Understanding Symptoms, Causes, and Risks for Alzheimer’s Disease

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What is Alzheimer’s Disease?

Goal:
Review the signs, symptoms, and current thoughts on the causes and risks for Alzheimer’s disease
Some Statistics

- Estimated that 5.2 million Americans have Alzheimer’s disease today
- Alzheimer’s disease is the 6th leading cause of death in US
- In the US alone, Alzheimer’s is estimated to cost $203 billion and is projected to cost 1.2 trillion by 2050

With a rapidly growing population of older adults, the number of people with Alzheimer’s disease in the United States will nearly triple by 2050

Alzheimer’s Association, 2013

What is the Impact of Alzheimer’s Disease?

- Profound effects for the Individual
- Increasing burden and stress for caregivers
- Loss for family and friends
- Impact on local communities and nationally
A Little History

1906: Dr. Alois Alzheimer first describes the brain changes in a patient who had profound memory loss

1968: Measurement scales are developed to relate memory and daily activities to brain in Alzheimer’s disease

1974-76: National Institute on Aging is established; Alzheimer’s disease recognized as the leading cause of dementia

1984-86: Proteins of brain pathology (plaques & tangles) of Alzheimer’s disease are identified

1987-1993: First genes for Alzheimer’s disease are identified

1993: First drug to treat symptoms approved by the FDA

2004 - today: Brain scans and other biomarkers evaluate Alzheimer’s disease over the lifespan

How does the course of Alzheimer’s Disease differ from healthy aging?

• Brain changes of Alzheimer’s disease may begin long before symptoms appear

• Mild cognitive impairment (MCI) for memory may be an early sign that differs from typical aging

• Problems with memory and other abilities later begin to interfere with daily activities

• As the disease progresses, there is loss of independence

National Institute on Aging, 2008
What are the Signs and Symptoms of Alzheimer’s Disease?

Signs and Symptoms

• Memory problems are often among the earliest warning signs

• Some have memory difficulties that are more than normal aging, but not severe enough to be Alzheimer’s disease - called mild cognitive impairment (MCI)

• When memory loss progresses to include other abilities, that are severe enough to affect daily activities, then a diagnosis of “dementia” is given

• Common symptoms of Alzheimer’s dementia include profound problems with forgetfulness, word finding, judgment, spatial abilities, and problem solving
Signs and Symptoms

- Thinking problems lead to difficulties in daily activities, e.g., keeping appointments, finances, making change, remembering names and events, and navigating in familiar places.

- As the disease worsens, problems in recognizing family and friends, dressing, eating, and other basic living skills emerge.

- Behavioral changes can include problems with wandering, impulsivity, agitation, and mood.

- In the severe end stages, the person is unable to communicate and they are dependent on others for all self care.

How does Alzheimer’s disease affect the Brain?

Cutting edge research
Brain Cells in Alzheimer’s Disease Become Dysfunctional

- Abnormal proteins form deposits of plaques and tangles of Alzheimer’s disease
- Brain cells work less efficiently, losing their ability to communicate with each other and cells eventually begin to die
- Accumulation of plaques and tangles with loss of connections spread from key brain areas for memory to other brain regions
- As the disease progresses, the affected brain regions begin to shrink; in the severe stages, the brain volume is greatly reduced

Brain Changes of Alzheimer’s Disease Progress as Symptoms Worsen

The blue areas show how the plaques and tangles spread in the brain as the disease progresses to affect memory and then other abilities

National Institute on Aging, 2008
Brain Scan Differences in Alzheimer’s Disease and Healthy Aging

MRI scans showing less brain volume in 145 patients with Alzheimer’s Dementia compared to 159 healthy elderly

Reiman et al., Lancet Neurology, 2012

Brain Scan Differences in Alzheimer’s Disease and Healthy Aging

Alzheimer’s Disease Healthy Aging

Brain Amyloid Imaging

Brain Glucose Imaging

Brain PET scans that measure amyloid pathology and glucose show differences between patients with Alzheimer’s disease and healthy elderly

Adapted from Ziolko et al., Neuroimage, 2006
Brain Scans Show Decline in Alzheimer’s Disease

Brain PET scans of glucose show decline in brain areas that extend beyond baseline differences between patients with Alzheimer’s disease and healthy elderly.

Adapted from Alexander et al., Am J Psychiatry, 2002

Causes and Risk Factors for Alzheimer’s Disease

What do we know?
## What Factors Influence the Risk for Alzheimer’s Disease?

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<thead>
<tr>
<th>Determined Risks</th>
<th>Modifiable Risks</th>
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<tr>
<td>• Age</td>
<td>• Lifestyle</td>
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<td>• Exercise</td>
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<td>• Family History</td>
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<td>• Social/Mental Activities</td>
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<td>• Environment</td>
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<td>• Head Injuries</td>
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National Institute on Aging, 2012

## Deterministic Risk Factors for Alzheimer’s Disease

- Age is the most important risk factor with most cases occurring in individuals over 60 years of age
- A family history of Alzheimer’s disease can increase risk, most notably in rare early onset forms
- Specific genetic factors have been identified as either deterministic or increasing susceptibility for Alzheimer’s disease (e.g., apolipoprotein ε4)
Modifiable Risk Factors for Alzheimer’s Disease

- Lifestyle choices can influence the risk for Alzheimer’s disease
  - e.g., Regular exercise

- Treating or preventing conditions that may increase the risk
  - e.g., heart disease, diabetes, high blood pressure

- Environmental modifications to reduce risk
  - e.g., Prevent head injuries

What about treatment?

Where are we now?
Developing approaches to treat Alzheimer’s Disease

- Treat symptoms of memory loss and other mental abilities by replacing brain chemicals to improve function (e.g., Aricept)
- Manage changes in behavior and personality that can often occur (e.g., sleep, mood, or agitation)
- Reducing risk with lifestyle and environmental changes for prevention (e.g., exercise, eating well, social & mental activity, reducing head injuries)

Some Current and Future Directions for Alzheimer’s Research

Major Research Initiatives

- Identify biomarkers to detect the disease early and follow the changes over time
- Developing new ways to evaluate potential treatments and interventions
- Understanding more on the genetic and other causes of Alzheimer’s disease
- Develop new treatments and prevention therapies
What You Can Do

Evidence-based approach

Suggestions for daily life changes

Keep informed: Stay up on the latest information on aging and Alzheimer’s disease
Suggestions for daily life changes

Regularly follow websites by:

- National Institute on Aging (http://www.nia.nih.gov)
- Alzheimer’s Association (http://www.alz.org)

Suggestions for daily life changes

Take steps to reduce your risk for Alzheimer’s disease

Start by making one lifestyle change
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<td>Be an advocate for aging and Alzheimer’s disease research</td>
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Consider participating in research to help advance knowledge about successful aging and brain health.
Summary

• Alzheimer’s disease has far reaching effects, extending from individuals to families to friends to local and global communities

• Learning to recognize the signs and symptoms can reduce concerns, while improving quality of life

• Unlike age and genetics, lifestyle choices, like exercising, eating well, and staying socially and mentally active can help reduce our risk

• Don’t wait, get started, and stay engaged!

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Cited References