

Alzheimer's Disease And Neuropsychology

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Objectives

- AD Statistics
- Neuropathology
- Neuropsychological Function
- Signs and Symptoms
- Interventions, Resources, and Considerations
- Clinical Case
- Questions



Alzheimer's Disease

Dementia: decline in
cognitive ability

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graph TD; A[Dementia: decline in cognitive ability] --> B[1 Alzheimer's Disease]; A --> C[2 Lewy Body Dementia]; A --> D[3 Vascular/Stroke Dementia]; A --> E[Parkinson's Disease Dementia];
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¹Alzheimer's
Disease

²Lewy Body
Dementia

³Vascular/Stroke
Dementia

Parkinson's
Disease
Dementia

Latina/o(s) and Dementia

1.5 times more likely to develop dementia

Living
Longer

High rates
of CVA risk
factors

Education

SES

AD Statistics

- 5% of people over age 65 have symptoms with AD
- Average age of diagnosis: 74.7 years
 - Range: between 70-79
- Approximately 5% have a familial variant of AD
 - Early-onset and have more rapid decline
 - Symptoms present between the ages of 40 and 60
- Estimated-25% and 50% of individuals older than age 85 meet criteria for AD

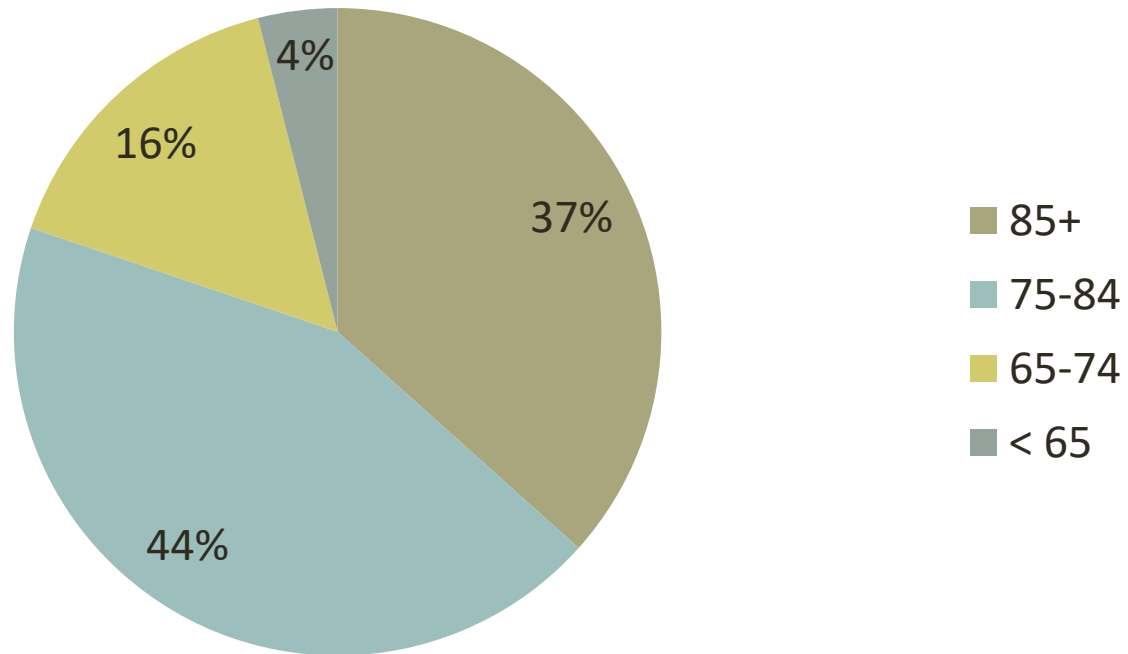


AD Statistics

- 5.7 million people in the United States with AD in 2018
 - 5.5 million people age 65 or older
 - Approximately 200,000 individuals under age 65
- Texas
 - 2018-380,000
 - 2025-490,000
 - Percent increase from 2018-2025: 28.9%
- 1 in 10 adults age 65 or older has AD
- Every 65 seconds someone in the US develops AD
- Every 33 seconds by 2050

AD Statistics

Alzheimer's Disease



AD Gender Differences

- More women than men have AD or other dementias
- Almost two-thirds of Americans with AD are women
- Of the 5.5 million people age 65 and older with AD
 - 3.4 million are women
 - 2.0 million are men
- Among people age 71 and older with AD or other dementias
 - 16% women
 - 11% men
- Lifetime Risk
 - Age 45: 20% for women and 10% for men
 - Age 65: 21% for women and 12% for men

AD Gender Differences

- Potential biological and social reasons
- Women live longer than men on average
 - Older age is the greatest risk factor for AD
- “Survivor bias”
 - Suggests that because men in middle age have a higher rate of death from cardiovascular disease than women in middle age, men who survive beyond age 65 may have a healthier cardiovascular risk profile and thus an apparent lower risk for dementia than women of the same age
 - More research is needed to support this finding

Duration of illness

- People age 65 and older with AD
 - Survive an average of 4 to 8 years after diagnosis
 - Up to 20 years with AD
- Average of 40% of this time in dementia's most severe stage
- Much of the time will be spent in a nursing home
- At age 80, approximately 75% of people living with AD are expected to be in a nursing home
 - Compared with only 4% of the general population at age 80
- Estimated two-thirds of those who die of dementia do so in nursing homes
 - Compared with 20% of people with cancer
 - 28% of people dying from all other conditions

Mortality and Morbidity

- 6th leading cause of death in US
 - 5th leading cause of death for those age 65 or older
- 6th leading cause of death in Texas
 - 8,904 deaths in 2015
 - 180% increase in AD deaths since 2000
- 1 in 3 seniors dies with AD or another dementia
- Severe dementia frequently causes complications
 - Immobility, swallowing disorders, and malnutrition
 - Pneumonia
 - Most commonly identified cause of death among elderly people with AD or other dementias

AD Risk Factors

- Older age: typically over 60 is the single largest known risk factor
- First-degree family member with AD increases risk
- CVA risk factors
- Moderate to severe TBI
- Concurrent small vessel/CVA disease
- Lower education and/or lower cognitive reserve

Modifiable factors

- Regular physical activity
- Management of cardiovascular risk factors
 - Diabetes, obesity, smoking, and hypertension
- Healthy diet
- Education (cognitive reserve)
- Social and cognitive engagement
- Avoid head injury (moderate and severe TBI)

Neuropathology

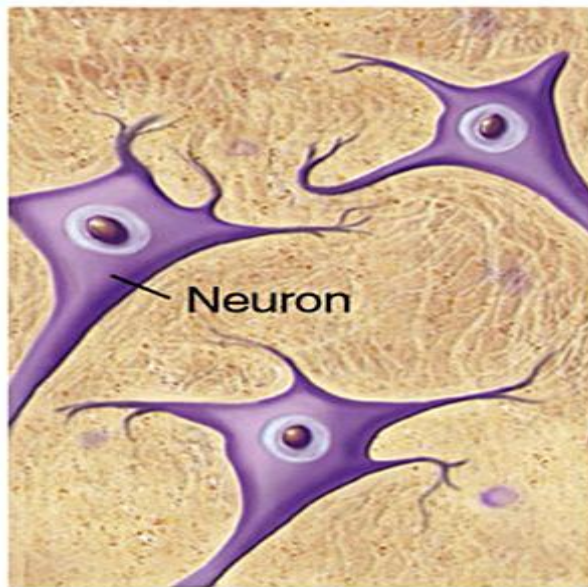
- Amyloid plaques and neurofibrillary tangles are two most common markers of AD in the brain
- Reduction in production to various neurotransmitters
 - Acetylcholine
 - Serotonin and norepinephrine
- Progression follows a temporal-to-frontal spread
 - Medial temporal lobes implicated in early stages
 - Entorhinal cortex and hippocampus
 - Spread to the parietal and frontal lobes
 - Eventually consume most of the neocortex
- Temporal lobe and association areas where most atrophy occurs



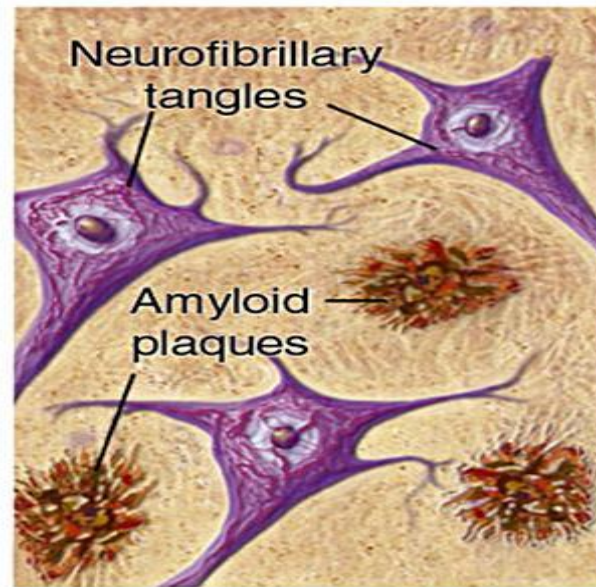
Neuropathology

Normal vs. Alzheimer's Diseased Brain

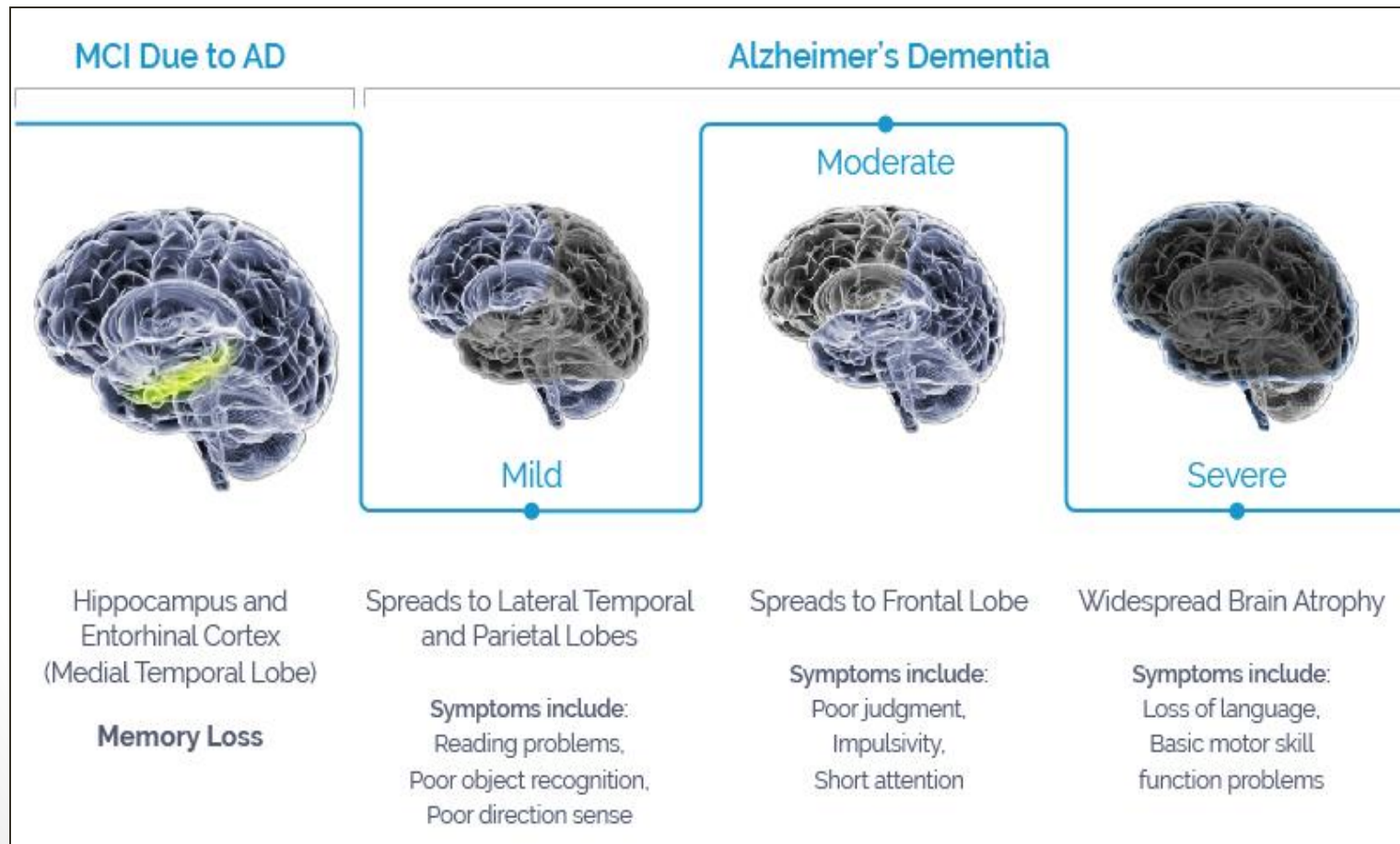
Normal



Alzheimer's



Neuropathology



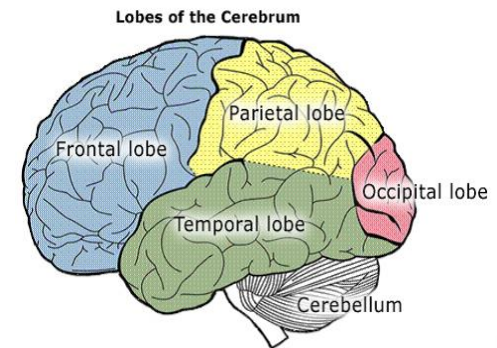
Genetics

- First-degree family member with AD increases the risk
- Early-onset familial AD has been implicated with a mutation in identified genes on chromosomes 1 (Presenilin 2 gene), 14 (Presenilin 1 gene), and 21 (APP gene)
- Chromosome 21 is also involved in Down Syndrome
 - Older individuals with Down Syndrome typically develop plaques consistent with AD
- Apolipoprotein E4 (ApoE4) genotype (carried on chromosome 19) associated with heightened risk of developing AD



Memory System

- Encoding/learning
- Retrieval
- Recognition/memory consolidation
- Different memory profiles
 - Alzheimer's disease: amnesic profile
 - Vascular dementia: retrieval deficit profile



Neuropsychological Function

- Memory impairment and dysnomia
- Deficits in consolidation and recall
- Rapid forgetting of new information
 - Retention rate < 50%
- Immediate memory may be less impaired than delayed recall



Neuropsychological Function

- Confrontation naming is generally impaired
- Verbal fluency is impaired
 - Semantic worse
- Constructional apraxia is common
- Simple attention intact until late in the disease
- Motor function is often preserved late into the disease

Behavioral Symptoms

- Early in the course of AD, subtle personality changes
 - Less energy
 - Socially withdrawn
 - Greater dependence on others
 - Indifference
- Patients often will minimize cognitive problems
 - Confabulate to cover memory deficits
- As the disease progresses
 - Agitation
 - Confusion
 - Wandering
 - Apathy
 - Decreased sleep and appetite
 - Emotional blunting
- Delusions and hallucinations can also occur later in AD

Alzheimer's Disease

10 warning signs

1. Memory changes that disrupt daily life
2. Challenges in planning or solving problems
3. Difficulty completing familiar tasks at home, at work, or at leisure
4. Confusion with time or place
5. Trouble understanding visual images and spatial relationships
6. New problems with words in speaking or writing
7. Misplacing things and losing the ability to retrace steps
8. Decreased or poor judgment
9. Withdrawal from work or social activities
10. Changes in mood or personality

AD Versus Normal Aging

- Age-related changes

- Making a bad decision once in awhile
- Missing a monthly payment
- Forgetting which day it is and remembering it later
- Sometimes forgetting which word to use
- Losing things from time to time

- Signs of AD

- Poor judgment and decision-making
- Inability to manage a budget
- Losing track of the date or the season
- Difficulty having a conversation
- Misplacing things and being unable to retrace steps to find them

MCI VS. Alzheimer's Disease

- Mild cognitive impairment (MCI)
 - Memory impairments
 - Intact ADLs/IADLs
- 10-15% of patients with MCI progress from MCI to dementia annually
- Not all patients diagnosed with MCI will develop AD

AD Onset

- Early stages
 - Insidious deficits in memory
 - Initially unaware of or downplay having memory problems
 - Gross personality changes are uncommon
 - Progressive social withdrawal
 - Decreased interest in hobbies and usual activities
 - Problem-solving difficulties in the work and/or home environment

AD Course

- Stage 1 (1-3 years): Memory impairment, dysnomia, and indifference
 - Typically function relatively independently in familiar environments
 - May have difficulty in unfamiliar settings
 - Common early changes:
 - Impairment and worsening of recent memory
 - Learning problems
 - Declining initiative
 - Start to shy away from new situations, preferring isolation or familiar routines
 - May not be aware of their cognitive changes and deny problems
 - Although can have some insight

AD Course

- Stage 2 (2-10 years): Amnesia, aphasia, visuospatial difficulties, and personality and emotional changes
 - Begin to show difficulty with more complicated tasks
 - Bill payment or balancing a checkbook
 - Rapid forgetting
 - Intact remote memory
 - Misplacing items increases
 - Word-finding deficits
 - Slower speech patterns

AD Stage 2 Continued

- Sustained attention problems
 - May lose train of thought during conversation
- Visuospatial deficits
 - Topographical disorientation
- Guardedness or suspiciousness
- Irritation and agitation, sometimes as a result of forgetfulness
- Lack of initiation

AD Course

- Stage 3 (8-12 years): Severe dementia, global aphasia, and mutism
 - Profound cognitive impairment
 - Involves all aspects of cognition
 - Often require 24-hour supervision and/or nursing home care
 - Clearly disabled and dependent on others
 - Sleep disturbance and behavioral abnormalities may develop
 - Hallucinations and nighttime wandering

Alzheimer's Disease

- Stage 4: Severe dementia and complete dependence
 - Disoriented and no longer capable of following basic routines
 - Increasingly sedentary and may become incontinent

Alzheimer's Disease

- Stage 5: Severe disability
 - May become unable to chew and swallow and may become non-communicative
 - Typically bedridden at this stage
 - Leads to progressive muscle wasting and weight loss prior to death
 - Increased vulnerability to pneumonia and other illnesses develop

Interventions

- Medications
 - Donepezil (Aricept)
 - Rivastigmine (Exelon)
 - Galantamine (Razadyne)
 - Memantine (Namenda)
- Efficacy of these medications varies across individuals
- Modest benefit in helping stabilize and delay progression for 12-18 months
- Common side effects
 - Nausea, vomiting, diarrhea, and dizziness

Interventions

- Cognitive Compensatory strategies
 - Environmental management and compensatory memory strategies
 - Provide structure and routine for the patient
- Healthy diet
- Exercise (as tolerated)
- Behavioral strategies

Considerations

- Level of supervision
- Functional issues
- Driving
- Employment
- Capacity

Resources

- Case management
- Psychoeducational approaches
- Counseling
- Support groups
- Respite care
- Web resources
 - Alzheimer's association (www.alz.org)

alzheimer's 
association®

Clinical Case

- Background
 - 68-year-old, right-handed, bilingual Latino
 - Referred by neurologist due to memory problems
- Cognitive Complaints
 - Memory problems
 - Forgetting to take his medications, conversations, names, appointments, steps for previously well-learned/known activities, and misplacing items
 - Language changes
 - Semantic paraphasic speech errors
 - Calls a bed a table
 - Word-finding difficulties
- Onset
 - Gradual onset that has worsened over time
- ADLS/IADLS
 - ADLs-intact
 - IADLS- forgets to take medications, wife manages finances, some trouble at work this last year, wife accompanies him to all appointments

Clinical Case

- Medical History-Hypertension managed with medication
 - MRI: Showed mild chronic small vessel ischemic changes
- Family Medical History-Unremarkable
- Psychological Functioning-Unremarkable
- Social History
 - 16-years of education
 - Teacher for 20 years
 - Recently retired
 - Married
 - 2-adult children
 - Lives with wife
- Behavioral Observations
 - Speech errors

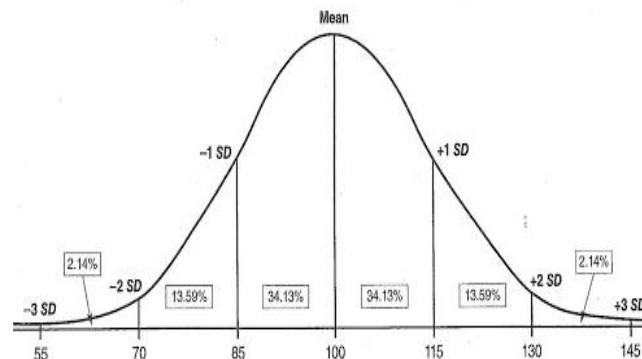
Clinical Case

- Testing
 - Orientation
 - Intellectual function
 - Memory
 - Attention
 - Language
 - Attention
 - Processing speed
 - Executive function
 - Visuospatial
 - Motor
 - Mood



Clinical Case

- Verbal Memory Profile
 - List Learning Test
 - Learning/Encoding: 3, 3, and 5
 - Delayed Recall/Retrieval: 0
 - Recognition: 3/12; 2 false-positives
 - Stories
 - Learning/Encoding: Impaired
 - Delayed Recall/Retrieval: 0
 - Recognition: Impaired
- Visual Memory Profile
 - Figures
 - Learning/Encoding: Impaired
 - Delayed Recall/Retrieval: Impaired
 - Recognition: Impaired
- Amnestic Memory Profile



Clinical Case

- Impaired

- Verbal Memory
- Visual Memory
- Naming
- Verbal Fluency
- IADLS

- Intact

- Orientation
- Intelligence
- Attention
- Processing Speed
- Executive Function
- Visuospatial
- Motor
- Mood

Clinical Case

- Impression
 - Neurocognitive profile, primarily involving severe impairments with memory and language abilities appear to be consistent with an Alzheimer's disease clinical presentation
- Diagnosis
 - Alzheimer's Disease (Early Stages-Mild)
- Recommendations
 - Follow-up with neurologist
 - Cognitive compensatory strategies
 - Support group
 - Resources
 - Follow-up evaluation in 1-year

Thank You