

Alzheimer's Disease 2008: Early Recognition and Treatment to Attenuate Disease Progression

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Objectives

Upon completion of this discussion, the participant will be able to:

- Identify those patient populations at risk for development of Alzheimer's disease.
- Differentiate clinically among Lewy Body dementia, Vascular dementia and Alzheimer's disease.



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Objectives

- Discuss tools employed to identify patients with Alzheimer's disease.
- Outline various pharmacological interventions designed to attenuate disease progression.
- State safety monitoring needed for pharmacological intervention.



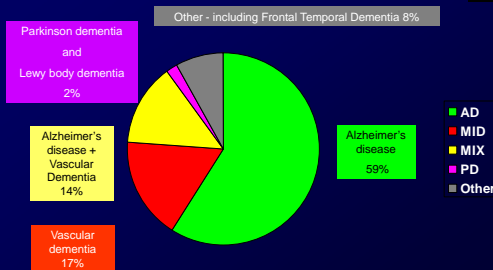
Dementia per DSM IV-R

- Mental disorder which involves deterioration in:
 - Mental functioning
 - Behavioral functioning
 - Emotional functioning

Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, Text Revision, American Psychological Association, American Psychiatric Publishing, 2000.



Types of Dementia



Boyle PA, Wilson RS, et al. Mild Cognitive impairment: risk of Alzheimer's disease and rate of cognitive decline. *Neurology*. 2006;67:441-5.



What is Alzheimer's Disease?

- Constitutes the most common dementia producing condition
- Progressive, neurodegenerative disease
- Characteristic brain abnormalities:
 - Amyloid plaques
 - Tangled bundles of fibers (neurofibrillary tangles) composed of misplaced proteins

National Institute of Neurological Disorders and Stroke, NINDS Disease Information Page available at: www.ninds.nih.gov/disorders/alzheimersdisease/alzheimersdisease.htm?cas=print.



Alzheimer's Disease: The Clinical Picture



- Characterized by
 - Memory impairment
- Eventual disturbances in
 - Cognitive function
 - Behavior
 - Function

Delagarza VW. Pharmacologic Treatment of Alzheimer's Disease: An Update
American Family Physician. 2003; 68 (7). Available at www.aafp.org/afp/20031001/1365.html.



The Impact of Alzheimer's

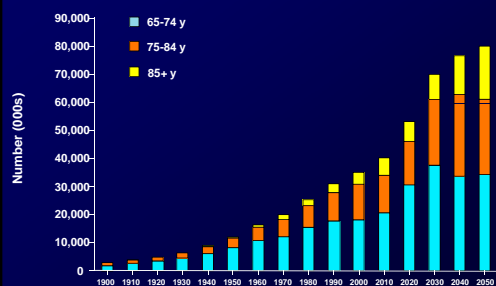


- 4.5 million Americans suffer from Alzheimer's Disease.
 - Number projected to be 14 million by year 2050
- Alzheimer's affects:
 - 5% of men and women aged 65 - 74 years
 - 50% of those 85 years of age and older

Fact Sheet. Alzheimer's Disease Foundation & Referral Center. US Department of Health
And Human Services; accessed 1-24-08 at www.alzheimers.nia.nih.gov.



Number of Persons Over Age 65 in US with Alzheimer's



US Census Bureau.



Who Develops Alzheimer's?



- Age is a significant risk factor:
 - 2% - 5% of individuals with Alzheimer's are in their 40's and 50's
 - 10% are individuals over > 65 years
 - Increases substantially after the age of 70
 - Not a normal part of aging

Stern Y. Cognitive reserve and Alzheimer's disease. *Alzheimer Dis Assoc Disord* 2006;20:112-7.



Genetic Link



- 4 major types of familial Alzheimer's disease have been identified:
 - Types 1, 3 and 4 are classified as early onset
 - Signs and symptoms often appear before age 65
 - Type 2
 - Late onset with signs and symptoms after age 65
 - Other cases of Alzheimer's disease are classified as sporadic or non familial
 - 75% of cases
 - Majority develops after age 65

<http://ghr.nlm.nih.gov/condition=alzheimerdisease> assessed 2-3-08



Genetic Link



- Early onset familial forms of AD (Types 1, 3 & 4) are believed to be inherited in an autosomal dominant pattern.
 - One copy of the altered gene in each cell is sufficient to cause the disorder.
 - In most cases, the affected person inherits the altered gene from one affected parent.

<http://ghr.nlm.nih.gov/condition=alzheimerdisease> assessed 2-3-08



Modifiable Risk Factors



- Hypertension
- Coronary artery disease
- Diabetes
- Elevated cholesterol
- History of depression
- Closed head injury
- Lower education level

Boyle PA, Wilson RS, et al. Mild Cognitive impairment: risk of Alzheimer's disease and rate of cognitive decline. *Neurology*. 2006;67:441-5.

Pathophysiology



Primary Microscopic Changes



- Two microscopic changes occur in the brain in those with Alzheimer's disease
 1. Senile plaques develop between neurons
 2. Neurofibrillary tangles develop within the neurons

Delagarza VW. Pharmacologic Treatment of Alzheimer's Disease: An Update. *American Family Physician*. 2003; 68 (7). Available at www.aafp.org/afp/20031001/1365.html.

Pathophysiology



- Involvement of the cholinergic neurons causes levels of acetylcholine within synapses to decline.
- Levels of acetylcholinesterase also drop, perhaps to compensate for the loss of acetylcholine.
- Butylcholinesterase increases (cholinesterase enzyme)
 - Significant portion of acetylcholine is metabolized by this enzyme – the disease progresses faster as a result of this process.

Delagarza VW. Pharmacologic Treatment of Alzheimer's Disease: An Update. *American Family Physician*. 2003; 68 (7). Available at www.aafp.org/afp/20031001/1365.html.

Glutamate



- Glutamate is another important brain chemical that, when produced in excessive amounts, may lead to brain cell death.
- Believed to play a significant role in the development of Alzheimer's disease

Differential Diagnosis: Dementia



Many Older Adults Have Multiple Etiologies of Dementia



- A significant number of older individuals on autopsy have brain pathology such as plaques, tangles, and vascular infarcts.
- Those with dementia most often have multiple brain pathologies i.e. vascular infarcts + tangles suggestive of Alzheimer's
- Presence of these abnormalities greatly increases risks of dementia

Schneider JA, et al. *Neurology* 2007;69:2197-2004



Most Have Additional Pathology



- 141 autopsies were conducted in people who were longitudinally followed in the Rush Memory and Aging Project.
- Fifty percent of those with Alzheimer's had multiple etiologies
 - 30% had pure Alzheimer's disease
 - 38% had Alzheimer's disease and infarcts
 - 12% had Vascular dementia
 - 12% Lewy Body/Parkinson's

Schneider JA, et al. *Neurology* 2007;69:2197-2004



Vascular Dementia



- Once thought to be responsible for 15% -20% of dementia cases – now viewed as much less common
 - Primarily caused by either multi-infarcts OR
 - Binswager's Disease – *subcortical vascular dementia*, is a type of dementia caused by widespread, microscopic areas of damage to the deep layers of white matter in the brain.
 - Impact on tiny arteries in the midbrain.

Gebrestsadik M, Grossberg GT. Is it Alzheimer's? How to pare down the possibilities. *Current Psychiatry*. 2007;7: (1): 53-71.



Vascular Dementia



- Clinical picture:
 - Sudden onset, stepwise deterioration
 - Difficulty retrieving words, organizing and solving complex problems, "absent mindedness", psychomotor slowing
 - Relatively preserved language skills
 - More depressive component
 - Numerous cerebrovascular/CV risk factors
 - MRI: Report of periventricular white matter disease

Gebrestsadik M, Grossberg GT. Is it Alzheimer's? How to pare down the possibilities. *Current Psychiatry*. 2007;7: (1): 53-71.



Lewy Body Dementia



- **Lewy Body Dementia**
 - Found in brains of individuals with both Parkinson's disease and Alzheimer's
 - Also present in absence of disease (Lewy Body variant)
 - 20% of those diagnosed with Alzheimer's actually have this form of dementia

Lippa CF, McKeith I. Dementia with Lewy bodies: Improving diagnostic criteria. *Neurology* 2003; 60: 1571-1573
Boyle PA, Wilson RS, et al. Mild Cognitive impairment: risk of Alzheimer's disease and rate of cognitive decline. *Neurology*. 2006;67:441-5.



Lewy Body Dementia: Clinical Picture



- Dementia presents first – followed then by physical changes
- Recurrent visual hallucinations and delusions
- Often walks with a stoop (similar to Parkinson's)
- Frequent falls are common
- Has more fluctuating attention problems
- Increased sensitivity to conventional anti-psychotics
- Performs better on verbal recall than patients with Alzheimer's
- Poor organization skills

Morris JC. Dementia update 2005. *Alzheimer's Dis Assoc Disor*. 2005;19:100-117.



Parkinson's Dementia



- Dementia is about 6x more common in the elderly patient with Parkinson's than in the average older adult.
- More common in the older patient who develops Parkinson's compared with the younger onset patient
- Most likely to occur in older patients who have had major depression.

Boyle PA, Wilson RS, et al. Mild Cognitive impairment: risk of Alzheimer's disease and rate of cognitive decline. *Neurology*. 2006;67:441-5.

Parkinson's Dementia



- Clinical picture
 - Physical changes occur first – followed then by dementia
 - Language is usually not affected in Parkinson's dementia
 - Visual hallucinations may occur in 1/3 of patients on long term medications designed to decrease the symptoms of Parkinson's disease.

Boyle PA, Wilson RS, et al. Mild Cognitive impairment: risk of Alzheimer's disease and rate of cognitive decline. *Neurology*. 2006;67:441-5.

Mild Cognitive Impairment



- A period of decline in memory that is clearly worse than baseline, yet still does not meet criteria for dementia.
- MCI is demonstrated on formal neuropsychological testing and patients suspected should be referred for this evaluation.

Rasquin SM, Lodder J, Visser FJ, et al. Predictive accuracy of MCI subtypes for AD and vascular dementia in Subjects with MCI: a 2 year follow up study. *Dement Geriatr Cogn Disord*. 2005;19(2-3):113-19.

Mild Cognitive Impairment



- Many patients with MCI will on to meet AD criteria within 5-10 years but can also progress on to other forms of dementia
- 80% of those initially diagnosed with MCI will prove to have AD on post mortem examination

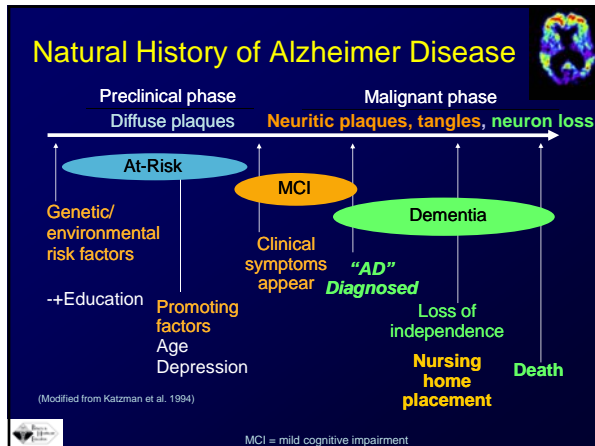
Mild Cognitive Impairment



- May have history of:
 - Untreated or inadequately treated depression
 - Drug abuse
 - Thyroid disease
 - Severe Vitamin B12 deficiency
 - Brain tumors

Boyle PA, Wilson RS, et al. Mild Cognitive impairment: risk of Alzheimer's disease and rate of cognitive decline. *Neurology*. 2006;67:441-5.

Diagnosis



Alzheimer's Dementia DSM IV-R

- The development of multiple **cognitive** deficits manifested by both:
 - **Memory impairment** and
 - One (or more) of the following four **cognitive disturbances**:

Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, Text Revision, American Psychological Association, American Psychiatric Publishing, 2000.

Alzheimer's Dementia DSM IV-R

- Aphasia** (language disturbance)
- Apraxia** (impaired ability to carry out motor activities despite intact motor function)
- Agnosia** (failure to recognize or identify objects despite intact sensory function)
- Executive function** disturbance (e.g., planning, organizing, sequencing, abstracting)

Diagnosis of Alzheimer's

- Alzheimer's disease cannot be definitely diagnosed until after death, when the brain can be closely examined for certain microscopic changes consistent with the disease.
- With thorough testing and a comprehensive work-up, practitioners today can accurately diagnose Alzheimer's disease with an almost 90% accuracy.

1. Alzheimer's Disease Education and Referral Center (ADEAR); National Institutes of Aging, National Institutes of Health, US Department of Health and Human Services.
2. Cummings, J.L. Clinical evaluation as a biomarker for Alzheimer's Disease. *J Alzheimer's Dz* 2005;8:327-37.

Diagnosis of Alzheimer's

- Complete history and physical examination
- Focus on the following:
 - Family history
 - Psychological history
 - Fall/trauma history
- Mental status and neuropsychological assessments
 - **Cognitive functions**
 - Attention
 - Learning
 - Recall
 - Language
 - Visual-spatial abilities

Hodges JR. Alzheimer's centennial legacy: origins, landmarks and the current status of knowledge concerning cognitive aspects. *Brain*. 2006;129:2811-22.

Diagnosis of Alzheimer's

- Interview family members and close associates of patient, if available and/or patient agrees
 - **Patient's emotional state**
 - Day to day routines
 - Possible alcohol/drug abuse
 - Possible trauma to the head
- Psychiatric assessments
 - **Uncover possible depression**
 - **Other mental illnesses**

Hodges JR. Alzheimer's centennial legacy: origins, landmarks and the current status of knowledge concerning cognitive aspects. *Brain*. 2006;129:2811-22.

Recommended Lab Tests

Test	Rationale
CBC	Anemia and signs of infection
Vitamin B 12	Related to reversible dementia, anemia
Folate	Related to reversible dementia, anemia
Homocysteine**	More accurate than individual B12 /folate
C reactive protein**	Ongoing inflammatory reaction
Thyroid function	Hypothyroidism – reversible dementia
Liver function	Metabolic causes of cognitive impairment
Renal function	Uremia, metabolic causes of dementia
Electrolytes and Serum calcium	Hypo/hyernatremia/hypo/hypercalcemia
Glucose	Hypoglycemia
Lipid panel	Vascular dementia risk factor
Baseline EKG	Cardiac abnormalities as vascular risk
RPR	Syphilis

Gebrestsadik M, Grossberg GT. Is it Alzheimer's? How to pare down the possibilities. *Current Psychiatry*. 2007;7: (1): 53-71.

Additional Diagnostic Testing

- CT
 - Changes in later stages of AD
 - Reduction of the size of the brain (atrophy)
- MRI
 - Rule out other causes of dementia (tumors, CVA)
 - May see structural and functional changes associated with AD
- PET or SPECT scanning
 - Difference in brain activity between a normal brain and AD
 - Can help differentiate AD from other forms of dementia
- Other diagnostics as needed
 - Neuropsychiatric evaluation
 - CSF fluid analysis

Hodges JR. Alzheimer's centennial legacy: origins, landmarks and the current status of knowledge concerning cognitive aspects. *Brain*. 2006;129:2811-22.

Differential Diagnosis

- Delirium
- Infectious Diseases
 - Chronic syphilis
 - Chronic HIV
 - Chronic fungal meningitis

Gebrestsadik M, Grossberg GT. Is it Alzheimer's? How to pare down the possibilities. *Current Psychiatry*. 2007;7: (1): 53-71.

Differential Diagnosis

- Side effects of medications
 - Benzodiazepines
 - Barbiturates
 - Anticholinergics
 - Opioid analgesics
 - Antihypertensives
 - Antidepressants
 - Anticonvulsants
 - Antiarrhythmics
 - Digitalis

Differential Diagnosis

- Screening for other disorders that can cause dementia
 - Parkinson's disease
 - Cerebrovascular disease
 - CVA
 - Brain tumor
 - Subdural hematoma
 - Multiple sclerosis

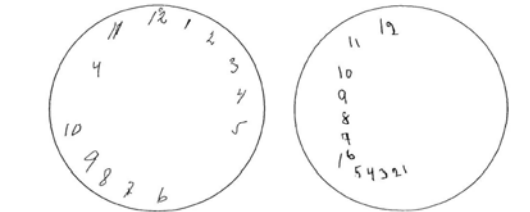
Hodges JR. Alzheimer's centennial legacy: origins, landmarks and the current status of knowledge concerning cognitive aspects. *Brain*. 2006;129:2811-22.

Clock Draw Test

- Used for screening for cognitive impairment and dementia
- Measure of spatial dysfunction and neglect
- Originally used to assess visuo-constructive abilities
 - Abnormal clock drawing occurs in individuals with Alzheimer's as well as other cognitive impairments

Freedman MI, Leach L, et al. Clock Drawing. Oxford University Press. 1994

Clock Draw Test



76 year old with AD; MMSE = 17
Needs direction to function but can respond appropriately to instruction

79 year old with VaD; MMSE = 19
Needs assistance to function; can't respond to direction alone

Agreil A, Dehlin, O. The Clock drawing test. *Age and Ageing* 1998;27:399-403.

Stages of Alzheimer's Disease

Early-stage Alzheimer's (Mild)

- Memory loss or other cognitive deficits are noticeable.
- Individual can compensate
- Individual can continue to function independently.

Alzheimer's Disease Education and Referral Center (ADEAR); National Institutes of Aging, National Institutes of Health, US Department of Health and Human Services

Mild Stage Behaviors

- Cognitive and memory problems begin to appear
 - Confusion
 - Forgets names and words; might make up words, or quit talking to avoid mistakes
 - Repeats questions, phrases or stories, *in the same conversation*
 - Forgets their own history, recent personal events, and current events
 - Less able to plan, organize, or think logically

Alzheimer's Disease Education and Referral Center (ADEAR); National Institutes of Aging, National Institutes of Health, US Department of Health and Human Services

Behaviors – Mild Stage

- Communication problems are observed...
 - May converse “normally” until a memory lapse occurs
 - Begins to have difficulty expressing self
 - Even if unable to speak well
 - can respond to what you tell them--to your emotional reactions, and to humor
 - Increasing difficulty comprehending reading material

Alzheimer's Disease Education and Referral Center (ADEAR); National Institutes of Aging, National Institutes of Health, US Department of Health and Human Services

Behaviors – Mild Stage

- Personality changes are evident...
 - Apathetic, withdrawn, avoids people
 - Anxious, irritable, agitated
 - Insensitive to others' feelings
 - Easily angered when
 - frustrated, tired, rushed, or surprised

Alzheimer's Disease Education and Referral Center (ADEAR); National Institutes of Aging, National Institutes of Health, US Department of Health and Human Services

Behaviors – Mild Stage

- Idiosyncratic behaviors start to develop...
 - Hoards, checks, or searches for objects of little value
 - Forgets to eat or eats constantly

Alzheimer's Disease Education and Referral Center (ADEAR); National Institutes of Aging, National Institutes of Health, US Department of Health and Human Services

Mid-stage Alzheimer's (Moderate)

- Memory loss or other cognitive deficits are noticeable
 - Person can compensate for them and continues to function independently
- Mental abilities decline
 - Physical problems develop so that the person becomes more and more dependent

Alzheimer's Disease Education and Referral Center (ADEAR); National Institutes of Aging, National Institutes of Health, US Department of Health and Human Services

Behaviors - Moderate

- Significant cognitive decline and memory problems continue...
 - Increasing difficulty in sorting out names and faces of family and friends
 - can still distinguish familiar from unfamiliar faces
 - Still knows their own name
 - no longer remembers their own address or phone

Alzheimer's Disease Education and Referral Center (ADEAR); National Institutes of Aging, National Institutes of Health, US Department of Health and Human Services

Behaviors - Moderate

- Significant cognitive decline and memory problems continue...
 - Can no longer think logically or clearly.
 - Can't organize their own speaking or follow others' logic.
 - Can no longer follow written or oral instructions or a sequence of steps.
 - Arithmetic and money problems escalate.
 - Disoriented about
 - the season, the day of the week, the time of day

Alzheimer's Disease Education and Referral Center (ADEAR); National Institutes of Aging, National Institutes of Health, US Department of Health and Human Services

Behaviors - Moderate

- Impaired communication skills worsen...
 - Problems with speaking, understanding, reading, and writing
 - Repeats stories, words, and gestures; repetitive questions
 - Problems with finishing sentences

Alzheimer's Disease Education and Referral Center (ADEAR); National Institutes of Aging, National Institutes of Health, US Department of Health and Human Services

Behaviors – Moderate

- Personality changes become more significant
 - Apathetic, withdrawn
 - Anxious, agitated
 - Suspicious and / or paranoid
 - May accuse spouse of having an affair
 - Frequently accuse family members of stealing
 - Delusions and hallucinations.
 - May hear, see, smell, or taste things that aren't present

Alzheimer's Disease Education and Referral Center (ADEAR); National Institutes of Aging, National Institutes of Health, US Department of Health and Human Services

Late-stage Alzheimer's (Severe)

- Mental abilities decline
- Personality changes
- Physical problems develop
- Complete deterioration of the personality
- Loss of control over bodily functions
 - requires total care for most basic activities of daily living.

Alzheimer's Disease Education and Referral Center (ADEAR); National Institutes of Aging, National Institutes of Health, US Department of Health and Human Services

Behaviors – Severe Stage

- Communication skills are nearly gone...
 - Appears uncomfortable
 - Cries out when touched or moved
 - Can no longer smile
 - Either doesn't speak or speaks incoherently, with just words or phrases
 - Can't write or comprehend reading material

Alzheimer's Disease Education and Referral Center (ADEAR); National Institutes of Aging, National Institutes of Health, US Department of Health and Human Services

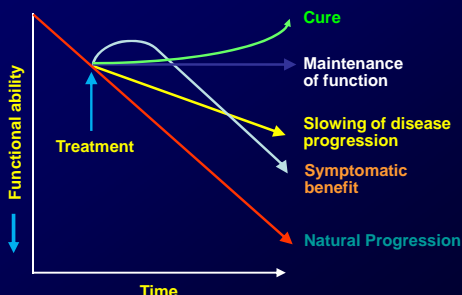
Behaviors- Severe Stage

- Voluntary control of the body increasingly disappears...
 - Complete urinary and bowel incontinence
 - Cannot walk, stand, sit up, or hold up head without assistance.
 - Cannot swallow easily and may choke on food
 - Cannot move voluntarily

Alzheimer's Disease Education and Referral Center (ADEAR); National Institutes of Aging, National Institutes of Health, US Department of Health and Human Services

Pharmacological Interventions

Treatment Outcomes in Alzheimer's Disease



Pharmacotherapy

- Currently FDA approved medications for Alzheimer's disease are not disease modifying drugs.
 - Current medications slow progression
- 2 classes of medications for the treatment of patients with Alzheimer's disease
 - Acetylcholinesterase inhibitors
 - NMDA receptor blockers

Delagarza VW. Pharmacologic Treatment of Alzheimer's Disease: An Update *American Family Physician*. 2003; 68 (7). Available at www.aafp.org/atp/20031001/1365.html.

Medications

- Purpose of medication
 - Reduce the symptoms and slow progression of Alzheimer's
 - Slow cognitive and functional decline
 - Delay/stabilize behavioral problems
 - Delay entrance into long-term care facilities
 - Reduce caregiver burden

Delagarza VW. Pharmacologic Treatment of Alzheimer's Disease: An Update
 American Family Physician. 2003; 68 (7). Available at www.aafp.org/afp/20031001/1365.html.

Medications - Overview

- Cholinesterase Inhibitors
 - With Alzheimer's, there is a dramatic drop in level of acetylcholine (message transmission)
 - Attention and memory impacted by low levels of acetylcholine
 - Blocking the breakdown of acetylcholine may help improve cognitive and neuropsychiatric symptoms or slow progression
 - May positively affect the long-term course of AD

Delagarza VW. Pharmacologic Treatment of Alzheimer's Disease: An Update
 American Family Physician. 2003; 68 (7). Available at www.aafp.org/afp/20031001/1365.html.

Acetylcholinesterase Inhibitors

Drug	Actions	Dosage	Target Dose	Min Dose	Cost
Donepezil (Aricept)	ACH inhibitor	Start 5mg daily @ HS; after 6 weeks increase to 10mg daily	10 mg once daily	5 mg daily	\$176 ODT/\$160 oral month
Rivastigmine (Exelon)	ACH inhibitor Butylcholinesterase inhibitor (Alzheimer's & Parkinson's Dementia)	Start 1.5 mg bid with food; at 2 week intervals increase dose by 1.5 mg up to a dose of 6mg twice daily	6 mg bid	3mg bid	\$185/capsules ; patch \$193 month
Galantamine (Razadyne ER)	ACH inhibitor Nicotinic receptor actions	Start at 8mg daily with food; at 4 week intervals increase each dose to 16 mg once daily; after 4-5 weeks to 24 mg once daily	6-24 mg a day	6 mg daily	\$178 month

Source: Product Inserts

Alternative Delivery System

- Donepezil ODT (Aricept)
 - A bioequivalent of Aricept tablets
 - Indicated: mild, moderate or severe dementia of the Alzheimer's Type
 - Allow tablet to dissolve completely on tongue and follow with water
 - 5mg and 10 mg tablets

Product insert accessed 2-1-08

Alternative Delivery Systems

- Rivastigmine Patch (Exelon Patch) is a new drug delivery system
- Dosing:
 - Initially 4.6 mg/24 hours
 - Increase in 4 weeks to 9.5mg/24 hours
- Maintenance dose is 9.5 mg/24 hours
- Patch is applied and old one removed every 24 hours

Product insert accessed 01-12-08

Delays nursing home placement

- Treating dementia patients with cholinesterase inhibitors delays placement into nursing homes and provide improved quality of life while sparing personal and societal resources¹
- These studies provided evidence that treatment can delay nursing home placement by an average of three and a half months or greater²
- Studies indicated no differences among medications²

1. <http://usfnnews.usf.edu/page.cfm?link=article&aid=1439> assessed 2-8-08

2. Knopman D, Schneider I, et al. Long term tacrine treatment: effects on nursing home placement and Mortality, Tacrine Study Group. Neurology 1996;47:166-77.
 Reuters Health News. Donepezil delays nursing home placement. Accessed April 2003 at: http://www.druginfo.com/Org/docs/pcjw_5111_edition_in.pdf.

Improves disturbed behaviors



- A galantamine (Razadyne) trial reported statistically significant improvement in the neuropsychiatric inventory (NPI).
- A subsequent trial of donepezil suggested benefit.
- Study (CALM-AD) study showed no benefit

Tariot PN, Solomon PR, et al. A 5-month, randomized, placebo controlled trial of galantamine in AD. The Galantamine USA 10- Study Group. *Neurology* 2000;54:2269-76.
Feldman H, Gauthier, S, et al. A 24 week, randomized, double-blind study of donepezil in moderate to severe AD. *Neurology* 2001;57:613-20.



Medications - Overview



- Memantine (Namenda)
 - Approved for the treatment of moderate to severe Alzheimer's disease
 - Blocks NMDA receptors – which helps to regulate glutamate
 - Glutamate essential for information retrieval and memory
 - Overstimulation of NMDA receptors has a negative impact on neurons

Delagarza VW. Pharmacologic Treatment of Alzheimer's Disease: An Update. *American Family Physician*. 2003; 68 (7). Available at www.aafp.org/atp/20031001/1365.html.



Combination Therapy



- Combination of an Acetylcholinesterase inhibitor + NMDA receptor
- Gold standard of therapy
- Very effective combination
- Studies have shown improved cognition with combination therapy beyond what either product produces individually

Hartmann S, Möbius HJ (2003). *International Clinical Psychopharmacology*, 18 (2): 81-5
Geerts H, and Grossberg GT. *J Clin Pharmacol*. 2006; 46: 8S-16S



Additional Treatment Options



- Antipsychotics or Neuroleptics
- Antidepressants and Anxiolytics

Delagarza VW. Pharmacologic Treatment of Alzheimer's Disease: An Update. *American Family Physician*. 2003; 68 (7). Available at www.aafp.org/atp/20031001/1365.html.



Summary



- Alzheimer's Disease is a slowly developing disease which initially eludes most healthcare providers
- This disease can be identified with approximately 90% accuracy.
- Medications can slow progression and assist with behavior control; they can not prevent or stop it.
- Acetylcholinesterase inhibitors and NMDA inhibitors are indicated to attenuate progression of the disease.
- Combination therapy is the gold standard of therapy



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Resources



Resources



- Alzheimer's Disease Education and Referral Center
 - adear@nia.nih.gov
- Alzheimer's Association
 - info@alz.org
- National Organization for Rare Disorders
 - orphan@rarediseases.org
- National Institute of Mental Health
 - nimhinfo@nih.gov
- Alzheimer's Foundation of America
 - info@alzfdn.org
- Family Caregiver Alliance/National Center on Caregiving
 - info@caregiver.org

