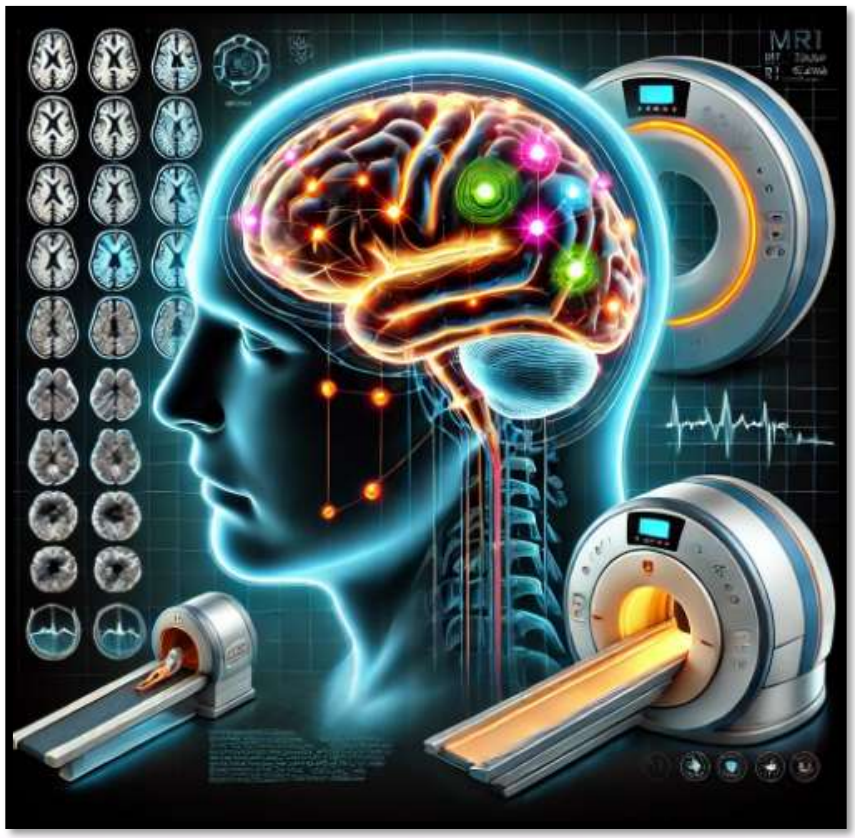
- **Memory loss**: Frequently forgetting recent conversations, appointments, or events.
- **Difficulty performing familiar tasks**: Trouble with daily activities such as

driving, cooking, or managing finances.

- **Disorientation**: Getting lost in familiar places or forgetting the time or date.
- **Language problems**: Difficulty finding the right words or following conversations.
- **Poor judgment**: Making uncharacteristic decisions, like poor financial choices.
- **Changes in mood and personality**: Becoming easily upset, confused, or anxious.
- **Loss of initiative**: Reduced interest in work, social activities, or hobbies.

Alzheimer's disease is diagnosed through a combination of medical history, cognitive tests, and imaging. There is no single test for Alzheimer's, but the following methods are commonly used:

- **Cognitive and neuropsychological tests**: To assess memory, problem-solving, attention, and language skills.
- **Brain imaging**: Techniques like MRI and PET scans can identify structural



changes in the brain, such as shrinkage or amyloid plaque buildup.

- **Blood tests**: Emerging blood-based biomarkers can now help in the early detection of Alzheimer's, especially in the context of genetic or family risk.
- **Genetic testing**: May be done to check for genes associated with early-onset



Alzheimer's.

Alzheimer's disease progresses through stages:

- **Mild (Early) Stage**: Symptoms are mild and often go unnoticed, with some memory loss and confusion.
- **Moderate (Middle) Stage**: Cognitive and behavioral symptoms become more pronounced, including difficulty with personal care, disorientation, and mood swings.
- **Severe (Late) Stage**: The person loses the ability to communicate, requires full

assistance with daily activities, and may lose physical abilities such as walking or swallowing.

Mild stage. In the early stage of Alzheimer's, a person may function independently. He or she may still drive, work and be part of social activities. Despite this, the person may feel as if he or she is having memory lapses, such as forgetting familiar words or the location of everyday objects.

Symptoms may not be widely apparent at this stage, but family and close friends may take notice and a doctor would be able to identify symptoms using certain diagnostic tools.

Common difficulties include:

- Coming up with the right word or name.
- Remembering names when introduced to new people.
- Having difficulty performing tasks in social or work settings.
- Forgetting material that was just read.
- Losing or misplacing a valuable object.
- Experiencing increased trouble with planning or organizing.

Moderate stage. Middle-stage Alzheimer's is typically the longest stage and can last for many years. As the disease progresses, the person with Alzheimer's will require a greater level of care.

During the middle stage of Alzheimer’s, the dementia symptoms are more pronounced. the person may confuse words, get frustrated or angry, and act in unexpected ways, such as refusing to bathe. Damage to nerve cells in the brain can

also make it difficult for the person to express thoughts and perform routine tasks without assistance.

Symptoms, which vary from person to person, may include:

- Being forgetful of events or personal history.
- Feeling moody or withdrawn, especially in socially or mentally challenging situations.
- Being unable to recall information about themselves like their address or telephone number, and the high school or college they attended.
- Experiencing confusion about where they are or what day it is.
- Requiring help choosing proper clothing for the season or the occasion.
- Having trouble controlling their bladder and bowels.
- Experiencing changes in sleep patterns, such as sleeping during the day and becoming restless at night.
- Showing an increased tendency to wander and become lost.
- Demonstrating personality and behavioral changes, including suspiciousness and delusions or compulsive, repetitive behavior like hand-wringing or tissue shredding.

In the middle stage, the person living with Alzheimer's can still participate in daily activities with assistance. It's important to find out what the person can still do or find ways to simplify tasks. As the need for more intensive care increases, caregivers may want to consider respite care or an adult day center so they can have a temporary

break from caregiving while the person living with Alzheimer's continues to receive care in a safe environment.

Severe stage. In the final stage of the disease, dementia symptoms are severe. Individuals lose the ability to respond to their environment, to carry on a conversation and, eventually, to control movement. They may still say words or phrases, but communicating pain becomes difficult. As memory and cognitive skills continue to worsen, significant personality changes may take place and individuals need extensive care.

At this stage, individuals may:

- Require around-the-clock assistance with daily personal care.
- Lose awareness of recent experiences as well as of their surroundings.
- Experience changes in physical abilities, including walking, sitting and, eventually, swallowing
- Have difficulty communicating.
- Become vulnerable to infections, especially pneumonia.

The person living with Alzheimer's may not be able to initiate engagement as much during the late stage, but he or she can still benefit from interaction in ways that are appropriate, like listening to relaxing music or receiving reassurance through gentle touch. During this stage, caregivers may want to use support services, such as hospice care, which focus on providing comfort and dignity at the end of life. Hospice can be of great benefit to people in the final stages of Alzheimer's and other dementias

and their families.

While there is no cure for Alzheimer's disease, several treatments can help manage symptoms:

- **Medications**: FDA-approved drugs aim to manage symptoms, including:
  - **Cholinesterase inhibitors** (Donepezil, Rivastigmine, Galantamine): Help improve communication between brain cells.
  - **NMDA receptor antagonists** (Memantine): Regulates glutamate, a neurotransmitter involved in learning and memory.
- **Monoclonal Antibodies**: New treatments, such as **Aducanumab** (Aduhelm), aim to target amyloid plaques, a hallmark of the disease.
- **Cognitive therapies**: These strategies help patients maintain cognitive function for as long as possible.
- **Supportive care**: A focus on maintaining quality of life through supportive measures, including home modifications and caregiver support.

Alzheimer’s disease is a progressive condition, meaning it worsens over time. On average, individuals live 4 to 8 years after diagnosis, although some may live as long as 20 years, depending on various factors like overall health and the quality of care provided. Alzheimer's disease is a devastating condition that impacts memory, thinking, and daily functioning. While there is currently no cure, advances in research and treatment provide hope for better management and potential future therapies. Early detection, a combination of medication, and lifestyle changes can improve quality of life and potentially slow the disease's progression.

References:

1. https://www.alz.org/alzheimers-dementia/stages

2. Abdurahinon N-tatnalqulovich va Shodiycv Amirqul Shodiycvich. NejToxirargiya [Main]: O'quv qo'llanma/ Mamadaliycv AM. Shodiyex A.Sh. - Saniarqand: Tibbiyot ko'zgusi. 2022/ 320 – bet.