

It has been successful to classify the patients of MCI(Mild Cognitive Impairment) with encoding failure which is a prodromal stage of Alzheimer's disease. Studied by Professor Young Chul Youn's Lab in the department of Neurology, College of Medicine, Chung-Ang University, collaborated with iMediSync.

Purpose

Mild cognitive impairment (MCI) is considered as prodromal stage of dementia but depending on the cause and type it progresses more quickly or recovers on its own. Due to different risks, it is difficult to prognose accurately. EF-MCI is expected to originate from hippocampal dysfunctions and have higher risk of Alzheimer's Disease Dementia(ADD) than RF-MCI. However, there is no comprehensive approach to understand the disease entity. In this study, we, thus, aimed to explore functional and structural differences between EF and RF using quantitative electroencephalography (QEEG) and magnetic resonance imaging (MRI) volumetry.

*EF-MCI : Encoding Failure Mild Cognitive Impairment, *RF-MCI : Retrieval Failure Mild Cognitive Impairment

Subjects / Methods

87 patients of EF-MCI (39 male, 48 female), 78 patients of RF-MCI (20 male, 58 female)

Outcome comparison was done with QEEG analysis and fMRI test, using AI-QEEG analyzing solution 'iSyncBrain'.

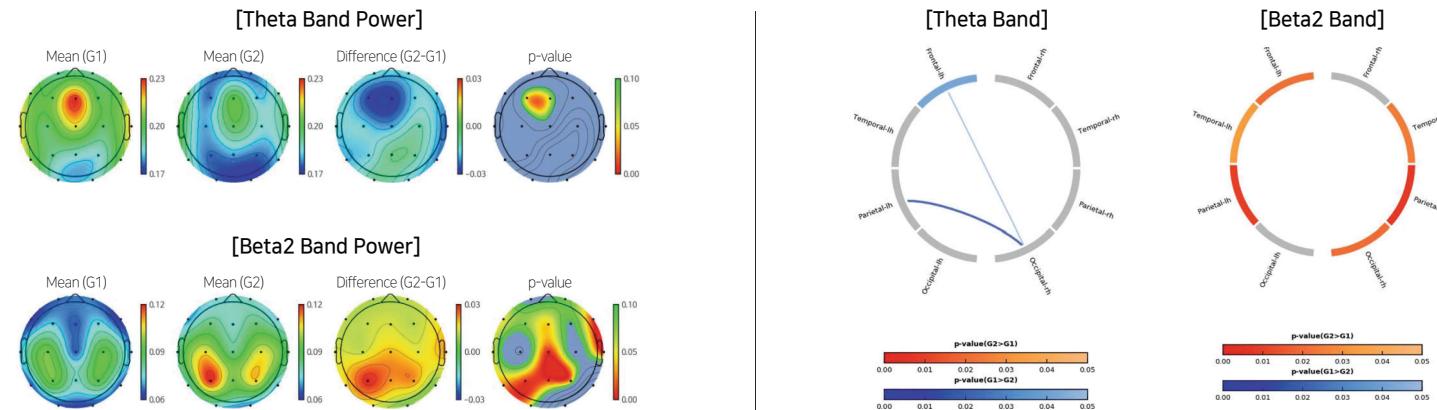
Results

[Sensor Level analyses result : Band Power] Compared to RF, EF patients' theta band power significantly increased in the frontal lobe.

Whereas beta2 power in the frontal, central, temporal, and parietal lobes decreased.

[Source Level analyses result : ROI Power & Connectivity] Theta band power of EF group showed significant increase in left frontal lobe.

At the same time, functional connectivity of theta also increased. This means, QEEG proved that EEG pattern differs according to type of MCI.



Discussion

Even with the same MCI, the risk of dementia differs depending on the functional and structural abnormalities of the memory circuit controlled by the hippocampus. Since RF has normal hippocampus, it can store information. But due to memory circuit damage, it has problem of recalling and has low risk of progressing to ADD.

Whereas EF has a problem of both storing and recalling of information, so has a high risk of progressing to ADD.

In other words, even with the same MCI, the risk of dementia differs depending on the functional and structural abnormalities of the memory circuit controlled by the hippocampus. This study identified that high risk of Alzheimer's disease Dementia can be predicted with QEEG, and Dementia can be prevented with appropriate intervention treatment.



R

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

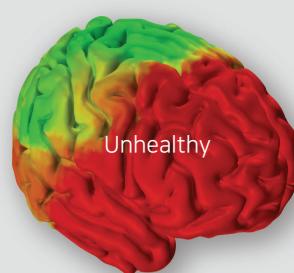
Normative Comparison

Comparison with Normative Database Group



Healthy(Norm)

VS



Unhealthy

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 G2

Paired t-test (Pre vs Post)

Pre-post comparison
within a group



G1(pre) G1(post)

ANOVA (3-Group)

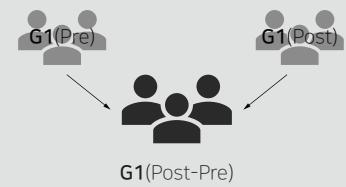
Comparisons among three
independent groups



G1 G2 G3

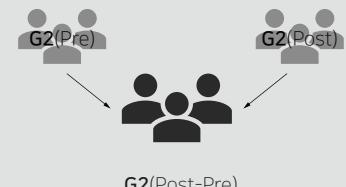
2-Group (Two arm study)

Comparison between two groups
using each group's pre-post differences



G1(Pre) G1(Post)

VS



G2(Pre) G2(Post)

VS

Intended for Research. FDA not Cleared