

Characteristics of Attention-Deficit/Hyperactivity Disorder Subtypes in Children Classified Using Quantitative Electroencephalography

Purpose

- Attention Deficit/Hyperactivity Disorder(ADHD) is one of the most common mental disorders in children and adolescents and generally occurs in childhood.
- The global prevalence rate is 2-7%, and about 60% of patients diagnosed with ADHD in childhood persist into adulthood.
- 60% of ADHD is accompanied by one or more conditions, such as anxiety, depression, behavioral disorders, rebellious disorders, and learning disorders.
- ADHD is diagnosed by interviews with clinicians and neurocognitive tests, but it is difficult to diagnose early and accurately because there are various symptoms and accompanying diseases.

Subjects / Methods

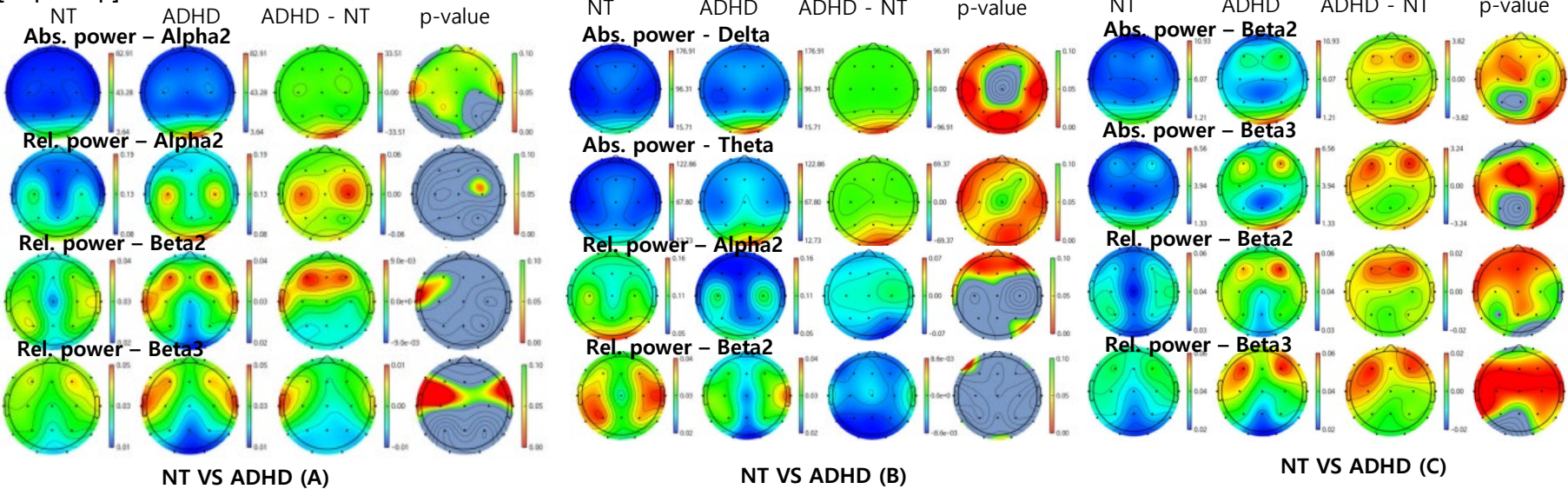
- ADHD : 42 participants (Male = 38 people, Female = 4 people, Age Level = 8.71 years old), Normal(Neurotypical, NT) : 27 people (Male = 18 people, Female = 9 people, Age Level = 8.93 years old)

	NT (N=27)	ADHD Subtype (N=42)			F _(1,2)	p-value
		Group A (N=15)	Group B (N=11)	Group C (N=16)		
Age, years (mean±SD)	8.93±1.81	8.46±1.81	8.73±1.66	8.93±1.59	0.378	0.769
Sex, male (%)	18 (66.7)	13 (86.7)	10 (90.9)	15 (93.8)	6.348	0.096
FSIQ (mean±SD)	105.15 ± 11.50	105.47 ± 18.17	97.36 ± 21.68	103.63 ± 14.57	0.740	0.532

- K-SADS-PL-K (intelligence test), K-ARS (parent assessment of children's ADHD), DBDS (child behavioral problem assessment), WURS (parent's recall scale of childhood ADHD-related symptoms), and EEG measurements were performed.
- Brainwave is analyzed using iSyncBrain, AI EEG analysis software of iMedisync Inc. and the sub-classification of ADHD is divided into three categories.
- (A) Fast alpha and beta power increase at relative power (15 people) / (B) Slow frequency (Delta, Theta) at absolute power (11 people) / (C) Beta power increase at absolute power and relative power (16 people)
- ANCOVA was performed to compare clinical characteristics with three ADHD subtypes.

Results

[Topomap]



[EEG]

- ADHD (B) : Although the power of delta and theta in the entire cerebral region was high at absolute power, beta2 in the occipital region and alpha2 in the frontal region at relative power were significantly lower than in the NT group.
- ADHD (C) : The beta power of the entire cerebral region was high at absolute power, and in most regions except the occipital region at state power.

[Survey]

- K-SADS-PL-K : No significant difference between the three ADHD subtypes and NT groups.
- K-ARS : Significantly higher than NT groups in ADHD (A) and ADHD (C).
- DBDS : Three ADHD subtypes are significantly higher compared to NT groups.
- WURS : ADHD (B) is significantly higher than NT group.

Discussion

- The QEEG characteristics of ADHD children were explored, and ADHD sub-characteristics were classified based on these characteristics.
- The clinical characteristics of parents of children by QEEG characteristics of children with ADHD were also identified.
- If parents experience many ADHD-related symptoms when they are young, their K-ARS score may be underestimated if their children's ADHD symptoms are not carefully monitored or neglected.
- Therefore, the results according to the QEEG characteristics of ADHD children can improve the diagnostic criteria for ADHD if the study of sufficient number of ADHD children is given