Two-hour glucose tolerance test predicts decline in episodic memory

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Diabetes is a risk factor for cognitive decline. In a study of the University of Turku and Finnish Institute for Health and Welfare, the researchers observed that already a higher two-hour glucose level in the

glucose tolerance test predicts worse performance in a test measuring episodic memory after ten years. Decline in episodic memory is one of the first symptoms of Alzheimer's disease.

Diabetes is known to be an independent risk factor for memory disorders. Previous studies have shown that risk factors for diabetes, such as obesity, metabolic syndrome, and decreased insulin sensitivity are associated with decline in cognitive functions and heightened risk of developing memory disorders. Fasting blood glucose is not as good a tool for measuring the risk as these are, and according to a previous report of the Finnish Health 2000 study, it did not predict decline in memory functions.

Two-hour glucose in a glucose tolerance test is a commonly used test in healthcare services, where it is used to study whether the person being tested has diabetes or impaired glucose tolerance. According to the definition, a person has impaired glucose tolerance when glucose level in two-hour glucose tolerance test is elevated, but the diagnostic criteria for diabetes are not met.

In the new study, the researchers studied whether the glucose levels of two-hour glucose tolerance test are connected to cognitive functions after a ten-year follow-up period. The surveys were conducted in 2000–2002 and 2011 for a total of 961 participants. Memory and other cognitive functions were measured with three tests which are commonly used in e.g. diagnostics and follow-up of patients suffering from memory disorders.

The study suggested that higher blood glucose level measured in a glucose tolerance test in 2001–2002 was associated with weaker performance in a memory test conducted in 2011, in which the participants needed to recall a previously learned list of words after a delay.

"The glucose level measured in the two-hour glucose tolerance test was also associated with a greater decline in the results of the test during the follow-up period. The analyses took into consideration the most important known risk factors of memory disorders such as age, education background, elevated blood pressure, elevated cholesterol level, obesity, type 2 diabetes, and smoking," says first author, Doctoral Candidate Sini Toppala from the University of Turku.

The study is based on the population-based Health 2000 Survey of the Finnish Institute for Health and Welfare and its supplementary data collected in 2001–2002 as well as its follow-up, the Health 2011 study. During the first survey, the participants were aged 45–74 years (mean 55.6 years).

"The study shows that glucose tolerance test helps identify patients with impaired glucose tolerance who have a heightened risk of cognitive decline. This is important for targeting interventions," explains Toppala.

The research article was published as an online ahead-of-print version on 15 August 2021. The study is scheduled to be published in a future issue of *Diabetes Care*.

More information: Sini Toppala et al, Oral Glucose Tolerance Test Predicts Episodic Memory Decline: A 10-Year Population-Based Follow-up Study, *Diabetes Care* (2021). DOI: 10.2337/dc21-0042

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