Trigger Factors and Effects of Alzheimer's Disease

Alzheimer Hastalığının Tetikleyici Faktörleri ve Etkileri

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ABSTRACT

Alzheimer's Disease is a neurodegenerative disorder characterised by symptoms such as cognitive decline, memory loss and decreased activities of daily living. Factors that play a role in the development of this disease include genetic, environmental and neurobiological factors. The importance of genetic factors has been associated with early onset of the disease and family history. Environmental factors include lifestyle factors such as toxic metals, pesticides, nutrition, exercise and sleep patterns. Neurobiological mechanisms include amyloid cascade hypothesis, hyperphosphorylation of tau proteins, oxidative stress and inflammation. Alzheimer's Disease is diagnosed through clinical assessments and cognitive testing, and treatment options focus on symptom relief. Future research should aim to deepen our understanding of the aetiology and pathogenesis of the disease and develop more effective treatment and prevention strategies. The complex nature of Alzheimer's Disease is determined by the interaction of genetic, environmental and neurobiological factors and understanding these factors plays an important role in the management of the disease.

Keywords: Alzheimer's Disease, Genetic Factors, Environmental Risk Factors, Neurobiological Pathways.

ÖZET

Alzheimer Hastalığı, bilişsel gerileme, hafıza kaybı ve günlük yaşam aktivitelerinde azalma gibi semptomlarla karakterize edilen nörodejeneratif bir hastalıktır. Bu hastalığın gelişiminde rol oynayan faktörler arasında genetik, çevresel ve nörobiyolojik etmenler bulunmaktadır. Genetik faktörlerin önemi, hastalığın erken başlangıcı ve aile öyküsü ile ilişkilendirilmiştir. Çevresel faktörler, toksik metaller, pestisitler, beslenme, egzersiz ve uyku düzeni gibi yaşam tarzı faktörleri arasında yer alır. Nörobiyolojik mekanizmalar arasında ise amiloid kaskad hipotezi, tau proteinlerinin hiperfosforilasyonu, oksidatif stres ve enflamasyon yer alır. Alzheimer Hastalığı'nın tanısı, klinik değerlendirmeler ve bilişsel testler ile konur ve tedavi seçenekleri semptomların hafifletilmesine odaklanır. Gelecekteki araştırmalar, hastalığın etiyolojisi ve patogenezi hakkındaki anlayışımızı derinleştirerek daha etkili tedavi ve önleme stratejileri geliştirmeyi amaçlamalıdır. Alzheimer Hastalığı'nın kompleks yapısı, genetik, çevresel ve nörobiyolojik faktörlerin etkileşimiyle belirlenir ve bu faktörlerin anlaşılması, hastalığın yönetiminde önemli bir rol oynamaktadır.

Anahtar Kelimeler: Alzheimer Hastalığı, Genetik Faktörler, Çevresel Risk Faktörleri, Nörobiyolojik Yollar.

INTRODUCTION

Alzheimer's disease, first described by Alois Alzheimer, is a progressive and irreversible brain disorder that slowly destroys cognitive and memory skills, and eventually the ability to carry out the simplest tasks of daily living. In most people with Alzheimer's, symptoms first appear after age 60. It is estimated that there are currently 4 million Americans suffering from this disease. This number is expected to double in the next 20 years as the population of older adults increases. While men and women in all racial and ethnic groups are at risk for developing Alzheimer's disease, prevalence is highest in African-American and Hispanic populations. Changes in the brain can begin 20 or more years before symptoms of Alzheimer's appear. This early period represents a critical opportunity for investigating possible preventive measures that could delay or reduce the risk of developing the disorder. Characterization of the entire continuum of disease, including asymptomatic and symptomatic phases, and investigation of genetic, environmental, and biological variables associated with disease onset and progression is a current public health priority. This project seeks to identify and define factors that trigger the process of cognitive decline, leading to the symptoms of Alzheimer's and the eventual diagnosis of dementia. This is the true beginning of the disease. Understanding these factors will aid the discovery of new treatments, or the enhancement of existing ones, to improve quality of life and postponement of disease progression for the millions of individuals at risk for Alzheimer's.

Alzheimer's Disease is a neurodegenerative disease that leads to cognitive decline, memory loss and ultimately a reduced ability to perform activities of daily living. The study of genetic, environmental and neurobiological factors involved in the development of Alzheimer's Disease is important in the treatment and prevention of the disease. In this article, we will discuss the triggering factors and effects of Alzheimer's Disease in more detail.

Role of Genetic Factors

The genetic basis of Alzheimer's Disease has clearly emerged, with onset of the disease at different ages and family history increasing the risk of the disease. There are two main forms of Alzheimer's, known as early onset (EOAD) and late onset (LOAD). EOAD is associated with genetic mutations and usually occurs in individuals under the age of 65. These mutations include changes in the APP, PSEN1 and PSEN2 genes. LOAD is associated with a genetic predisposition and usually occurs in individuals over the age of 65. The most important genetic risk factor for LOAD is various variants of the APOE gene. However, other genes are also known to influence Alzheimer's risk. For example, genes such as TREM2, CLU, CR1 and PICALM may be associated with the disease (1,2).

Impact of Environmental Factors

The effect of environmental factors on Alzheimer's Disease plays an important role in the development of the disease together with genetic predisposition. Environmental factors include toxic metals, pesticides, air pollution, nutrition, exercise, sleep patterns and social interaction. Research shows that environmental factors may increase the risk of Alzheimer's disease. For example, accumulation of toxic metals such as aluminium and mercury may play a role in neurodegenerative processes. Similarly, factors such as chronic stress, sleep disorders, and malnutrition may also negatively affect brain health and increase the risk of Alzheimer's (3-5).

Role of Neurobiological Mechanisms

The neurobiological mechanisms of Alzheimer's Disease are critical to understanding the pathology of the disease. The amyloid cascade hypothesis proposes that the deposition of amyloid-beta peptide underlies Alzheimer's Disease. Amyloid plaques can disrupt communication between nerve cells and lead to neuronal toxicity. Hyperphosphorylation of tau proteins may also contribute to the formation of neurofibrillary bundles and neuronal degeneration. In addition, other neurobiological mechanisms such as oxidative stress, inflammation, mitochondrial dysfunction and neuronal apoptosis may also play a role in the pathogenesis of Alzheimer's Disease (6-8).

Epidemiological Findings and Diagnostic Methods

Alzheimer's Disease is a global public health problem and is becoming an increasing burden with the ageing world population. The prevalence of the disease varies depending on age, gender, race and geographical location. Alzheimer's is diagnosed by clinical assessments, cognitive tests and neuroimaging methods. However, early diagnosis of the disease is still difficult and autopsy may be required for a definitive diagnosis (9-11).

Treatment Methods and Future Research

Although there is no effective treatment for Alzheimer's Disease, research has shown promising findings for the treatment and prevention of the disease. Medications, lifestyle changes, cognitive therapy and supportive care play an important role in the management of Alzheimer's Disease. Future research should aim to deepen our understanding of the aetiology and pathogenesis of Alzheimer's Disease and develop more effective treatment and prevention strategies (12-14).

CONCLUSION

The precipitating factors of Alzheimer's Disease are determined by a complex interplay of genetic, environmental and neurobiological factors. Understanding these factors can increase our knowledge of the aetiology and pathogenesis of the disease and allow us to develop more effective treatment and prevention strategies.

DESCRIPTIONS

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