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Author: Bo Peng Zhiye Chen Lin Ma Yakang Dai

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Cerebral Alterations of Type 2 Diabetes Mellitus on MRI: A Pilot Study

Bo Peng^{a,b,c,1}, Zhiye Chen^{d,1}, Lin Ma^{d*}, Yakang Dai^{a,*}

^a Suzhou Institute of Biomedical Engineering and Technology, Chinese Academy of Sciences, Suzhou 215163, China

^b University of Chinese Academy of Sciences, Beijing 100049, China

^c Changchun Institute of Optics, Fine Mechanics and Physics, Chinese Academy of Sciences, Changchun 130033, China

^d Department of Radiology, PLA General Hospital, Beijing 100853, China

¹ These authors contributed equally to this work

* Correspondence: daiyk@sibet.ac.cn (Y. Dai), cjr.malin@vip.163.com (L. Ma).

Highlights:

- Decline of gray matter volume, cortical thickness and surface area were found in T2DM.
- The findings indicated that T2DM probably caused brain changes in specific regions.
- The potential neural alterations of T2DM may help early diagnose the disease.

Abstract:

This study is to investigate gray matter volume, cortical thickness, and surface area of the brain in patients with type 2 diabetes mellitus (T2DM). High-resolution T1-weighted MR images were obtained from eighteen T2DM and seventeen normal controls. All images were processed using our newly developed BrainLab toolbox. Declines of gray matter volume, cortical thickness and surface area were found in T2DM patients. Significantly reduced ROIs of gray matter volume happened in subcortical gray nuclei (left caudate and right caudate), and significantly reduced ROIs of cortical thickness occurred in temporal lobe (left superior temporal gyrus), parietal lobe (left angular gyrus) and occipital lobe (right superior occipital gyrus, left middle occipital gyrus and right cuneus). Apparently reduced ROIs of surface area were mainly distributed in frontal lobe (right superior frontal gyrus (dorsal) and left paracentral lobule). The findings indicated that T2DM caused brain changes in specific regions. This work revealed neural alterations of T2DM, which had a great significance in early diagnosis of the disease.

Key Words:

type 2 diabetes mellitus; brain MRI; gray matter volume; cortical thickness; surface area

1. Introduction

Examination of brain changes from brain magnetic resonance (MR) imaging is critical in type 2 diabetes mellitus (T2DM) diagnosis. T2DM is a common metabolic disorder that characterizes by a slowing mental speed and a diminished mental flexibility in an aging population. Cross-sectional study of several

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