Alzheimer's Disease

Prototype of Cognitive Deterioration, Valuable Lessons to Understand Human Cognition

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KEYWORDS

• Alzheimer's disease • Dementia • Cognition • Cognitive domains • Aging
• Mild cognitive impairment • Neuropsychology

KEY POINTS

- With the aging of the population and limitation of access to complex diagnosis tools for Alzheimer's disease, now is the proper time to emphasize for neurologists how important it is to become more familiar with neuropsychological evaluation because of its crucial role in early detection of cognitive decline in the elderly population.
- The ever-increasing growth of this method in research, as an available, inexpensive, and noninvasive diagnostic approach, which can be administered even by non–specialist-trained examiners, makes this knowledge more necessary than ever.
- Such knowledge has a basic role in planning national programs in primary health care systems for prevention and early detection of Alzheimer's disease as a debilitating disorder.
- This is more crucial in developing countries, which have to deal with higher rates of dementia prevalence along with cardiovascular risk factors, lack of public knowledge about dementia, and limited social support.

INTRODUCTION

With the aging of the population, more neuroscientists, neurologists, psychiatrists, and psychologists focus their research on age-related medical disorders in general, and more specifically dementia. Alzheimer's disease (AD) is the most common cause of severe memory loss and cognitive deterioration in the elderly; the main goal of research on cognitive aging has been to find treatments for AD and other dementias. However, apart from the disease process, it is also crucial to understand the normal

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process of cognitive decline with age: age is the greatest predisposing factor for a spectrum of neurodegenerative disorders. Thus, understanding what the brain goes through in the normal process of aging helps not only to improve the quality of life for the general population but may also ultimately help unravel pathologic changes that at present seem unrelated.[1] AD is one of the most prevalent conditions in the elderly and the most common cause of memory impairment in old age.[2] Nearly 40 years ago, dementia, and particularly AD, was first emphasized as a major public health problem.[3] According to the World Health Organization (WHO), in the year 2011, 35.6 million people were affected by dementia.[4] This number is destined to increase rapidly. The aging of the population affects both the incidence and the prevalence of this syndrome,[5,6] thus, it has been estimated that, by the year 2050, 115.4 million people will be affected.[4] In Western industrial nations, AD is the most common form of dementia[7]: approximately 60% to 80% of dementia cases in these countries are AD[8]; thus, AD is the fourth cause of death (after cardiovascular disorders, cancer, and cerebral hemorrhage). Over the past 30 years, neuropsychological assessment has played one of the central roles in characterizing the dementia associated with AD. As well as being available, noninvasive, and inexpensive, it has helped identify the most significant cognitive and behavioral symptoms; it has also contributed greatly to the staging and tracking of the disease.[9–13] At present, no curative treatments exist for AD. However, several promising strategies are being developed that may delay or even prevent the progression of AD.[14] It is now known that decades before the onset of cognitive symptoms, such as episodic memory loss, AD-related neurologic changes begin to accumulate.[15,16] Thus, intervention well before the onset of observable symptoms could provide a promising opportunity to slow the progression of the disease or minimize the damage, particularly if targeted at individuals with the greatest risk of developing AD.[17] This article describes the neuropsychological profile of AD and its contrast with cognitive changes that occur in normal aging and in mild cognitive impairment (MCI) over the course of time.

The Spectrum of Alzheimer's disease as a Prototype of Cognitive Disorder

The first case of the disease was described by Alois Alzheimer's in November 4, 1906, in his lecture at the 37th Conference of South-West German Psychiatrists in Tübingen and the condition was later called AD by Emil Kraepelin.[18,19] This first case (Aguste D) was a 51-year-old woman with progressive cognitive and behavioral impairment in middle age; however, in general, AD affects the elderly. The first clinical signs in most patients with AD are shown during the seventh decade. Early-onset cases are often familial; in many of these patients mutations have been discovered. In contrast, late-onset cases are sporadic, and their cause is still unknown. In both the sporadic and familial forms of AD there is a remarkably selective defect in declarative memory, which is discussed later.[1] Recent research, which has increasingly focused on earlier stages of AD, has made clear that cognitive and behavioral symptoms of the illness can be preceded by biological markers by years.[9] AD disorder is usually initially selective for limbic regions that subserve episodic memory, which in turn brings about circumscribed memory deficit in the early stages of the disease.[20–22] Over time, with the progress of the disorder to other neocortical regions,[23–26] further cognitive symptoms emerge and the full dementia syndrome manifests itself. The established research diagnostic criteria for AD dementia has served well since 1984; however, these recent discoveries have prompted its revision.[27] In addition to defining the dementia of AD,[28] the new criteria also incorporate a fuller spectrum of cognitive aging, and include an intermediate stage of MCI that precedes the full-blown dementia.[29] A third, even earlier, stage of preclinical AD has also been identified.[30]