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Brief Report

Higher BMI and Smaller Grey Matter; Association of Obesity with morphological changes in Brain.

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Abstract

Obesity epitomizes as the world's exigent public health concern. It is considered a worst pandemic that results in various cardiovascular complications, metabolic disorders and development of Type 2 diabetes mellites. Previous studies connect obesity with an increased risk of augmented decline in cognitive function and development of dementia, explaining the vicissitudes in brain

Keywords: Obesity, pandemic metabolic disorders, Type 2 diabetes mellitus, cognition, dementia

Introduction

Obesity epitomizes as the world's exigent public health concern. It is considered a worst pandemic that leads to various systemic dysfunctions such as cardiovascular disorders, metabolic disorders such as development of Type 2 diabetes mellitus. Recent research suggests a direct link between obesity and neurological dysfunctions. Obesity related changes lead to an increased risk of augmented decline in cognitive function and development of dementia, explaining the vicissitudes in brain. This has been attributed to the obesity related morphological changes in the neural tissues.[1]

Brain changes in obesity

Obesity leads to alterations in regions such as frontal cortex and limbic system. This leads to lesions of white matter, dementia and deterioration of decision-making functions. It also hastens the aging process in the neural tissues.[2] The hypothalamus and the nucleus tractus solitarii are the principal regions that regulates food intake according to actual caloric as well as nutritional necessities.

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The amygdala, nucleus accumbens and hippocampus plays a major role in hedonic food intake. Genetic Studies suggest that the volume of accumbens was found to be larger in obese children (9–12 years).[3] Childhood obesity is a predominant factor for development of Type 2 Diabetes in young individuals which is associated with abnormalities in the brain morphology. Research reveals the association between obesity and differences in white matter microstructure.[4]

State of neuroinflammation

Apart from affecting the brain morphologic structure and microstructural integrity, Without the peripheral immune cells, subtle glial cell activation occurs in obesity suggesting a state of inflammatory response of the central nervous system.[1]

Smaller subcortical grey matter volumes

From a UK based Biobank study, a large-scale multiparametric imaging data involving 12 087 participants found that obesity was associated with smaller subcortical grey matter volumes and higher coherence but lower magnitude of white matter microstructure, proving the differential influences of obesity on the microstructure of white matter.[1]

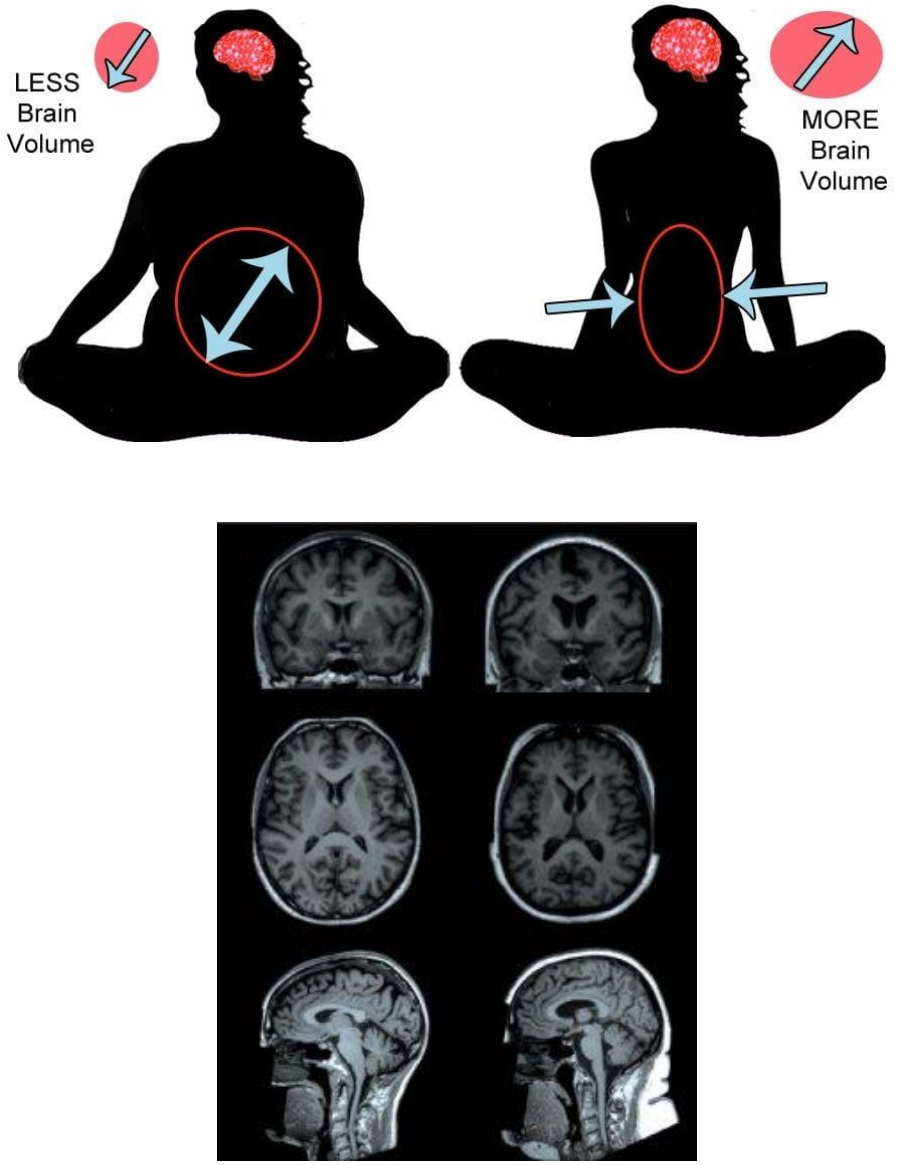

Figure. The brain situation
(Image Credit: Radiological Society of North America[1])

Author contributions

DR, AV conceived of the study and participated in its design and coordination as well as helped to draft the manuscript; also read and approved the final manuscript.

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Conflict of interest

All authors declare that they have no conflict of interest.

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