A04.i. Imaging, Biomarkers, Diagnostics: EEG, brain mapping, MEG

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ASSESSMENT OF EEG-BASED BIOMARKERS OF ALZHEIMER'S DISEASE PROGRESSION
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Aims

Recent studies on Alzheimer's disease (AD) have suggested that brain damage and neuronal loss start several years before clinical symptoms can be recognized. In the last decade, electroencephalography (EEG) has emerged as a promising tool to evaluate these processes in AD. Moreover, EEG presents the advantages of being portable, widely available and non-invasive. Here, we explore the relationship between the extensively used Mini-Mental State Examination (MMSE) scores and EEG features derived from the amplitude modulation analysis [1], along with the classical power band features, with the ultimate goal of identifying EEG biomarkers which could be useful for monitoring AD progression.[1] Cassani R et al (2014) Front. Aging Neurosci. 6:55. doi: 10.3389/fnagi.2014.00055

Method

EEG data was derived from 20-channel resting-awake recordings from 55 participants. AD patients were diagnosed by experienced neurologists according to NINCDS-ADRDA criteria. Participants were classified according their MMSE scores into three groups, namely: healthy controls, mild AD, and moderate-to-severe AD. EEG amplitude-modulation and power-band features were computed and analyzed to assess their relationship with MMSE scores and, consequently, with disease progression.

Results

Feature analysis corroborates major findings reported in literature, including the slowing of the EEG with AD. Additionally, the present analysis provides further insights into the recently proposed amplitude-modulation features and their usefulness in monitoring AD progression.

Conclusion

EEG biomarkers of AD progression have been found and could open doors for improved AD monitoring, diagnosis, and treatment, particularly in low-income countries where access to doctors and expensive neuroimaging tools may be scarce.