Evaluating Whether EEG could Predict Alzheimer's Disease Onset in Preclinical Patients with the ApoE4 Allele

ENZE MA[1], Selin Kutlu[1], Nathan Kim[2], Catherine Mitchell[3], Vimala Vajjala, MD[1,3], Enrique Carrazana, MD[1,3], Jason Viereck, MD, PhD[1,3] and Kore Liow, MD[1,3], (1)John A. Burns School of Medicine, Honolulu, HI, USA, (2)University of Hawaii at Manoa, Honolulu, HI, USA, (3)Hawaii Pacific Neuroscience, Honolulu, HI, USA

POSTER

ISTAART

alzheimer's association

STUDENT

EEGs may be a potential predictive test for the onset of Alzheimer's Disease in high-risk patients.

INTRODUCTION

Alzheimer's disease (AD) is progressive neurodegenerative disease and is the most common cause of dementia in the elderly. Currently, patients are diagnosed based on memory loss through mental status exams, supportive imaging, and/or laboratory tests. Even though there are no biomarkers or tests available for preclinical patients, the Apolipoprotein E (ApoE) polymorphic alleles indicate if a patient is at high (e4 allele), neutral (e3 allele), or low risk (e2 allele). In this study, we use electroencephalogram (EEG) analysis in preclinical participants at high genetic risk for AD to determine if there are characteristic EEG changes and/or patterns that may predict progression to AD at the preclinical stage.

METHODS

Participants ages 64 to 78 were selected from Hawaii Pacific Neuroscience's patient database. Selected participants had a Mini-Mental Status Exam score of no lower than 28. Participants were asymptomatic at the time of the study. Each participant also had a genotype study to determine their ApoE genotype (11 participants were e3e3; 3 participants were e3e4; 2 participants were e4e4; 1 participant was e2e4). An EEG was conducted to determine any apparent trends via visual analysis.

RESULTS

Of the 18 participants who had received EEGs, 6 (33%) displayed evidence of abnormal focal temporal slowing of some kind. 4 of the 6 (e3e3, e3e3, e3e4, e3e4) displayed focal left temporal slowing, and 2 of the 6 displayed bilateral temporal slowing (e4e4, e3e3), of which one was independent (e4e4). The remaining 12 patients did not display any abnormalities in their EEG study. Of the 11 e3e3 genotype participants, 3 (27%) displayed abnormal slowing. Of the 3 e3e4 genotype participants, 2 (67%) displayed abnormal slowing. Of the 2 e4e4 genotype participants, 1 (50%) displayed abnormal slowing.

CONCLUSIONS

This study suggests that EEGs may be a potential predictive test for the onset of AD in high-risk patients, particularly with the ApoE4 allele. Future studies may follow the progression of EEGs in this patient population to determine if our EEG data correlates with future onset of cognitive symptoms. If proven to be successful, EEGs may be an additional, noninvasive tool to detect possible AD before progression to permanent memory loss.

REFERENCES

Stomrud, Erik, et al. "Slowing of EEG correlates with CSF biomarkers and reduced cognitive speed in elderly with normal cognition over 4 years." *Neurobiology of aging* 31.2 (2010): 215-223.

Tsolaki, A., Kazis, D., Kompatsiaris, I., Kosmidou, V., & Tsolaki, M. (2014). Electroencephalogram and Alzheimer's disease: clinical and research approaches. *International journal of Alzheimer's disease*, *2014*.

CONTACT

Enze Ma, MD Candidate

John A. Burns School of Medicine

alzheimer's association AAIC 21 ALZHEIMER'S ASSOCIATION INTERNATIONAL CONFERENCE®