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Alzheimer's: What You Need To Know

What is Alzheimer's disease?

Alzheimer's disease (AD) is defined as a gradually progressive dementia affecting both cognition and behavior.[1] Dementias are a group of symptoms that are characterized by losses in memory, reasoning, and overall cognitive ability.[1] AD, the most common cause of dementia, destroys neurons (specialized cells that carry messages throughout the brain) responsible for higher learning, memory, reasoning, behavior, and emotional control.[1,2,3,4] Structural abnormalities in the brain are a hallmark of AD. There are several neuronal pathways destroyed by AD, but the cholinergic pathway is among the most profoundly affected of all.[1,2] Cholinergic neurons are largely associated with the proper functioning of memory and cognition.[1,] Neurofibrillary tangles (NFT) and amyloid plaques are essential for the progression of AD; the NFT and amyloid plaques essentially destroy the neurons in the brain.

What causes Alzheimer's disease?

The exact cause of Alzheimer's is unknown, which makes it a difficult disease to treat. Genetics and environmental factors seem to be the most likely factors. Numerous gene alterations have been identified that may increase an individual's risk for developing AD. Those individuals with a parent or sibling with AD have a three and a half times greater risk of developing AD than those who do not.[5] Environmental factors such as stroke, alcohol abuse, severe head trauma, and lower levels of education have also been implicated. [6]

Who is affected?

AD affects approximately 10% of individuals older than 65 years of age and more than 50% of individuals older than 85 years of age.[7] AD currently affects approximately four million Americans, but experts agree that the incidence of AD is grossly under diagnosed and untreated.[3,7] The highest rates of AD are found in developing countries and African-American populations.[5]

How do I know if I have Alzheimer's disease?

There is no definitive diagnostic or laboratory test for AD. Any evaluation for AD should include a thorough patient history, physical exam, and neurological exam.[4] Diagnostic criteria for dementia of the Alzheimer's type include memory impairment along with one or more of the following: language disorder, problems planning or executing motor movements, loss of ability to recognize objects, and difficulty planning and organizing.[9] A thorough examination is paramount to rule out other types of dementia.

What can I do to augment my risk for developing AD?

While there is no "magic bullet" available to prevent AD, most experts believe there are certain steps individuals can take to reduce their risk. It is important that individuals take these steps early in life as opposed to after symptoms emerge. Experts believe it is important to control cardiovascular risk factors, quit smoking, stay physically and mentally active, effectively manage stress, protect against head trauma, and practice large and fine motor skills.[5]

Treatment

The current medications available to treat AD are moderately effective at best **(Table 1)**. Therapy is most successful when initiated early in the disease onset. AD affects an individual's cognitive ability, so it is important to closely monitor the use of sleeping and anti-anxiety medications and an individual's driving ability.[4] It is essential that a

power attorney be selected early in the process and caregivers are trained to assist the individual in activities of daily living.[4]

Cholinesterase inhibitors are considered the mainstay of AD treatment. Cholinesterase is a normally-occurring enzyme that breaks down excess amounts of the neurotransmitter acetylcholine. Acetylcholine is normally released by cholinergic neurons. In AD, these neurons are slowly destroyed, so there is already a deficit of acetylcholine. Combine this with the cholinesterase activity, and you have decreased acetylcholine leading to problems with memory and cognition. Cholinesterase inhibitors prevent this enzyme from breaking down all of the acetylcholine. These drugs have been shown to provide moderate improvement in cognitive performance.

The most common adverse effect with these drugs is nausea, which can be prevented by taking the medication with food and starting at a low dose and increasing the amount slowly. The members of this drug class include Aricept, Cognex, Exelon, and Reminyl. Cognex is rarely used anymore because of associated live problems.

The newest drug on the market, Namenda, belongs to a class of medications called the N-Methyl-D-Asparate Receptor Antagonists. One of the multiple mechanisms of AD is thought to be the over-stimulation of certain receptors in the brain which lead to cell death. Glutamate, an amino acid in the brain, is thought to stimulate these receptors. Namenda prevents Glutamate from stimulating the particular receptor by occupying the receptor space. Namenda can be used alone or in combination of a cholinesterase inhibitor. The most common adverse effect associated with Namenda is dizziness and confusion, so AD patients should be watched closely. Again, these adverse effects can be augmented if the dose is started low and increased slowly over time.

Unfortunately, AD patients suffer from more than cognitive loss. Depression occurs in 25 to 50 percent of patients, agitation in 50 to 70 percent, and psychosis in 30 to 60 percent.[4] Treatment of these symptoms is important and may improve the quality of life of the individual and his or her caregiver.

Table 1

Brand Name	Mechanism of Action	Dosing*	AWP (Per tab)
Aricept	Cholinesterase Inhibitor	10 mg daily	5 mg = $5.74 10 mg = $5.74
Cognex	Cholinesterase Inhibitor	20-40 mg four times daily	10 mg = $2.91 20 mg = $2.91
Exelon	Cholinesterase Inhibitor	3-6 mg twice daily	3 mg = $3.25 4.5 mg = $3.25 6 mg = $3.25
Namenda	N-Methyl-D-Asparate Receptor Antagonist	20 mg daily	Titration Pack = $2.58 10 mg = $2.58
Reminyl	Cholinesterase Inhibitor	8-12 mg twice daily	8 mg = $2.85 12 mg = $2.85

*These represent target doses. Some physicians prefer to slowly titrate the dose.

References:

1. Delfilippi JL, Crimson ML, Clark WR. Alzheimer's disease. In: Dipiro JT, Talbert RL, Yee GC, et al. eds. Pharmacotherapy, a pathophysiologic approach. 5th ed. New York, McGraw-Hill, 2002: 1165-1182.
2. Alzheimer disease. eMedicine. www.emedicine.com/neuro/topic13.htm. Access 2/22/06.
3. Zagaria ME. Alzheimer's disease: focus on early diagnosis and treatment. U.S. Pharmacist 2002; September supplement: S1-S6
4. Kawas CH. Early Alzheimer's disease. *New England Journal of Medicine 2003; 349:* 1056-1063.
5. Maddox R, Maddox S. Reducing the risk of Alzheimer's disease. U.S. Pharmacist 2005; March supplement: S1-S6.
6. Tsuang D, Larson E, Brown J, et al. The utility of apolipoprotein E genotyping in the diagnosis of Alzheimer's disease in community-based case series. *Arch Neurol. 1999; 56:* 1489-1495.
7. Women & Alzheimer's Disease. *National Women's Health Report.* National Women's Health Resource Center. 2004; 26: 1-8.
8. American Psychiatric Association. Diagnostic and Statistical Manual of mental Disorders. 4th ed. Washington, DC; 1994.