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 Aβ 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

<table>
<thead>
<tr>
<th>Age in years</th>
<th>Incidence</th>
</tr>
</thead>
<tbody>
<tr>
<td>60-64</td>
<td>1%</td>
</tr>
<tr>
<td>85-89</td>
<td>40%</td>
</tr>
</tbody>
</table>

Causes of Dementia

<table>
<thead>
<tr>
<th>Cause</th>
<th>Incidence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alzheimer’s disease</td>
<td>60-80%</td>
</tr>
<tr>
<td>Vascular dementia</td>
<td>10-20%</td>
</tr>
<tr>
<td>Dementia with Lewy bodies</td>
<td>10%</td>
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<tr>
<td>Fronto-temporal dementia</td>
<td>10%</td>
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<tr>
<td>Parkinson’s disease with dementia</td>
<td>5%</td>
</tr>
</tbody>
</table>

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 Aβ42 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)