CHAPTER 2: ALZHEIMER’S DISEASE AND OTHER DEMENTIAS

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OUTLINE

• What is Alzheimer’s disease?
• Causes of Alzheimer’s disease?
  – Cognitive Changes
  – Behavioral, Psychiatric issues
• Progression and Stages
  – Death from other chronic conditions
  – Reverse development
• References
What is Alzheimer's Disease? Alzheimer’s disease (AD) is a progressive brain disorder that gradually destroys a person’s memory and ability to learn, reason, make judgments, communicate and carry out daily activities. As Alzheimer’s disease progresses, individuals may also experience changes in personality and behavior, such as anxiety, suspiciousness or agitation, as well as delusions or hallucinations.1

“AD is the most common type of dementia, accounting for approximately 70% of cases. We can only estimate because of the difficulties in diagnosing and reporting dementias.” 2

Causes of Alzheimer's Disease. Although no single cause of AD was identified, research suggests a complex set of factors can cause AD. One factor is a protein called beta-amyloid that accumulates on the outside of brain cells consisting of clumps of altered proteins surrounding fibers within brain cells. These fibers become tangled inside brain cells and nerve cells in the brain's memory centers die. 3

COGNITIVE CHANGES. Cognitive or cognition refers to functions of the brain such as attention, memory, language, visuospatial skills, and executive function.4

- Amnesia is a memory impairment. The inability to recall information recently read or the names of newly introduced people is oftentimes a common presenting symptom of early AD. An individual will typically be unable to recall information even if multiple choice lists or clues are provided. Commonly in AD, recent memory is more affected than remote memory, although as the disease progresses remote memory is lost as well. For example, an individual with early AD may not remember what he/she had for breakfast, but will remember their trip to Europe as a teenager. Both semantic (memory for facts) and episodic (memory of personal events) memories decline. During a clinical exam, short-term memory is tested by instructing the patient to remember 3 objects and asking him/her to recall the objects at the end of the exam. 5

- Apraxia is the inability to carry out learned motor activities despite intact motor function. This usually occurs late in the progression of AD. An individual suffering from apraxia may not be able to perform motor commands, such as drawing a rectangle. An individual may begin to forget what to do with common objects, such as a toothbrush or a remote control. Although this object had been used many times in the past, an individual may require reminders on how to brush teeth or change the channel of the TV. 4,5

- Aphasia is the inability to use or understand language (spoken or written). An individual with AD may find it difficult to express their thoughts or feelings, forgetting the names of objects or phrases commonly used in conversations. The ability to write letters and make grocery lists deteriorates. 4,5

- Agnosia is the inability to recognize objects, people and places despite intact sensory function.4

- Attention and Concentration: Attention is the ability to focus and resist distraction. Concentration is the ability to stay focused for longer periods of time. Attention and concentration deficits often accompany memory and executive function deficits. Executive functioning includes the ability to organize and sequence information. Executive functioning is required in tasks such as planning parties. Oftentimes these deficits in cognitive behavior occur early in the course of Alzheimer’s disease and lead to the inability to perform at work or cause withdrawal from social events.

<table>
<thead>
<tr>
<th>Amnesia</th>
<th>Memory impairment</th>
<th>Does the person recall information just read in a newspaper article?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apraxia</td>
<td>Inability to carry out motor activities despite intact motor function</td>
<td>Does the person have difficulty remembering what to do with a broom/remote control/seat belt (any common object?)</td>
</tr>
</tbody>
</table>
Inability to recognize objects despite intact sensory function

Does the person have difficulty recognizing what something is by just feeling it?

Aphasia

Inability to use or understand language (spoken or written)

Does the person have difficulty finding the right word/words during conversation; following verbal directions; explaining an article from the newspaper; writing letters/grocery lists?

Attention and Concentration

Attention is the ability to focus and resist distraction. Concentration is the ability to stay focused on a topic for longer periods of time.

Attention can be tested by saying individual digits at a rate of 1 digit per second and having the individual repeat the digits in the same order (normal: ability to repeat 7 digits, + or – 2). Concentration is tested by using the ‘A test,’ in which the examiner states a series of letters over 30 seconds and the patient must raise their hand each time the ‘A’ appears.\(^4,5\)

BEHAVIORAL, PSYCHIATRIC ISSUES

- **Restlessness and Agitation:** Agitation occurs in approximately 70% of persons with Alzheimer’s disease (AD). Agitation is more common in late-onset AD, older individuals, and more severe cognitive decline. Agitation refers to excessive motor activity associated with a feeling of inner tension. Forms of agitation include behavioral changes such as pacing, wringing of hands, repetitive questioning, pulling on clothing, fidgeting, and inability to sit still. Anxiety is common in patients suffering from AD or other forms of dementia. Anxiety, excessive apprehension and sense of doom, can manifest itself as restlessness. Restlessness includes frequent changing of position and pacing, which are motor expressions of anxiety.\(^4\)

- **Delusions** are false beliefs based on incorrect inferences about external reality despite evidence to the contrary. Delusions may be assessed by asking questions about burglary, phantom boarders, infidelity, abandonment, and replacement. The delusions of dementia are often persecutory in nature, meaning that the individual may believe that others are trying to harm them. Some common delusions had by persons with dementia are that their home is infested with insects, others are plotting against them, unwelcome guests are living in the home, their home is being burglarized, or that their spouse is being unfaithful. A person with dementia may not remember a delusion experienced outside of the medical office, therefore delusions are often assessed by reports of caregivers.\(^4,5\)

- **Hallucinations** are sensory perceptions of objects or people that appear to be real to an individual although they do not exist. For example, a demented individual may see an old friend that is not present or smell food that is not being cooked. Hallucinations can take the form of shadows and colored lights or of actual objects or people. Hallucinations are not solely visual; hallucinations can be auditory (noises or voices); olfactory (smells); tactile (touch); and gustatory (taste). Although, hallucinations have occurred in Alzheimer’s patients, hallucinations do not commonly occur with dementia and Alzheimer’s disease.\(^4\)

- **Illusions** are similar to hallucinations. However, illusions are a distortion of sensory perceptions rather than perceptions derived from no external stimuli. Illusions are defined as “misinterpretation of external visual stimuli”.\(^4\) For example, an individual may perceive an object to be larger or smaller than reality or distorted in some way. Oftentimes, an individual experiencing hallucinations will also experience illusions.\(^4\)
Physical aggression: Physical aggression is a form of agitation that occurs in moderately severe to severe AD and other forms of dementia. Physical aggression includes hitting, shoving, and threatening behavior. Verbal aggression manifests itself with shouting and cursing at caregivers and family. Oftentimes, an individual may be resistant to receiving care, such as bathing and toileting. This severe behavioral change can be very upsetting to caregivers, making it difficult to provide care.4

Depression: Depression is a mood disorder characterized by sadness and inability to feel pleasure. A depressed individual may express feelings of worthlessness and helplessness; complain of chronic fatigue; have an inability to concentrate; have recurrent thoughts about death. Insomnia, decreased libido, change in appetite (either no appetite or an increased appetite), and apathy are all signs of depression. Physical manifestations of depression include withdrawal from social interaction, slowed movements, lack of facial expression, slowed or delayed speech, and poor posture. Depression can exacerbate the functional and cognitive decline of Alzheimer’s disease and other forms of dementia.4

PROGRESSION AND STAGES OF ALZHEIMER’S DISEASE:

Disease course. People with Alzheimer’s disease live an average of 8 years after diagnosis, however, they may live anywhere from 3 to 20 years.

Functional changes Dr. Reisberg developed the Functional Assessment Staging (FAST)10 scale, which measures the progressive deterioration of functional capacity. Functional changes are those changes in one’s ability to perform everyday activities that were at one time elementary skills, such as dressing, toileting, and eating. Dr. Reisberg divides the progression of AD into 16 functional stages. The table below outlines these stages.6,10

<table>
<thead>
<tr>
<th>FAST stage</th>
<th>Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 (normal adult)</td>
<td>No decline in function</td>
</tr>
<tr>
<td>2 (normal adult)</td>
<td>Personal awareness of functional decline</td>
</tr>
<tr>
<td>3 (early AD)</td>
<td>Deficits noticed in demanding employment situations</td>
</tr>
<tr>
<td>4 (mild AD)</td>
<td>Requires assistance in complicated tasks, such as handling finances, planning dinner party</td>
</tr>
<tr>
<td>5 (moderate AD)</td>
<td>Requires assistance in choosing proper attire</td>
</tr>
<tr>
<td>6 (moderately severe AD)</td>
<td>Requires assistance dressing</td>
</tr>
<tr>
<td>6a</td>
<td>Requires assistance bathing properly</td>
</tr>
<tr>
<td>6b</td>
<td>Requires assistance with mechanics of toileting</td>
</tr>
<tr>
<td>6c</td>
<td>Urinary incontinence</td>
</tr>
<tr>
<td>6d</td>
<td>Fecal incontinence</td>
</tr>
<tr>
<td>6e</td>
<td></td>
</tr>
<tr>
<td>7 (severe AD)</td>
<td>Speech ability limited to about a half-dozen intelligible words</td>
</tr>
<tr>
<td>7a</td>
<td>Intelligible vocabulary limited to a single word</td>
</tr>
<tr>
<td>7b</td>
<td>Ambulatory ability lost</td>
</tr>
<tr>
<td>7c</td>
<td>Ability to sit up lost</td>
</tr>
<tr>
<td>7d</td>
<td>Ability to smile lost</td>
</tr>
<tr>
<td>7e</td>
<td>Ability to hold up head lost</td>
</tr>
</tbody>
</table>

The functional stages of Alzheimer’s disease and their incorporation into the Functional Assessment Staging scale. Copyright, 1984 by Barry Reisberg, MD
• **Death from other chronic conditions or brain shut down:**

The final stage of AD, severe AD, can last for up to 7 years. It is often difficult to know how close an individual is to death. People with this illness ultimately die of a complete shut-down of vital organs, unless acute causes such as pneumonia or heart attack occur first. A patient at the final stages will not be able to walk or talk, sit up alone, or have control of bowel or bladder. Muscle contractures and inability to swallow put the person at risk of malnutrition and the complications of being bedridden, such as pneumonia and skin breakdown. The last stage of AD requires extensive care for the patient from feeding to physical therapy to toileting and bathing. This is a stressful time for the caregiver who must make many difficult decisions. They must grapple with questions such as whether or not to insert feeding tubes, treat a bout of pneumonia, or institute a ventilator.

• **Stages:** Many different staging methods for the progression of AD have been developed. It is important to note that although AD has a typical pattern of cognitive, functional, and behavioral deterioration, not all people with AD will progress exactly the same. Staging the progression of AD is useful in counseling people with AD and families about what to expect. The Global Deterioration Scale (GDS) maps out seven stages of symptoms. The stages are commonly categorized as **mild**, **moderate**, **moderately severe**, and **severe**.

1. During the first stage of the GDS, there is not cognitive impairment and memory problems are undetected by examination from a health care provider.

2. During the second stage, very mild cognitive decline, the individual may notice a decline in memory, such as forgetting familiar words or names or losing objects such as keys. Although the individual may be aware of these changes, family, friends, and health care providers do not notice the change.

3. During stage 3, mild cognitive decline occurs and early stage AD may be diagnosed. Medical exam may reveal deficits in memory or concentration. Friends and family will notice a deficit in memory, including an inability to remember names of people introduced, decline in performance at work or in social settings, inability to retain information that was just read, losing objects, and inability to plan and organize.

4. Stage 4 in the GDS is characterized by moderate cognitive decline and is **mild** or early-stage AD. Clinical exam reveals deficits in knowledge of recent events, ability to perform mathematical problems such as counting backwards by 7 from 100, decline in ability to perform complicated tasks such as managing personal finances and organizing events, reduced memory of past history, withdrawal and subdued affect in challenging situations.

5. GDS stage 5, moderately severe cognitive decline, or **moderate** or mid-stage AD, reveals further loss or memory and cognitive ability and need for assistance with everyday tasks. An individual with AD will forget their phone number or address; become disoriented (unable to recall date or day of the week); exhibit a decline in mathematical ability; be unable to select proper attire. During moderate or mid-stage AD, the individual is still able to remember events in their own history and the names of close family members. Functionally they do not require assistance with toileting and eating.

6. During GDS stage 6, or **moderately severe** or mid-stage AD, severe cognitive decline occurs. The individual with AD is no longer aware of their surroundings or the events going on around them. Although they will recall their own name, they may forget the names of their spouse or children. At this stage, functional capacity decline and assistance is required in toileting, and getting dressed properly. Life for the caregiver becomes more difficult as increased episodes of urinary and fecal incontinence occur and disruption of sleep cycle occurs. Personality changes and behavioral symptoms emerge, including suspiciousness and delusions; hallucinations; or...
compulsive, repetitive behaviors. In addition, the individual may become prone to wandering and getting lost.

7. In the seventh and final stage of AD, severe or late-stage AD, individuals lose their ability to respond to the environment, to speak, and perform simple motor skills including walking. Intelligible speech is lost. Eating and toileting requires assistance and incontinence occurs. Individuals deteriorate to the point of losing skills acquired during infancy, such as ability to walk without assistance, ability to sit without support, ability to smile, and ability to hold head up. Muscle rigidity and abnormal reflexes develop and difficulty swallowing makes eating a challenge.\(^6\), \(^7\), \(^9\)

- **Reverse development.** Evidence suggests that the progression of AD is the reverse of the childhood development. A reversal of all the skills learned from infancy to adulthood occurs. The AD patient will initially have trouble performing the skills necessary to hold a job, the skills learned as a teenager. As the disease progresses to mild AD, simple finances such as balancing a checkbook become difficult. In moderate AD, the ability to select proper clothing deteriorates, a skill learned as a 5-7 year old person. Functional decline continues, reversing the stages of development until a victim of AD can no longer talk, walk, sit up, smile, or hold head up, skills learned as an infant.\(^6\)

**References**

7. [http://www.alz.org/AboutAD/Stages.asp](http://www.alz.org/AboutAD/Stages.asp)