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**ТИББИЁТДА ЯНГИ КУН
НОВЫЙ ДЕНЬ В МЕДИЦИНЕ
NEW DAY IN MEDICINE**

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www.bsmi.uz

https://newdaymedicine.com E:

ndmuz@mail.ru

Тел: +99890 8061882

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THE RELATIONSHIP BETWEEN COGNITIVE IMPAIRMENT AND GLYCEMIC PARAMETERS IN PATIENTS WITH TYPE 2 DIABETES MELLITUS

Yakubova Markhamat Mirakramovna <https://orcid.org/0000-0002-0208-8013>

Fayzieva Munis Dilshod kizi <https://orcid.org/0009-0004-0049-0561>

Tashkent medical academy, Uzbekistan, Toshkent sh. Farobiy ko'chasi 2. Tel: +998781507825,
e-mail: info@tma.uz

✓ Resume

Cognitive impairment in patients with type 2 diabetes mellitus is one of the actual problems not only of neurology, but also of geriatric medicine. Cognitive impairment is one of the main factors influencing the quality and life expectancy of patients, achieving full effectiveness of the process of treating the underlying disease - diabetes, as well as the formation of an adequate worldview of the patient to his illness. The study involved 126 patients undergoing inpatient treatment. The MMSE test and blood glycemic indicators were studied. In patients with type 2 diabetes mellitus and stage 3 chronic cerebral ischemia, increasingly severe cognitive impairment is observed. Cognitive impairment is directly proportional to blood glycemic indicators. These indicators show that the role of persistent hyperglycemia in the development of cognitive impairment is significant and has a negative impact on cognitive performance.

Key words: cognitive dysfunction, diabetes mellitus, cognitive disorders, chronic cerebral ischemia, glycohemoglobin, encephalopathy.

ВЗАИМОСВЯЗЬ КОГНИТИВНЫХ НАРУШЕНИЙ С ПОКАЗАТЕЛЯМИ ГЛИКЕМИИ У ПАЦИЕНТОВ С САХАРНЫМ ДИАБЕТОМ 2-ТИПА

Якубова Мархамат Миракрамовна <https://orcid.org/0000-0002-0208-8013>

Файзиева Мунис Дилшод кизи <https://orcid.org/0009-0004-0049-0561>

Ташкентская медицинская академия, Узбекистан, г. Ташкент, ул. Фараби 2. Тел:
+998781507825, e-mail: info@tma.uz

✓ Резюме

Когнитивные нарушения у больных сахарным диабетом 2 типа являются одной из актуальных проблем не только неврологии, но и гериатрической медицины. Именно когнитивные нарушения являются одними из основных факторов, влияющих на качество и продолжительность жизни больных, достижение полной эффективности процесса лечения основного заболевания – сахарного диабета, а также формирование адекватного мировосприятия больного. к своей болезни. В исследовании приняли участие 126 пациентов, находящихся на стационарном лечении. Изучали тест MMSE и показатели гликемии крови. У больных сахарным диабетом 2-го типа и хронической ишемией головного мозга 3-й стадии наблюдаются все более тяжелые когнитивные нарушения. Когнитивные нарушения прямо пропорциональны с гликемическими показателями крови. Эти показатели показывают, что роль стойкой гипергликемии в развитии когнитивных нарушений значительна и оказывает негативное влияние на когнитивную деятельность.

Ключевые слова: когнитивная дисфункция, сахарный диабет, когнитивные расстройства, хроническая ишемия головного мозга, гликогемоглобин, дисциркуляторная энцефалопатия

QANDLI DIABET 2-TURI BILAN OG'RIGAN BEMORLARDA KOGNITIV BUZILISHLAR VA GLIKEMIYA KO'RSATKICHLARI O'RTASIDAGI BOG'LIQLIK

Yakubova Marxamat Mirakramovna <https://orcid.org/0000-0002-0208-8013>

Fayziyeva Munis Dilshod qizi <https://orcid.org/0009-0004-0049-0561>

Toshkent tibbiyot akademiyasi, O'zbekiston, Tashkent, Farabi street 2. Tel: +998781507825, e-mail: info@tma.uz

✓ *Rezyume*

Qandli diabet 2-turi bilan kasallangan bemorlarda kognitiv buzilishlar nafaqat nevrologiyaning, balki geriatrik tibbiyotning dolzarb muammolaridan biridir. Aynan kognitiv buzilishlar bemorlarning hayot sifati, umr davomiyligiga, asosiy kasallik, ya'ni qandli diabet davolanish jarayonining to'laqonli samaradorligiga erishishga, bemor tomonidan o'z kasalligiga nisbatan adekvat munosabatni shakllantirishga ta'sir qiluvchi asosiy omillar sirasiga kiradi. Tadqiqot ishida statsionar davolanayotgan 126 ta bemor qatnashdi. MMSE testi va qon glikemiya ko'rsatkichlari o'rganildi. Qandli diabet 2-turi va bosh miya surunkali ishemiyasi 3-bosqichi bilan kasallangan bemorlarda kognitiv buzilishlar ko'proq va og'irroq darajalarda uchraydi. Kognitiv buzilishlar qondagi glikemiya ko'rsatkichlari bilan to'g'ri proporsional bog'langan. Bu ko'rsatkichlar kognitiv buzilishlar rivojlanishida doimiy giperqlikemiyaning roli katta ekanligini va kognitiv faoliyatga salbiy ta'sir qilishini ko'rsatmoqda.

Kalit so'zlar: kognitiv disfunktsiya, qandli diabet, kognitiv buzilishlar, surunkali bosh miya ishemiyasi, glikogemoglobin, dissirkulyator ensefalopatiya.

Relevance

Diabetes mellitus is a disease associated with metabolic disorders, characterized by hyperglycemia in the blood, i.e., excess sugar in the blood [1].

In 1921, the introduction of insulin made what had previously been an inevitable disease manageable with treatment. As a result, the average life expectancy of diabetic patients began to increase, and many complications of diabetes began to be studied. The first scientific studies related to diabetes examined the death-causing organs - renal and heart failure - as well as the insulin-sensitive tissues - the liver and skeletal muscle - that are responsible for much of glucose homeostasis. In turn, these scientific studies led to an increase in the life expectancy of people with diabetes, and it became clear that diabetes damages all organs, including the brain [2].

Purpose of the study: To study the effects of the stage of chronic cerebral ischemia and blood glycemia on cognitive functions in patients with type 2 diabetes mellitus.

Materials and methods

126 patients took part in the study. Of these, 64 are women, 62 are men. The age of the patients ranged from 38 to 85 years; the average age was 59.1±2.2 years.

The patients were divided into 3 groups. Group I included 41 patients with type 2 diabetes mellitus and stage I chronic cerebral ischemia. Group II consisted of 36 patients with type 2 diabetes mellitus and stage II chronic cerebral ischemia. Group III included 19 patients with type 2 diabetes mellitus and stage III chronic cerebral ischemia.

Detailed information on the distribution of patients by group, gender and age is presented in Table 1

All patients underwent a clinical examination: patient complaints, medical history, MMSE questionnaire, neurological examination, laboratory tests.

Table 1.

Distribution of patients participating in the study into groups								
Groups	Average age	Total number of patients	Men			Women		
			abs	%	Average age	Abs	%	Average age
1-group (DM type 2+chronic cerebral ischemia I)	49,3±0,4	41	19	46,3	48,5±0,9	22	53,7	46,1±1,5
2-group (DM type 2 + chronic cerebral ischemia II)	51,6±2,4	36	16	44,4	51,6±2,2	20	55,6	54,6±2,4
3-group (DM type 2 + chronic cerebral ischemia III)	60,5±3,4	19	8	42,1	61,1±1,4	11	57,9	60,2±2,9

Results and discussions

In the complaints of patients in all study groups, general weakness and decreased performance were observed in 81.7% of patients, fatigue - in 69% of patients, headaches - in 60.3% of patients, dizziness - in 53.9% of patients. Also, 40.4% of patients have tinnitus, 61.9% have night sleep disturbances, and 32.5% have increased irritability. Table 2 presents the semiological characteristics of the complaints of all patients.

Table 2.

Description of complaints of patients participating in the study.

Complaints	n=126	
	Abs	%
General weakness and decreased ability to work	103	81,7
Fast fatiguability	87	69
Headache	76	60,3
Dizziness	68	53,9
Sleep disorders	78	61,9
Noise in ears	51	40,4
Nervousness	41	32,5

During neurological examination of patients, the following changes were mainly noted. 53.93% of patients who took part in the study had central palsy of the VII pair of cranial nerves, 41.2% had central palsy of the XII pair of cranial nerves, and 15% had symptoms of oral automatism. In addition, 60.3% of patients had anisoreflexia, and 32.5% of patients had instability in the Romberg position. Incorrect performance of dynamic coordination tests - intention when performing the finger-nose test was detected in 15.8% of patients. Focal neurological signs in patients are presented in detail in the 1-diagram.

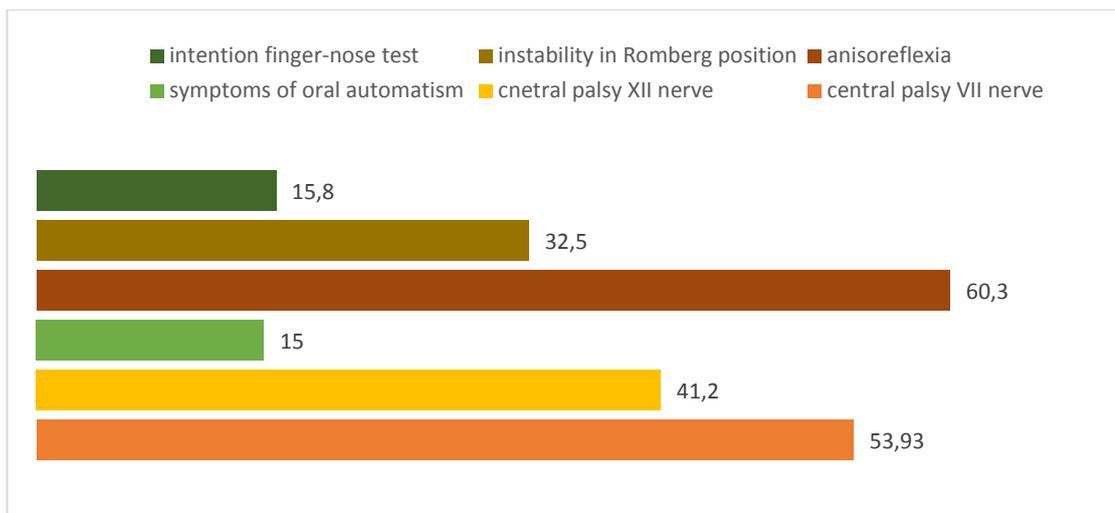


Figure 1. Results of neurological examination of patients

The MMSE test was used to assess the patients' cognitive abilities. All tests were performed with patient consent. For the MMSE questionnaire, patients were asked 30 questions for 10-15 minutes each and the necessary tasks were completed by the patients. According to the results of the MMSE test conducted in three groups of patients, the average MMSE score was 26.4 ± 0.2 in patients with type 2 diabetes mellitus and stage 1 chronic cerebral ischemia. In 2 groups of patients this indicator was 18.4 ± 0.4 points. The average MMSE score was 16.2 ± 0.04 in patients of group 3 - patients with type 2 diabetes mellitus and stage III chronic cerebral ischemia. (Diagram 2)

According to the validated interpretation of the MMSE questionnaire, we assessed the results as follows:

- 28-30 points – no cognitive impairment;
- 24-27 points – pre-dementia cognitive disorders;
- 20-23 points – mild dementia;
- 11-19 points - moderate dementia;
- 0-10 points – severe dementia

According to the analysis of the results of the MMSE test, pre-dementia cognitive disorders were identified in patients of the 1st group, and mild dementia in patients of the 2nd group. In group 3, patients with the lowest scores in our study had moderate dementia.



Figure 2. Average MMSE scores by group

In addition, the relationship between blood glucose and glycated hemoglobin levels and cognitive performance was studied in patients. For this purpose, venous blood was taken from the patient on an empty stomach in the morning of the first day of hospitalization. Glucose and glycated hemoglobin HbA1c were determined in this blood sample.

In patients of group 1, the average blood sugar level was 7.6 mmol/l, glycated hemoglobin - 8.1%. In patients of group 2, this figure was 9.1 mmol/l and 8.5%. The average glucose level in patients of group 3 was 10.5 mmol/l, glycated hemoglobin - 9.5%. The results of laboratory tests are presented in the 3-diagram.

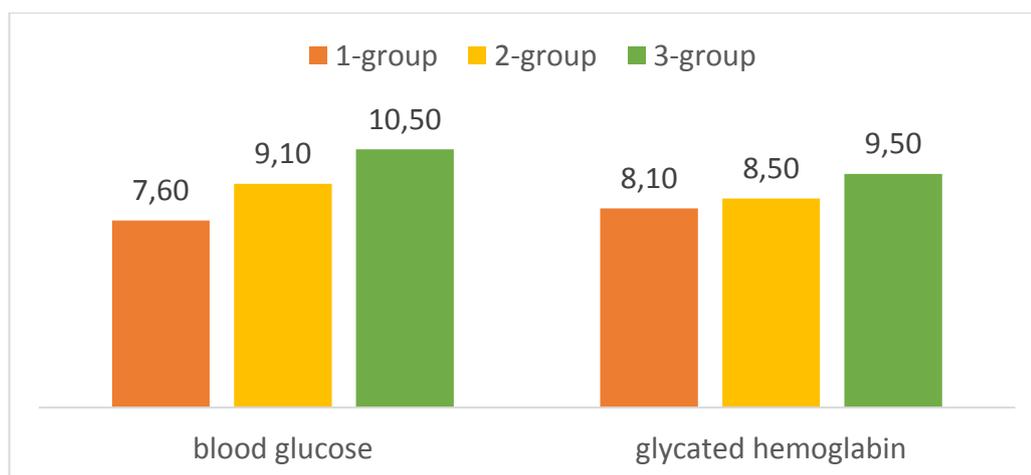


Figure 3. Indicators of blood glucose and glycated hemoglobin

According to the results of laboratory analysis, the lowest levels of blood sugar and glycated hemoglobin were recorded in the first group, that is, in the group of patients with type 2 diabetes mellitus and the first stage of chronic cerebral ischemia. On the contrary, the highest rates were observed in patients with type 2 diabetes mellitus and stage III chronic cerebral ischemia.

Marden JR et al and Dorudgar M et al studied the relationship between cognitive function and HbA1c in patients with type 2 diabetes [3], [4].

Studies by Dorudgar M. and others did not find a relationship between cognitive function and depression with blood HbA1c levels in patients with type 2 diabetes mellitus. However, they found that HbA1c had a negative impact on the ability to remember current events [4]. In his study, Marden J.R. et al found that cognitive function was associated with HbA1c levels in patients with type 2 diabetes over 50 years of age and in a population without the disease. Based on the results, they found that diabetes accelerates the development of cognitive impairment by 10%. Also in their studies, they came to the conclusion that high levels of HbA1c in the blood have a negative effect on the cognitive functions of patients [3]. Our study found that a high level of HbA1c in the blood of patients with type 2 diabetes mellitus affects the severity of cognitive impairment in patients.

Conclusions

Based on all the data presented in the study, it can be concluded that cognitive dysfunction is very common in patients with type 2 diabetes. The degree of cognitive impairment is associated with the stage of chronic cerebral ischemia in the patient. In the later stages of chronic cerebral ischemia, cognitive impairment increases significantly. Changes in cognitive function in patients with type 2 diabetes mellitus are predominantly mild cognitive impairment. The degree of cognitive impairment is directly proportional to the level of glycated hemoglobin and glucose in the blood of patients. These indicators show that the role of persistent hyperglycemia in the development of cognitive impairment is significant and causes negative impact and cognitive performance.

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