

## DEVELOPING METHODS FOR DIAGNOSING CHRONIC CEREBRAL ISCHAEMIA IN PATIENTS WITH TYPE 2 DIABETES MELLITUS

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### Abstract

Chronic cerebral ischaemia (CCI) is one of the leading causes of stroke. As a consequence of chronic circulatory disorders, an inflammatory response develops, characterised by the activation and release of cytokines, chemokines, adhesion molecules and proteolytic enzymes, which in turn contribute to damage to brain structures. HIM is worse among diabetic patients, leading to increased mortality and disability.

**Keywords:** Chronic cerebral ischaemia, cytokines, chemokines, adhesion molecules, diabetes mellitus

### Introduction

In recent decades, the intensive use of insulin or other drugs that stimulate insulin secretion as the primary method of preventing hyperglycaemia and its long-term complications has led to an increased incidence of hypoglycaemia in diabetic patients. An intensively treated patient with type 1 diabetes may experience up to 10 episodes of symptomatic hypoglycaemia per week and severe temporarily disabling hypoglycaemia at least once a year. In addition, impaired counter-regulatory response leads to frequent episodes of hypoglycaemia in diabetic patients. However, hypoglycaemia is becoming more frequent, depending on the history of hypoglycaemia and the duration of insulin treatment. Hypoglycaemia is estimated to account for about 2-4% of deaths in patients with type 1 diabetes. In a study of young patients with type 1 diabetes, continuous glucose monitoring revealed frequent and prolonged asymptomatic (glucose <65 mg/dl) hypoglycaemia in almost 70% of patients. A similar study of older patients with type 2 diabetes found that these patients experience hypoglycaemia (glucose  $\leq$ 70 mg/dl) for an average of 60-89 minutes per day, or 4-6% of the time. It is thus important to understand how neuroinflammatory mediators after hypoglycaemia, or hyperglycaemia and diabetes-related cerebral ischaemia, cause irreversible damage to the CNS. This will inform the development of effective therapies to minimise the extent of damage and improve clinical outcomes.

**Aim of the study:** to develop methods for diagnosis of chronic cerebral ischaemia in patients with type 2 diabetes mellitus

**Materials of investigation methods:** We have analyzed the clinical picture of chronic ischemia in 35 patients with diabetes mellitus type 2. We determined the level of neuron-specific enolase, S100 protein, myelin basic protein, proinflammatory cytokines IL-1, IL-6, TNF-a in patients with chronic brain ischemia with type 2 diabetes.

**RESULTS:** The main clinical manifestations, the so-called "clinical core" of CHEM, are vascular cognitive disorders, the severity of which varies considerably from mild to moderate cognitive impairment in the early stages to very pronounced in the later stage. Careful analysis showed a significant influence of carbohydrate metabolism parameters in different clinical situations: in acute MI - on the severity of neurological deficits, prognosis and outcome; in preventive angiosurgical interventions - on the formation of foci of brain substance damage.

**Conclusions:** Thus, Chronic cerebral ischaemia in the structure of mortality in patients with type 2 diabetes mellitus and disability associated with ischemic ICH determine the priority tasks of finding ways to reduce the risk and improve the prognosis of stroke in this category of patients, whose number is steadily increasing, creating an increasing burden on the healthcare system around the world.

### Literature

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