

ALZHEIMER'S DISEASE

DEFINITION

Alzheimer's disease (AD) is an insidious onset of dementia due to cortical atrophy with accumulation of plaques containing abnormal proteins and fibrillary tangles in the neurons. The dominant abnormal protein is A β peptide, a form of amyloid. Approximately 10% of individuals >70 years of age have significant memory loss and in >50% of these cases, the cause is AD. The cortical atrophy involves medial temporal lobes, lateral and medial parietal lobes and lateral frontal cortex.

CLINICAL PRESENTATION

The cognitive changes of AD follow a characteristic pattern starting with memory impairment and later leading to language and visuospatial deficits. Approximately 20% of patients present with non-memory complaints like word finding, organizational or navigational difficulty.

Incidence of AD

Age in years	Incidence
60-64	1%
85-89	40%

Causes of Dementia

Cause	Incidence
Alzheimer's disease	60-80%
Vascular dementia	10-20%
Dementia with Lewy bodies	10%
Fronto-temporal dementia	10%
Parkinson's disease with dementia	5%

HIGH RISK FACTORS

- Old age
- Family history of dementia
- Female gender
- Head trauma with concussion
- Environmental factors – Exposure to aluminum & mercury, certain viral infections
- Diabetes – increases the risk of AD three fold
- Vascular disease
- Stroke
- Miscellaneous probable associated factors –
 - Elevated Homocysteine & Cholesterol levels
 - Hypertension

- Low levels of serum folic acid
- Low dietary intake of fruits, vegetables & red wine
- Lack of exercise

LOW RISK FACTORS

- Capacity to express complex written language in early adulthood

PATHOLOGY

- Most severe degeneration is found in the medial temporal lobe, lateral temporal cortex & nucleus basalis of Meynert consisting of neuritic plaques & neurofibrillary tangles
- Biochemically AD associated with a decrease in cortical levels of proteins and neurotransmitters like acetylcholine, choline acetyltransferase and nicotinic cholinergic receptors

LABORATORY DIAGNOSIS

- Neuroimaging studies – CT / MRI usually show patchy or posteriorly predominant cortical & hippocampal atrophy.
- EEG – maybe normal or shows nonspecific slowing
- CSF $A\beta_{42}$ levels – decreased
- CSF hyperphosphorylated Tau protein– increased
- ApoE genotyping – Presence of ApoE4 allele increases the risk of AD in the general population including sporadic and late age onset familial form
- PS-1 (Presenilin-1) gene mutation detection - presence of this mutation tend to produce AD at an earlier age (mean onset 45 years)