Keywords used: early diagnosis of Alzheimer's

Problem: Alzheimer's disease is the primary cause of dementia. For decades, people have assumed dementia was an inevitable aspect of aging. Research indicates otherwise. With early detection, clinicians can promptly address brain insults and improve outcomes.

Solution: The study of Alzheimer's disease has advanced significantly in the last decade. This article will focus on new strategies for early diagnosis.

New Strategies for Early Diagnosis of Alzheimer's Disease

Alzheimer's disease is the primary cause of dementia, accounting for approximately 75% of cases globally. For decades, people have assumed dementia and Alzheimer's disease were inevitable aspects of aging. Recent findings indicate otherwise. Alzheimer's disease results from brain insults caused by genetic, lifestyle and environmental factors. Current methods of diagnosing rely on the documentation of mental decline. However, early stages of the disease are not apparent. By the time cognition wanes, significant brain injury already exists.

What if physicians could diagnose Alzheimer's before the onset of symptoms? With early diagnosis of Alzheimer's, clinicians can address the causes impacting neurological health. The hope is that with early detection and therapy, Alzheimer's rates will decrease.

Retirees will take that long-awaited vacation. Grandchildren will benefit from the wisdom of the ages. Children will continue working, knowing their parents are happy and healthy. Early diagnosis and intervention benefit everyone. Current research focuses on three innovative strategies for early detection of Alzheimer's disease: biomarkers, imaging and genetics.

Key Takeaways

- Alzheimer's disease is the primary cause of dementia, affecting more than 25 million individuals worldwide. Five million people receive a new diagnosis annually.
- Current diagnoses depend on documentation of cognitive decline. However, innovations in biomarkers, imaging and genetic profiling may facilitate diagnosis before symptom onset.
- Amyloid beta peptide and tau protein are two biomarkers in cerebrospinal fluid and plasma. They provide exciting promise for early detection.
- Brain imaging helps physicians visualize the structure and function of gray matter. Physicians use these tests to diagnose late-stage Alzheimer's. However, imaging focusing on specific brain locations may aid in early diagnosis.

• Genetic testing for the APOE-e4 gene is another innovation in Alzheimer's research. This test may motivate people to make healthy choices. However, it does not answer people's most pressing question, "Will I get Alzheimer's?"

Why early diagnosis of Alzheimer's disease is important

Physicians wonder, "Why focus on early diagnosis when pharmaceutical interventions are nonexistent?" Experts suggest that **it is possible to prevent or delay dementia** by addressing common risk factors:

- 1. Hypertension
- 2. Smoking
- 3. Obesity
- 4. Diabetes
- 5. Sleep apnea
- 6. Stress

Alzheimer's economic burden is growing. Treatment options are minimal. According to the National Institute of Health (NIH), early detection lessens the load, contains disease progression, and delivers the following benefits:

- Prevents or postpones dementia by modifying common risk factors
- Allows time for individuals to make care plans
- Provides motivating information to embrace neuron-benefiting lifestyle changes
- Results in cost savings for healthcare systems and families

Alzheimer's disease affects more than the person with the disease. It influences healthcare, social care and informal care. Most of the burden falls on informal caregivers or family members. Early diagnosis of Alzheimer's allows for personal advocacy and lifestyle modifications before it is too late.

Three innovative strategies for early detection

Diagnosing Alzheimer's currently depends on the documentation of mental decline. However, early diagnosis could offer clinicians a significant treatment advantage. Biomarkers, brain imaging and genetic testing are rightfully gaining attention. These innovative strategies provide hope in the fight against Alzheimer's.

Biomarkers

Biological markers, or biomarkers, provide exciting promise for early diagnosis. Two classic signs of Alzheimer's disease pathology are:

- 1. Amyloid beta peptide: found as extracellular plaque deposits
- 2. Tau protein: found as flame-shaped neurofibrillary tangles

Low amyloid beta in the cerebrospinal fluid (CSF) and plasma may indicate a decreased clearance of this protein from the brain. Experts believe an imbalance between production and clearance produces amyloid oligomers and plaque. These two characteristics are hallmarks of Alzheimer's disease.

Elevated tau protein in the CSF could also indicate Alzheimer's disease. These biomarkers could provide accurate, measurable and reliable information to diagnose early-stage Alzheimer's.

Brain imaging

Many medical practices use brain imaging for detecting Alzheimer's disease, and most Alzheimer's trials rely on these tools for research. However, no single test can rule out or diagnose this disease.

Structural

Brain shrinkage is a well-documented finding in people with Alzheimer's. However, **shrinkage in specific locations, like the hippocampus, may be an early indicator.**

Scientists have recently determined a standard brain volume. This guidance helps physicians recognize brain damage caused by neurodegenerative conditions. Magnetic resonance imaging (MRI) and computed tomography (CT) let physicians visualize the brain's volume, position and shape. These factors aid in early detection.

Functional

Patients with Alzheimer's disease typically have decreased brain cell activity in certain areas. This feature leads to less glucose and oxygen consumption in those locations. With functional imaging, providers and researchers can evaluate different brain regions. They can determine **if the brain is appropriately utilizing sugar and oxygen supplies.**

Medicare currently recommends fluorodeoxyglucose (FDG)-positron emission tomography (PET) for patients with six months of cognitive decline and a recent dementia diagnosis. However, many experts believe that earlier imaging is vital.

Molecular

Molecular imaging is one of the most targeted areas of Alzheimer's research. Like functional imaging, molecular imaging uses PET scans. These tests detect biological indicators before damage to structure or function occurs. **Highly targeted radiotracers help experts pinpoint chemical or cellular changes.** Molecular imaging may soon become an ordinary tool for monitoring the progression and treatment of Alzheimer's disease.

Genetic testing

People with a sibling or parent who has Alzheimer's disease worry that they also will suffer cognitive decline. A first-degree relative increases a person's risk of developing Alzheimer's disease. However, it does not guarantee the inheritance of the condition.

Risk genes are associated with a higher likelihood of developing the illness. **APOE-e4 is the risk gene with the most substantial impact**. Between 40% to 65% of people with Alzheimer's have this gene. Those with APOE-e4 inherited from both parents have the most significant risks. In the United States, 20%-30% of the population has at least one copy. Research indicates that 2% of Americans have two copies of this gene.

Genetic profiling is another innovation in Alzheimer's research. However, it does not answer people's most pressing question, "Will I get Alzheimer's?" Many people who have this risk gene never experience dementia symptoms. Consequently, The Alzheimer's Association does not recommend genetic testing for the general public.

Innovation that supports early diagnosis of Alzheimer's

More than 25 million people have dementia worldwide, and Alzheimer's disease causes 75% of these cases. More than 5 million people receive an Alzheimer's diagnosis annually. Recent research focuses on exploring innovative approaches to support early diagnosis of Alzheimer's. Biomarkers and neuroimaging help detect this disease in the early stages of development.

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Resources

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