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EEG Slowing and CSF Amyloid Status: Implications for Alzheimer's Disease Detection and Progression

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Introduction
Alzheimer's disease (AD) is a progressive neurodegenerative disorder characterized by cognitive decline. Cerebrospinal fluid (CSF) biomarkers amyloid-β and tau proteins play a significant role in the diagnosis of AD. However, alternative non-invasive biomarkers are needed for early detection of the disease. Electroencephalogram (EEG) find ings, particularly slowing of brain wave patterns, have been observed in AD patients, but their relationship with CSF amyloid status remains underexplored.
Methods
This was a retrospective cohort study investigating the association between CSF amyloid status, EEG findings, and AD stage. Demographic information, Mini-Mental State Examination (MMSE) scores, CSF amyloid status, and magnetic resonance imaging reports were collected for each participant. EEG recordings were analyzed through visual analysis and manual counting.
Results
Among 19 participants, 13 were CSF amyloid-positive and six were CSF amyloid-negative. Among CSF amyloid-positive individuals, eight (62%) displayed evidence of diffuse background slowing, while two (33.3%) o f the CSF amyloid-negative individuals exhibited slowing. When comparing individuals with mild cognitive impairment (MCI) and AD, there was no significant difference in CSF amyloid status, but MCI individuals had a higher prevalence of diffuse background slowing and lower average MMSE scores compared to AD individuals.
Conclusion
Despite the lack of a significant difference between diffuse background slowing on EEG and CSF amyloid status, the novelty and practicality of EEG makes additional research on this topic worth pursuing. Integrating EEG analysis with CSF amyloid status could enhance AD diagnosis and facilitate means of early intervention in the disease progression. Longitudinal studies with larger sample sizes are needed to determine the precise relationship between EEG patterns and CSF amyloid status across the AD spectrum.