

QEEG can differ between Good dementia and Bad dementia!

Eunpyeong St. Mary's Hospital, Professor Yong S. Shim's team(Department of Neurology) uncovers the EEG patterns of Alzheimer's disease dementia patients with bad dementia symptoms through iMediSync AI-brain mapping technology!

Purpose

- Many Alzheimer's disease dementia(ADD) patients have neuropsychiatric symptoms(NPS), such as delusions, depression, hallucinations, apathy, agitation, and many more. These symptoms not only impair the patient's daily life, by lengthening hospitalization, but also lowers the family's life quality, by increasing the financial burden of care and stress of a caregiver.
- During the disease course, neuropsychiatric symptoms can appear in 80-90% and have an important effect on diagnosis, prognosis, and treatment. It is very important to develop brain function test technology to predict the symptom manifestation and progress.
- This study was conducted to discern the difference in brain function between Alzheimer's disease dementia patients(ADD) with or without neuropsychiatric symptoms through QEEG analysis.

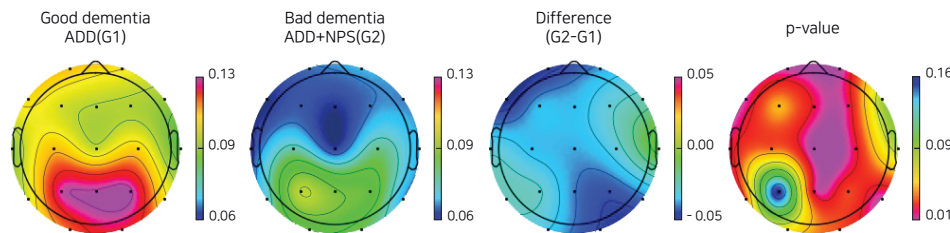
Subjects / Methods

51 Alzheimer's disease dementia patients(ADD) (17 male, 34 female / mean age 77.7), 20 Alzheimer's disease dementia patients without NPS(ADD+None NPS), 31 Alzheimer's disease dementia patients with NPS(ADD+NPS). Outcome comparison of these groups was done with QEEG analysis, using AI-EEG analyzing solution 'iSyncBrain'.

Results

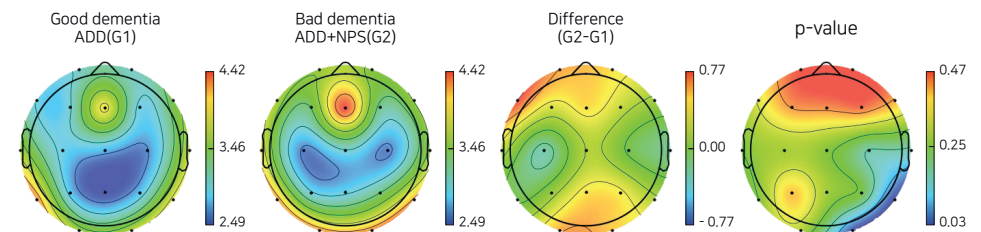
[Topomap (Rel. power) – Decrease of Alpha 2 waves]

In dementia patients, the decrease in occipital lobe alpha waves is known to increase frontal lobe alpha waves at the same time, and this leads to impairment of frontal lobe function. So, compared to the Alzheimer's disease dementia group(G1=good dementia), a significant decrease of Alpha 2 waves in the Alzheimer's disease dementia group(G2=bad dementia) with neuropsychiatric symptoms is a very meaningful result. Frontal lobe (p = 0.016), Central lobe (p = 0.044), Temporal lobe (p = 0.009)



[Theta/Beta Ratio (TBR) – Increase of Theta waves and decrease of Beta waves]

Since high TBR is associated with decreased attention, compared to the Alzheimer's disease dementia group(G1=good dementia), a significant increase of TBR in the Alzheimer's disease dementia group(G2=bad dementia) with neuropsychiatric symptoms is a very meaningful result. Frontal lobe (p = 0.032), Central lobe (p = 0.030)





Discussion

- Alzheimer's disease dementia patients have various clinical courses, so it is important to classify and predict these courses.
- In this study, good dementia patient's alpha waves were relatively preserved. Whereas patients who had bad dementia symptoms had low alpha waves in the overall brain and a degraded pattern(increase of theta waves) of the frontal lobe function was observed.
- By classifying these differences with QEEG patterns, it is expected to help predict neuropsychiatric symptoms manifestation and progress in Alzheimer's disease dementia patients.

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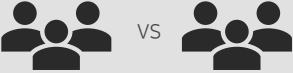
A Standardized QEEG (Quantitative Brainwaves) Group Statics Package with AI Denoising Pipeline

Normative Comparison
Comparison with Normative Database Group


VS


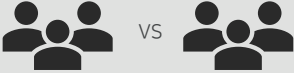
Powerful group statistical analysis
utilizing normative library
The world's one and only age and sex
specific normative database

Independent t-test (G1 vs G2)
Used for comparison between
two independent groups




G1 VS G2

Paired t-test (Pre vs Post)
Pre-post comparison
within a group



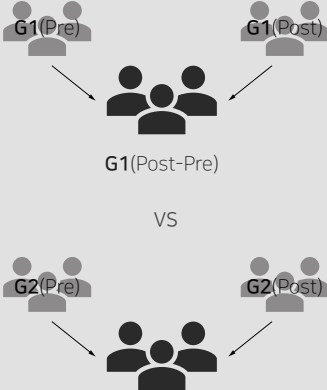
G1(pre) VS G1(post)

ANOVA (3-Group)
Comparisons among three
independent groups



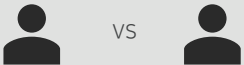
G1 VS G2 VS G3

2-Group (Two arm study)
Comparison between two groups
using each group's pre-post differences



G1(Post-Pre) VS G2(Post-Pre)

1 : 1 Comparison
Pre and post comparison
for an individual



Man(pre) VS Man(post)