

Association of Childhood Obesity with the Central Nervous System (CNS): Study of Diffuse Tensor Imaging (DTI)

Thursday 10:40-10:50 AM | SSQ17-02 | Room: S103AB

PURPOSE

The aim of this work is to investigate the influence of childhood obesity on changes in anatomy and cerebral connectivity, using the DTI by Magnetic Resonance Imaging (MRI). The hypothesis is that the brain is an organ also affected by high adiposity, particularly the hypothalamus, which is a complex region involved in the regulation of appetite and hormonal homeostasis.

METHOD AND MATERIALS

The images were obtained on Achieva 3T Phillips Magnetic Resonance. The sample for statistical analysis consisted of 120 subjects: 59 obese adolescents and 61 healthy adolescents, aged 11 years to 18 years, and matched regarding gender, age, and schooling. The images were processed with the FSL-Tbss (Tract Based Spatial Statistics) program and analyzed statistically by the same program with Randomize.

RESULTS

Statistical analysis showed decrease in the values of Fractional Anisotropy (FA) of obese pediatric patients compared with healthy controls in amygdala, hippocampus, thalamus, cingulate gyrus, fornix, insula, putamen, orbital gyrus and bilateral hypothalamus. There was no region of higher FA in obese patients in relation to the control group.

CONCLUSION

The data reveal a pattern of involvement in important regions in the control of appetite and emotions. Limbic structures, such as amygdala, hippocampus, thalamus, cingulate gyrus, fornix and insula are altered. Important regions related to impulse control, reward and pleasure in eating (putamen and orbital gyrus) and autonomic appetite control (bilateral hypothalamus) were also shown to have decreased FA.

CLINICAL RELEVANCE/APPLICATION

Childhood obesity is a subject of high clinical importance, and presents data of ascent from 10 to 40% of the last 10 years in most countries. Previous studies have pointed to obesity as a risk factor for neurodegenerative disorders through DTI tractography. In this way, we investigated previous or early cerebral changes in obesity.