Event-related potential and behavioral characteristics in children with attention deficit hyperactivity disorder of different school entrance ages: a comparative study

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Abstract

OBJECTIVE:
To evaluate the effects of school entrance age on cognition and behaviors in children with attention deficit hyperactivity disorder (ADHD) using mathematical event-related potential (ERP), behavioral test, and Conners Parent Symptom Questionnaire (PSQ).

METHODS:
Fifty-eight ADHD children aged 7-12 years were enrolled and classified into older age and younger age groups according to the school entrance age (n=29 each). The children in the older age group were admitted at an age of 6 years and 6 months to 6 years and 11 months, and those in the younger age group were admitted at an age of 6 years to 6 years and 5 months. The ERP with a mathematical task was used to detect the difference in brain electrical activity between the two groups, and the behavioral test results were compared. The children's parents were asked to complete the PSQ, and the scores on each subscale were compared.

RESULTS:
The ERP detection showed that the older age group had a significantly higher P2 amplitude for wrong answers than the younger age group (10.9±5.0 μv vs 8.5±3.6 μv; P<0.05). The younger age group had a significantly shorter time of response to wrong answers than the older age group (619±340 ms vs 870±418 ms; P<0.05). The scores on the subscales of learning problems and impulse-hyperactivity of PSQ were significantly higher in the younger age group than in the older age group (P<0.05).

CONCLUSIONS:
School entrance age can affect cognition and behaviors in children with ADHD, and the ADHD children with a younger school entrance age have an obvious defect in executive function, especially the function of error detection, which leads to the prominent problems in impulse-hyperactivity and learning.