RELATIONSHIP BETWEEN GLYCEMIC CONTROL AND THE SEVERITY OF ISCHEMIC STROKE IN PATIENTS WITH TYPE 2 DIABETES MELLITUS

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Aim: *To determine the relationship between glycemic control parameters and the severity of ischemic stroke in patients with type 2 diabetes mellitus.*

A history of type 2 diabetes mellitus is associated with increased severity of stroke manifestations, an increased probability of stroke recurrence over the subsequent 10 years, and higher mortality in the setting of acute cerebrovascular events (20–40%) [1]. The pathogenetic mechanism underlying the development of ischemic stroke in the setting of diabetes mellitus is primarily related to the effects of pathologically altered vascular walls on hemorheology, hemostasis, and fibrinolysis. Diabetes mellitus contributes to the development of ischemic stroke. Hyperglycemia causes excessive glucose uptake and accumulation in cells; primarily, these include retinal endothelial cells, glomerular mesangial cells, and endothelial cells of the peripheral nerves. Alternative metabolic pathways are activated, resulting in the formation of glycation products and reactive oxygen species. The resulting free radicals activate lipid peroxidation, leading to destruction of cell membranes and DNA damage [2]. Interaction of these radicals with nitric oxide (NO) results in the formation of peroxynitrite, which reduces NO-dependent vasodilation. This contributes to the development of endothelial dysfunction. In diabetes mellitus, the oxygen-transport function of hemoglobin is impaired as a consequence of its glycation, subsequently contributing to tissue hypoxia. Reduced erythrocyte deformability and increased erythrocyte aggregation impair blood flow in the microcirculation and contribute to vascular wall injury [3]. Dysfunction of the hemostatic system is manifested by increased fibrinogen levels, increased activity of coagulation factors VII and VIII, and decreased levels of antithrombin III and thrombomodulin.

Materials and Methods: The study included 36 patients with ischemic stroke and type 2 diabetes mellitus. Blood glucose level, HbA1c, duration of diabetes mellitus, and type of antidiabetic treatment were assessed. Stroke severity was evaluated using

the National Institutes of Health Stroke Scale (NIHSS), while functional status was assessed using the modified Rankin Scale (mRS). Patients were divided into two groups according to their HbA1c level: <7% and ≥7%.

Results: The mean NIHSS score was 36 points in patients with HbA1c ≥7% and 18 points in those with HbA1c <7% ($p<0.05$). A positive correlation was identified between HbA1c level and NIHSS score ($p=0.001$). Patients with higher glycemic parameters demonstrated more pronounced functional limitations during the early period.

Conclusion: Impaired glycemic control may be associated with a more severe course of ischemic stroke and poorer functional recovery in patients with type 2 diabetes mellitus.

References

1. Gao X, et al. Diabetes duration, glycemic control, and risk of stroke and stroke subtypes: a nationwide prospective cohort study. Scientific Reports. 2025. doi: 10.1038/s41598-025-30221-9. — The association between diabetes duration and HbA1c and the risk of stroke was studied in 23,401 patients with diabetes. The risk of ischemic stroke was higher when HbA1c was ≥8% compared with HbA1c <7%.
2. Kaynak N, Kennel V, Rackoll T, et al. Impaired glucose metabolism and the risk of vascular events and mortality after ischemic stroke: a systematic review and meta-analysis. Cardiovascular Diabetology. 2024;23:323. doi: 10.1186/s12933-024-02413-w. — A meta-analysis of 159 studies demonstrated that diabetes increases the risk of recurrent stroke, cardiovascular events, and mortality after ischemic stroke.
3. Zhao M, Dong Y, Chen L, Shen H. Influencing factors of stroke in patients with type 2 diabetes: a systematic review and meta-analysis. PLoS One. 2024;19(6):e0305954. doi: 10.1371/journal.pone.0305954.
4. Prentza V, Pavlidis G, Ikonomidis I, et al. Antidiabetic Treatment and Prevention of Ischemic Stroke: A Systematic Review. Journal of Clinical Medicine. 2024;13(19):5786. doi: 10.3390/jcm13195786. — The role of metformin, pioglitazone, and GLP-1 receptor agonists in stroke prevention was analyzed.