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Opinion

Basic Sciences and Clinical Implications of Alzheimer's Disease

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Abstract

Alzheimer's disease (AD) is an irreversible and chronic progressive neurodegenerative disorder characterized by progressive cognitive dysfunction, memory loss, and decline. This disorder is the most common dementia type in elderly, accounts for 60%-80% of all cases [1-4]. Current estimates described that about 50 million people are living with dementia worldwide and treatment options are limited, placing significant suffering and financial burden on families and society. This number of people with dementia is predicted to increase to 131.5 million by 2050, as the population ages [4,5]. Although the AD etiology is still unknown, certain risk factors may influence on the clinical course of this illness, such as: age, gender, ethnicity, expression of the epsilon4 allele of apolipoprotein E (ApoE4), advanced parental age, cerebrovascular disease, severe or repeated head trauma, hypertension, myocardial infarction, diabetes mellitus, hyperlipidemia, and immunological defects; genetic factors as chromosomal defects (e.g., Down syndrome); and environmental factors as infective agents, toxins, smoking, elitism, limited education resulting in low neurofunctional stimulation, and sedentary lifestyle. Despite some controversies, authors report that limited education can be related to the high incidence of AD, once low neurofunctional stimulation could result in less cerebral metabolism and, as a consequence, favor the β-amyloid peptide (Aβ) deposits in the brain [1,6-8]. About 1% of cases of AD is autosomal dominant inheritances which is caused by high penetrance mutations in three genes, including APP (amyloid precursor protein, chromosome 21), PSEN1 (Presenilin 1; chromosome 14) and PSEN2 (Presenilin 2; chromosome 1) genes. The presence of the ApoE gene, located on the long arm of chromosome 19 (locus 19q13.2), increases the risk of developing AD. Among the three common ApoE allelic forms (epsilon2, epsilon3, and epsilon4), the ApoE4 is the most significant genetic risk factor for formation and deposition of β-amyloid peptide (Aβ) plaques in the brain tissue. These plates are neurotoxic agents which impair the synapses and ultimately cause neurodegeneration for early-onset and late-onset AD [2,3,6,8,9].

Introduction

This neurological condition is characterized by the following cardinal signs and symptoms: presence of extracellular senile plaques (extraneuronal deposition of beta-amyloid fibrils) and intracellular neurofibrillary tangles (intraneuronal aggregates of tau protein), gradual and progressive loss of episodic memory or other cognitive domains, inability to recognize common objects, family or friends (visual agnosia), to comprehend or formulate language (aphasia), and to carry out their basic activities in daily living (apraxia), and motor dysfunction. This last feature leads to immobility, inanition due to severe weakness and wasting from lack of food, and death. Personality changes, delirium, depression, and various behavioral abnormalities are also identified [3,10]. AD may affect a person in different ways and the disease progression depends upon the impact of the disease itself, the person's personality, and health conditions. Considering these contexts, this illness has been divided into three stages: mild, moderate, and severe. The literature has still described that chronic cardiovascular and respiratory diseases and their comorbidities, e.g. obstructive sleep apnea, may increase the risk for development of AD and/or accelerate its progression. So, the treatment of these illnesses may contribute to AD prevention and/or control its progression [11]. Thus, it is important to comprehend the impact of pathogenesis on daily living and to know the clinical implications and approaches of this disease to provide good health for patients with AD, especially for institutionalized elders. Furthermore, the continuous application of the best transdisciplinary practices in health may result in good general health status and better preservation of stomatognathic system in this population.

Probably, these practices together may contribute to construction of knowledge, creation of new work philosophies and,

consequently, improvement of lifestyle quality and longevity of people with dementia.

With respect to AD progression, elders become more dependent, resulting in major limitations in their self-care for general and oral health-promoting practices. Then, it is extremely important that family members and/or caregivers are continually guided by physicians and dental physicians to control the evolution of preexisting illness and to avoid the appearance of new comorbidities. As a support therapy, transdisciplinary approaches must be applied to activate his/her memory and cognitive skills, including games, music therapy, physical exercises, and others. This may allow a good adaptation to several limitations which are caused by chronic and progressive exacerbation of AD.

An overview of the oral healthcare scenario, many dental physicians have great difficulty in assisting this public-target due to the physical, behavioral, and mental impairments. Oral dysfunctions sucking habits and involuntary oral and perioral movements are very frequent, compromising an appropriate oral rehabilitation. So, the choices of therapeutic approaches depend upto the evolution stages of AD. In initial stage, the dental physicians must remove all the infection foci (e.g., caries, periodontal diseases, and periapical abscess and cysts) and to restore the functions of the oral and maxillofacial complex. In severe stage, oral healthcare must be performed through safe and effective clinical procedures using intravenous sedation or general anesthesia in a hospital environment.

Conclusion

Considering that the World Health Organization has recognized AD as a global public health priority due to the increase of the elderly population and disparity in health inequality in all around the world, continuous collaborative efforts of specialized health multiprofessionals must be done to provide a well-being and satisfactory health conditions for these individuals. Furthermore, the best transdisciplinary and clinical practices in continuing healthcare must be recommended in private and public health units, as an irrefutable fact, mainly in healthcare services of long-term private or public nursing homes. In this manner, great benefits may be attained with success, leading to the management and control of AD progression, reduction in appearance of new comorbidities, decline of morbidity and mortality, and finally preservation of good quality of life of this target public.

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