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The Effect of Inattention on Cerebral Blood Flow Perfusion

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Objective: This study attempted to differentiate between ADHD patients, primarily inattentive subtype, from a healthy comparison group, using high resolution brain SPECT imaging. Method: Participants included 140 patients with ADHD inattentive type and 149 demographically-matched controls. All participants underwent brain SPECT imaging at rest and during concentration using semiquantitative visual readings. Results: A one-way ANOVA was conducted and revealed significant differences in cerebral blood perfusion, as measured by SPECT scan, between the ADHD group and the healthy controls. Significant differences at the ($p < .001$) level were observed in 100% of the measured areas of the occipital lobe, 71% of the areas of the frontal lobe, 61% of the cerebellum, 12.5 % of the vermis within the cerebellum, 50% of the parietal lobe, 50 % of the angular gyrus, 50% of the calcarine fissure, and 4.5 % of the temporal lobe. Regions of interest that were insignificant included all measured areas of the amygdala, cuneous, fusiform gyrus, insula, olfactory, palladium, caudate nucleus, putamen, paracentral lobule, and lingual gyrus. Conclusion(s): Results indicate a significant difference in cerebral blood perfusion for the ADHD inattentive group in several brain areas when compared to a healthy control group. This study shows that compared to a healthy control group, participants diagnosed with the inattentive subtype of ADHD have significantly different perfusion in their frontal, occipital, and parietal lobe, as well as the cerebellum. These results can have important applications when prescribing and developing medication to target attentional difficulties and in developing rehabilitation strategies for those with frontal lobe deficits.

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