

Associations between cerebral blood-flow measured by single photon emission computed tomography (SPECT), electro-encephalogram (EEG), behaviour symptoms, cognition and neurological soft signs in children with attention-deficit hyperactivity disorder (ADHD).

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Twenty-eight children with attention-deficit hyperactivity disorder (ADHD) were examined with SPECT (single photon emission computed tomography). Seven of the children had abnormal distribution of the regional cerebral blood-flow (rCBF) on visual evaluation and 10 had abnormal EEG findings. The only clinical finding that differentiated the group with normal from abnormal rCBF was behaviour symptom load. A factor analysis of the rCBF in different regions of interest yielded one factor with low rCBF in the temporal and cerebellar regions and high rCBF in the subcortical and thalamic regions, which was significantly associated with the degree of motor impairment and results on a cognitive test (WISC). Another factor consisting of high rCBF in frontal and parietal regions had a significant negative correlation with the degree of behaviour symptoms. There was a negative correlation between the rCBF in the right frontal regions and the degree of behaviour symptoms. The number of minor physical anomalies (MPA) was negatively correlated to the rCBF in the frontal lobes bilaterally. These results suggest that there may be at least two functional disturbances in ADHD, one specific neurodevelopmentally determined disturbance of the frontal lobes, especially of the right hemisphere, related to behaviour deviance, and another disturbance of the integration of the temporal lobes, the cerebellum and subcortical structures, related to motor planning and aspects of cognition.