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Analysis on ADHD Brain SPECT Images by Statistical Parametric Mapping

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INTRODUCTION : There are a few studies about Attention deficit hyperactivity disorder(ADHD) for children using statistical parametric mapping(SPM). ADHD is one of the common psychiatric disorders in school age children and it has persisting to adult. ADHD is affected 7.6% in Korean children, and persisting into 15-20% in adult. The purpose of this study is to evaluation the distributions of clusters in each probability levels in children ADHD SPECT brain blood flow images by using BOLD(blood oxygenation level dependent)plotting in statistical parametric mapping. BOLD method can display about functional mapping studies of the human brain. METHODS : We studied 64 children ADHD patients group(4-15y, 8.03±2.57y. M/F:52/12) and 12 normal group(6-17y, 9.42±3.37y, M/F:8/4) and compared between boys and girls ADHDs. The number of normal boys are 8(6-7y, average:9.6±3.9y) and 51(4-11y, average: 9.0± 2.4)ADHD patients, and normal girls 4(6-12y, average:9±2.4y), 13(2-13y, average:10±3.5y) ADHD patients. A blood flow tracer of 99mTc-ethylcysteinate dimer(ECD) was injected as rCBF agent and took the blood flow images by SPECT camera(Simens Inc., Hoffman Estates, IL, USA) after 30 minutes from injection. RESULTS : In case of ADHD boys , the blood flow increased at the cingulate gyrus, right occipital lobe and right parietal lobe. Average hyperperfusion rate is 15.3~15.8% in each clusters and average hypoperfusion rate is 14.97~15.64%. Hypoperfusion clusters appeared at the right cerebral sup. temporal gyrus, left and right frontal lobe.

In case of ADHD girls, the blood flow increased at the cerebellar, post. Lobe. Average hyperperfusion rate is 24.7~31.3% in each clusters. Average hypoperfusion rate is 30.6~30.8%. Hypoperfusion clusters appeared at the right cerebral lentiform nucleus. CONCLUSION : As a result of this study, the recommend probability level is $P<0.1\sim0.2$ for hyperperfusion clusters in ADHD, and a correct information can be took from the cluster distributions in brain image. BOLD plotting technique can be used to measure a quantification of the effect in relation to cerebral blood flow(CBT) and also can evaluate the brain regional activities.

Keywords : SPECT, SPM, ADHD