Letter

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Association between Type 2 Diabetes Mellitus and Brain Atrophy: A Meta-Analysis (*Diabetes Metab J* 2022;46:781-802)

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Type 2 diabetes mellitus (T2DM) is associated with increased risk of cognitive impairment and incidence of Alzheimer's disease (AD) [1]. Cortical atrophy has been suggested as a strong predictive marker for neurodegenerative disease [2]. Therefore, it is tempting to measure cortical atrophy as a biomarker link between the two disease entities T2DM and AD, which are increasing as a great burden on society. In the current issue, in the article entitled, "Association between type 2 diabetes mellitus and brain atrophy: A meta-analysis," Zhang et al. [3] systematically reviewed studies on magnetic resonance imaging-measured brain volume and T2DM.

In the study, the authors proposed that individuals with T2DM had smaller brain volumes, and the volume reduction rate positively correlated with diabetes duration. There are certain limitations to the current study. As the author mentioned, there were not many longitudinal case-control or longitudinal population-based studies. Moreover, there were heterogeneities in the measurement (automated vs. manual) and limited information on covariates, which may hamper a firm conclusion.

However, this interesting topic raises some points for future research on the cognitive function of T2DM patients. First, finding meaningful structural changes in the brain that correlate with functional cognitive decline would be helpful to predict further cognitive decline in T2DM patients. Although some studies measured brain volume and analyzed cognitive function in the same participants [4,5], it is premature to accept local brain changes as a predictive marker for cognitive functions.

Second, more research on the differential effects of different kinds of anti-diabetic drugs on brain atrophy is needed. There is evidence that insulin usage is associated with an increased risk of dementia, while other oral anti-diabetic drugs reduced the risk [6]. It needs to be proven whether intermittent hypoglycemia or poorly controlled hyperglycemia (more severe cases with insulin treatment) is the possible reason for the result. In addition, although some agents may reduce cognitive decline, their roles in delaying brain atrophy are not known.

Last, whether the glucose-lowering therapy is effective in delaying cognitive decline and brain atrophic changes needs to be validated. It is well known that strict blood glucose control may substantially reduce the risk of microvascular and macrovascular complications. Although previous studies reported that poor glycemic control may worsen the cognitive performance in elderly with T2DM [7], the effect of glucose lowering on cognitive function in T2DM patients is controversial [8-10].

These points suggest that a well-controlled study design with detailed clinical information on diabetes may help understand the important complication of T2DM and intervene in the early stages of cognitive decline.

CONFLICTS OF INTEREST

No potential conflict of interest relevant to this article was reported.

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