

RISK FACTORS IN ALZHEIMER'S DISEASE

AUTHORS

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ABSTRACT

Alzheimer's Disease is usually sporadic, though in around 5% of cases mostly in younger age-groups- the disease is inherited in an autosomal dominant fashion. Mutations in genes coding for amyloid precursor protein (APP) and presenilin (PS1 and PS2) produce a clinical picture of AD. Mechanisms leading to the commoner form of AD are incompletely understood. Numerous studies of the epidemiology of AD have been undertaken with the aims of social planning and identifying modifiable risk factors for the development of the disease. There have been identified possible risk factors and also protective factors for AD

KEY WORDS: Alzheimer's disease, risk factor

Alzheimer's disease (AD) is a neurological disorder which is characterized by progressive neurodegeneration manifested through functional, behavioral and cognitive abnormalities. It is a form of dementia and it is common for aging people, marking the last decade of the affected patients' life. Over 8 million people around the world are suffering of AD.

It is a fact that 10 – 15% of individuals over the age of 65 are affected by cognitive decline, AD being the most frequent disorder.

It is important to identify early risk factors for Alzheimer's disease because the neurodegenerative processes of Alzheimer's disease may begin in midlife. Identification of these risk factors may shed some light on the pathophysiology of Alzheimer's disease and also provide new potential avenues for its prevention and treatment. The preliminary findings showing an association between vascular risk factors and Alzheimer's disease need to be replicated in independent populations, and no population based study has yet evaluated the association of both midlife blood pressure and cholesterol concentrations with Alzheimer's disease in later life in both sexes.

RISK FACTORS

A number of factors increase the risk of developing Alzheimer`s disease:

- Age: is the most dramatic risk factor, so that 50% of the world`s elder population is affected by this disease
- Sex: Estrogen has a benefic role on the brain by protecting it from memory loss and reduced mental functioning. Due to the estrogen loss after menopause, women are more predisposed to this disorder than men.
- Family history of dementia: patients who have first degree relatives with AD present a high risk in developing this disease
- Head trauma/injuries
- Education level: individuals with low education have a greater risk of getting AD compared to individuals with a high level of education, who have a higher number of neurons and synapses, which protects the brain from degeneration. The first category of patients develop dementia symptoms earlier and the progression of Alzheimer`s disease is quicker.
- Vascular disease: can cause dementia. Strokes can cause AD in elder individuals. Also, the risk factors for vascular disease are common with the ones for AD, such as: high blood pressure, smoking, high cholesterol level, high homocysteine level.
- Diabetes: because of the vascular mechanisms or because of the interaction of insulin degrading enzymes with the amyloid metabolism.
- Coronary artery bypass grafting
- Down Syndrome: young mothers who gave birth to children diagnosed with Down Syndrome present a higher risk of developing AD; also the Down Syndrome patients are highly predisposed to this form of dementia because of the neurological changes in the brain
- Genetic factors: a cholesterol-bearing protein – the apolipoprotein e4 (ApoE-4) allele increases the risk of Alzheimer`s disease
- Small head size: some studies show that the shrinking of the brain in elder people can cause mental impairment
- Depression: Untreated depression can lead to dementia and it has been proven that depression itself represents an early symptom for Alzheimer`s
- Blood pressure, cholesterol, and risk of Alzheimer's disease;

High systolic blood pressure in midlife is a significant risk for Alzheimer's disease in later life. Borderline high systolic blood pressure in midlife also increases the risk, Midlife diastolic blood pressure had no significant effect on the risk of Alzheimer's disease High serum cholesterol concentration in midlife is a significant risk for Alzheimer's disease. Notably, in Japanese-American men the raised diastolic blood pressure in midlife predicted Alzheimer's disease only in participants never treated with antihypertensive drugs. From this perspective, the potential risk of Alzheimer's disease related to raised diastolic blood pressure, emphasizes the importance of raised systolic blood pressure, even in people with normal diastolic blood

pressure. Blood pressure control may prevent dementia, in patients with isolated systolic hypertension.

- High serum total cholesterol concentration in midlife also predict Alzheimer's disease in later life. This finding is consistent with the findings in elderly Finnish men. Recent studies extend these findings to younger age groups and both sexes, making these data more representative.
- The medical history. Patients with Alzheimer's disease were more likely to have been treated with antihypertensive drugs in midlife, but at re-examination later in life there was no difference between treated and not treated patients.. At re-examination, patients with Alzheimer's disease were significantly more likely to have a history of myocardial infarction and cerebrovascular symptoms (almost invariably expressed as transient ischaemic attack) and less likely to be alcohol users
- Clinical indicators of atherosclerosis are more common in patients with Alzheimer's disease than subjects without dementia. A population based, cross sectional study has previously indicated an increased risk of Alzheimer' disease in patients with atherosclerosis. Hypertension and hypercholesterolaemia may increase the risk of dementia by inducing atherosclerosis and impairing blood flow, but they may also directly induce the neurodegeneration of Alzheimer's disease.
- Recent findings are suggesting that hypertension and hypercholesterolaemia themselves pose a risk for Alzheimer's disease. Furthermore, the combination of hypertension and hypercholesterolaemia in midlife was a particularly strong predictor of Alzheimers disease; these factors may accelerate the development of Alzheimer' disease partly through different pathophysiological mechanisms.
- Apolipoprotein E genotype may influence the observed associations, but more than 85% of the variation in serum cholesterol concentrations is thought to be independent of the apolipoprotein E genotype. Accordingly, the findings in elderly Finnish men suggested that high serum cholesterol concentration was an independent risk factor for Alzheimer's disease regardless of the apolipoprotein E genotype. However, more research is needed to determine if apolipoprotein E genotype modulates the effects of risk factors for Alzheimer's disease.
- The observed relation between midlife vascular risk factors and Alzheimer's disease later in life may have implications for the prevention of dementia as both hypertension and hypercholesterolaemia can be treated.

OTHER POTENTIAL RISK FACTORS

- Mental inactivity: without mental exercise, especially in midlife, the brain is inclined to degeneration
- Midlife depression
- Psychological distress
- Exposure to metals especially to aluminium, was once belived to be relevant – renal patients present the phenomenon of ”dialysis dementia” because of the exposure to

dialysate with high concentrations of aluminium. They present typical AD pathology . Likewise zinc can induce Abeta aggregation in vitro.

PROTECTIVE FACTORS WHICH DECREASE THE RISK OF DEVELOPING ALZHEIMER`S DISEASE

- Social and cognitively stimulating activities
- Diets high in antioxidants, olive oil, fish,
- Diets low in fats or calories
- Nonsteroidal anti-inflammatory drugs (NSAIDs)
- Cholesterol-lowering agents
- Vitamin C and E intake may reduce the prevalence of AD
- Alcohol in moderate amounts may be protective

MILD COGNITIVE IMPAIRMENT

The early detection of functional and cognitive impairment has made it easier to identify very mild manifestations of cognitive decline, which is called "mild cognitive impairment" (MCI). The amnesic MCI shows an increased risk of developing into AD. However, not all MCI cases will be affected by dementia, because mild cognitive impairment occurs also in patients with psychiatric diseases, cerebrovascular diseases, or systemic disorders. The transition from MCI to Alzheimer`s disease is recognized through striking cognitive decline, for example the selective loss of short-term memory.

ALZHEIMER`S DISEASE PREVENTION

Studies have shown that individuals who have hobbies which need high mental resources such as: playing crosswords, board games, cards, chess, people who play a musical instrument and explore their creative side in life, are generally protected from mental lability in their elder years. It has been also concluded that food supplements with vitamins B12, C and E, Gingkobiloba extracts, Acetyl L- Carnitine, Thiamin, Phosphatidylserine prevent brain degeneration.

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