



DISTRIBUTION OF OBESITY IN DIFFERENT CATEGORIES OF HYPERGLYCEMIA

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✓ Resume

To study the prevalence of obesity and overweight in different categories of hyperglycemia. Research methods: population, clinical, instrumental, biochemical, statistical. Results obtained and their novelty: In the scientific study, new data were obtained on the prevalence of cases of disorders of the sympathoadrenal phase of the glycemic curve. All categories of hyperglycemia, including sympathoadrenal phase disorders, have been found to be associated with major components of obesity. The original prevalence rates in obese and overweight patients identified in the study may be the basis for the development and implementation of treatment and prevention programs for this syndrome. The use of glycemic coefficients is important in determining the risk of developing obesity and overweight in individuals with normal glycemic levels. Today, obesity is considered not only as the most important risk factor for cardiovascular diseases and type 2 diabetes (according to the World Health Organization, overweight and obesity predetermine the development of up to 44–57% of all cases of type 2 diabetes, 17–23% of cases of coronary heart disease, 17% of arterial hypertension, 30% of cholelithiasis, 14% of osteoarthritis, 11% of malignant neoplasms, but also reproductive dysfunction and an increased risk of developing cancer. With obesity of the 1st degree, the risk of developing diabetes increases by 2-3 times, of the 2nd degree - by 5 times, and of the 3rd degree - by 10 times

Keywords: Overweight, obesity, diabetes, hyperglycemia, hyperlipidemia, metabolic syndrome (MS), moxonidine.

РАСПРЕДЕЛЕНИЕ ОЖИРЕНИЯ ПРИ РАЗЛИЧНЫХ КАТЕГОРИЯХ ГИПЕРГЛИКЕМИИ

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✓ Резюме

Изучить распространенность ожирения и избыточной массы тела при различных категориях гипергликемии. Методы исследования: популяционный, клинический, инструментальный, биохимический, статистический. Полученные результаты и их новизна: В ходе научного исследования получены новые данные о распространенности случаев нарушений симпатoadренальной фазы гликемической кривой. Было обнаружено, что все категории гипергликемии, включая нарушения симпатoadренальной фазы, связаны с основными компонентами ожирения. Выявленные в ходе исследования исходные показатели распространенности у пациентов с ожирением и избыточной массой тела могут быть положены в основу разработки и реализации лечебно-профилактических программ данного синдрома. Использование гликемических коэффициентов важно при определении риска развития ожирения и избыточной массы тела у лиц с нормальным уровнем гликемии. Сегодня ожирение рассматривается не только как важнейший фактор риска сердечно-сосудистых заболеваний и сахарного диабета 2-го типа (по данным Всемирной организации здравоохранения, избыточная масса тела и ожирение определяют развитие до 44–57% всех случаев сахарного диабета 2-го типа, 17–23% случаев ишемической болезни сердца, 17% — артериальной гипертензии, 30% — желчнокаменной болезни, 14% — остеоартрита, 11% — злокачественных новообразований, но и нарушения репродуктивной функции и повышенного риска развития онкологических заболеваний. При ожирении 1 степени риск развития СД увеличивается в 2-3 раза, 2 степени — в 5 раз, а 3 степени — в 10 раз.

Ключевые слова: избыточная масса тела, ожирение, сахарный диабет, гипергликемия, гиперлипидемия, метаболический синдром (МС), моксонидин.

ГИПЕРГЛИКЕМИЯНИНГ ТУРЛИ ТОИФАЛАРИДА СЕМИЗЛИКНИНГ ТАРҚАЛИШИ

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✓ Резюме

Гипергликемиянинг турли тоифаларида семизликнинг ва ортиқча тана вазнинининг тарқалишини ўрганиш. Тадқиқот усуллари: популяцион, клиник, инструментал, биохимик, статистик. Олинган натижалар ва уларнинг янгилиги: Илмий ишда гликемик эгриликнинг симптоадренал фазаси бузилиши ҳолатларининг тарқалиши бўйича янги маълумотлар олинди. Гипергликемиянинг барча тоифалари, шу жумладан симптоадренал фазасининг бузилиши ҳам семизликнинг асосий компонентлари билан боғликлиги аниқланди. Тадқиқотда аниқланган семизлик ва ортиқча тана вазни бор беморларда асл тарқалиш кўрсаткичлари ушбу синдромни даволаш ва профилактика дастурларини ишлаб чиқиш ва амалга ошириш жараёнида асос бўлиши мумкин. Гликемия даражаси нормал бўлган шахсларда семизлик ва ортиқча тана вазнининг ривожланиши хавфини аниқлашда гликемик коэффицентларнинг қўлланилиши муҳим аҳамиятга эга. Бугунги кунда семизлик нафақат юрак қон-томир касалликлари ва 2- тип қандли диабетнинг энг муҳим хавф омили сифатида қаралади. (Жаҳон соғлиқни сақлаш ташкилоти маълумотларига кўра, ортиқча тана вазн ва семизлик 2- тин қандли диабетнинг барча ҳолатларининг 44-57% гача ривожланишини олдиндан белгилаб беради). Коронар юрак қон- томир касалликларининг 23%, артериал гипертензиянинг 17%, ўт-тош касаллигининг 30%, остеоартритнинг 14%, хавфсиз ўсмалар 11%, шунингдек, репродуктив дисфункция ва саратон ривожланиш хавфи ортади. 1-даражали семизлик билан диабетнинг ривожланиш хавфи 2-3 маротабага, 2- даражали семизликда 5 маротабага ва 3-даражали семизликда - 10 маротабага ортади.

Калит сўзлар: Ортиқча тана вазни, семизлик, қандли диабет, гипергликемия, гиперлипидемия, метаболик синдром (МС), моксонидин.

Relevance

21st century headaches have been marked by an intensive study of body weight and obesity. Under the orphan syndrome is understood to be a combination of many risk factors (FR), but on the basis of the majority of car accidents, the main components of MS are: arterial hypertension (AG), insulin resistance (IR) in type 2 diabetes mellitus (DM) or impaired glucose tolerance, hyperlipidemia, excessive mass of the body (IMT) or obesity, and, above all, abdominal obesity - [1, 2, 3].

The main problem is that among people with O there is a very high overall mortality and, above all, mortality from cardiovascular diseases. (CVD). According to various authors, mortality from CVD with O is more than 20 times higher than without MS - [2, 4]. Most authors attribute insulin resistance and the hyperinsulinemia caused by it to trigger mechanisms of O.

Against the background of hyperinsulinemia, various risk factors are formed and progress (obesity, hypertension, dyslipidemia, etc.), as well as various diseases develop or prerequisites for their formation are created.

Purpose of the study. To study the prevalence of the main components of the metabolic syndrome in various categories of hyperglycemia.

Material and methods

In order to study the prevalence of O and its main components in various categories of hyperglycemia, an epidemiological study was conducted among 793 people, representing a representative sample of men and women in Bukhara, aged 20-69 years. In order to study the dynamics of the activity of the sympathoadrenal phase of the glycemic curve 5 years after the initial screening, individuals who had hyperglycemia at the start of the study 1 hour after the glucose load were re-examined. According to these recommendations, O was recorded if the patient had the following components: IGT or diabetes mellitus, BMI and obesity or abdominal obesity, hypertension, hyperlipidemia.

According to the IDF recommendations, these components were identified according to the following criteria. Cholesterol (CS) and triglycerides (TG) were determined in venous blood using a Hospitex analyzer. At cholesterol levels >6.1 mmol/l, hypercholesterolemia (HC) was recorded, and TG levels >1.7 mmol/l were taken as hypertriglyceridemia (HTG). Abdominal obesity (AO) was recorded when the waist circumference for men >94 cm, and for women >80 cm. Overweight was determined by the

Quetelet Index (QI) and was calculated using the formula: $\text{weight (kg)} / \text{height (m)}^2$. IQ levels from 25 to 29.9 were considered as BMI, and QI levels ≥ 30 were considered obese. Arterial hypertension (AH) was detected at SBP levels >140 mm Hg, and DBP >90 mmHg AH was also recorded, regardless of blood pressure indicators, in cases where the patient was on antihypertensive therapy during the 2 weeks preceding the examination. The state of glucose tolerance was studied using an oral glucose tolerance test with the determination of glucose in capillary blood on an automatic glucose analyzer "Glucodr".

Glycemic levels were studied on an empty stomach, as well as 1 and 2 hours after taking 75 gr. glucose. The evaluation of blood glucose levels was carried out according to WHO criteria (WHO, 1999). To assess the ratio of sympathoadrenal and vagoinular phases, the following glycemic coefficients were studied: Baudouin coefficient - the ratio of glycemia 1 hour after glucose loading to the level of fasting glycemia. This coefficient reflects the activity of the sympathoadrenal phase of the glycemic curve and in our study it is designated as the hyperglycemic coefficient (HyperGC); - Rafalsky coefficient is the ratio of fasting blood glucose to the glucose level 2 hours after exercise.

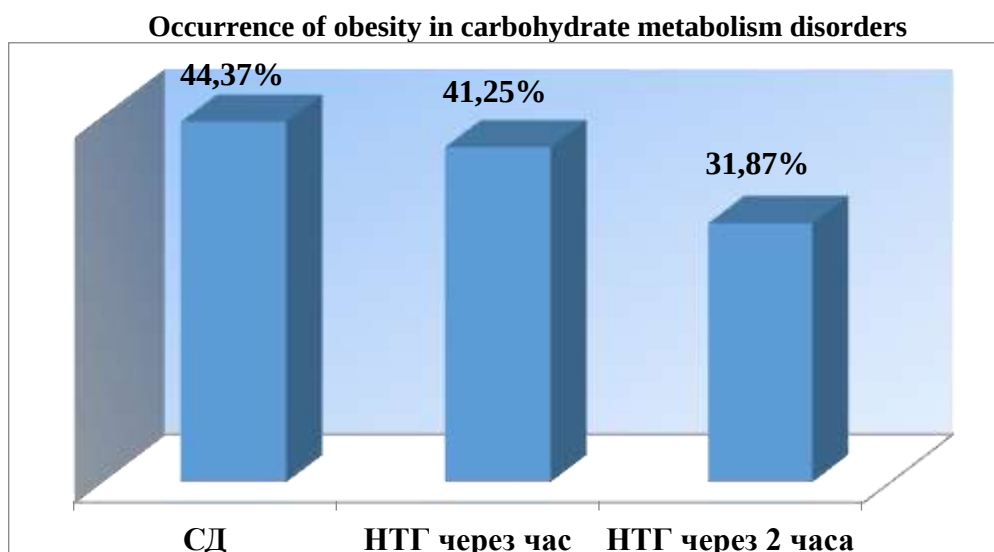
This coefficient reflects the body's ability to utilize the glucose that has entered it, i.e. activity of the vagoinular phase of the glycemic curve (PostGK). Along with these coefficients, we introduced another coefficient into the study, the hypoglycemic coefficient (HypoGC). It is calculated as the ratio of the glycemic level 1 hour after a glucose load to the glucose level 2 hours after a glucose load.

This coefficient reflects the ratio of the activity of the sympathoadrenal and vagoinular phases of the glycemic curve. In the classification of diabetes mellitus proposed by WHO in 1966, along with hyperglycemia 2 hours after a glucose load, it was also necessary to determine the level of glycemia 1 hour after a glucose load. This was due to the fact that glycemia 1 hour and glycemia 2 hours after glucose load reflect different aspects of carbohydrate metabolism.

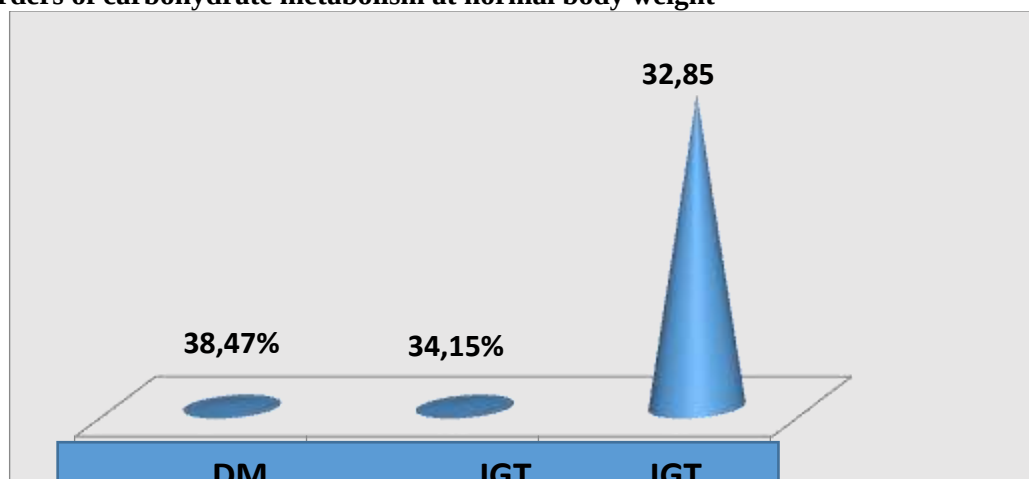
Result and discussion

According to the data obtained (Fig. 1), among persons without hyperglycemia, the incidence of hypertension is 11.2%.

The frequency of AH in different categories of hyperglycemia" In hyperglycemia on an empty stomach and 1 hour after glucose loading, AH occurs more than in every fourth patient (26.9% and 27.0%, respectively) and exceeds the frequency of AH among individuals with normal tolerance to glucose by 2.4 times. Among persons with hyperglycemia, 2 hours after glucose loading, the frequency of AH reaches 40.3% and is almost 4 times higher than the frequency of AH among persons without hyperglycemia.



Disorders of carbohydrate metabolism at normal body weight



The highest frequency of hypertension occurs in patients with diabetes, among whom it occurs in 70.7% of cases. Further, the frequency of BMI and obesity among individuals with different categories of hyperglycemia was analyzed. As it turned out (Table 1), in all categories of hyperglycemia, there is a higher incidence of BMI and obesity. Frequency of overweight (BMI) and obesity among individuals with different categories of hyperglycemia.

The fact was revealed that the frequency of BMI in patients with hyperglycemia 1 hour after the glucose load was higher than in patients with impaired glycemia 2 hours after the glucose load and in patients with diabetes.

Moreover, the frequency of UTI in patients with DM was slightly lower than in individuals with fasting hyperglycemia. This fact can be explained by the fact that obesity is more developed in diabetic patients and its frequency is 2 times higher than in patients with fasting hyperglycemia and 1 hour after glucose loading.

In general, overweight (BMI + obesity) is 2 times more common among individuals with fasting hyperglycemia and 1 hour after glucose loading (57.69% and 57.23%, respectively) than with normal glycemic levels (27.77%). The highest frequency of overweight (BMI + obesity) occurs with hyperglycemia 2 hours after glucose loading and with diabetes (82.09% and 80.49%). These data indicate that the violation of the sympathoadrenal phase of the glycemic curve is also important in relation to the frequency of overweight (BMI + obesity).

Somewhat lower rates of overweight (BMI + obesity) in patients with diabetes compared to the group of people with hyperglycemia 2 hours after exercise can be explained by the fact that patients with diabetes are registered and take certain measures to control weight. Currently, when assessing body weight, it is customary to consider such an indicator as abdominal obesity (AO).

According to the data obtained, AO occurs least frequently in patients with normal glucose tolerance (32.74%). In hyperglycemia on an empty stomach, the frequency of AO is 1.8 times higher (42.31%), and in violation of glycemia 1 hour after a glucose load, it is 2.2 times higher (50.94%) than with normal glycemia levels. The highest rates of occurrence of AO occur in patients with DM (80.49%) and in the group of persons with impaired glycemia 2 hours after glucose loading (74.63%). It should be noted that the differences in all indicators of the frequency of AO in groups with different categories of hyperglycemia had statistically significant differences from the rate of AO in the group of individuals with normal glucose tolerance. Thus, the results obtained allow us to conclude that AO is closely associated with all categories of hyperglycemia.

At the same time, for the first time, a pronounced relationship was established between AO and a violation of the sympathoadrenal phase of the glycemic curve. Further, the frequency of hypercholesterolemia (HC) and hypertriglyceridemia (HTG) among individuals with different categories of hyperglycemia was analyzed. According to the data obtained, the lowest rates of HC occurrence are observed among individuals with normal glycemic levels and with hyperglycemia 1 hour after glucose loading (10.88% and 9.09%, respectively).

The frequency of HC among individuals with hyperglycemia on an empty stomach and 2 hours after a glucose load is 3.3 and 2.2 times higher than in normal glycemic levels (33.33% and 24.0%). As expected, the highest frequency of HCh occurred in patients with DM (47.06%). A slightly different picture is observed in relation to the frequency of occurrence of HTG.

Here, there is a slightly higher frequency of HTH in individuals with fasting hyperglycemia (26.0%) and 1 hour after glucose loading (23.21%) than in individuals with normal glycemic levels (20.21%).

However, the differences found were not significant. Statistically significantly ($p < 0.05$) higher rates of HTG frequency in the group of persons with hyperglycemia 2 hours after glucose loading (31.0%) and in patients with DM (59.41%) differ from the group of persons with normal levels of glycemia. Thus, an analysis of the frequency of occurrence of HC and HTG showed that different categories of hyperglycemia in one or another.

Non-drug prevention. Activities for non-drug prevention and treatment of obesity in various body weight conditions expand the range of opportunities for lifestyle modification by involving family members in the treatment and prophylactic process. Measures aimed at weight loss and maintenance of the achieved result should include:

- rational nutrition
- education of patients in the right way of life with a change in eating habits
- Keeping a food diary
- exercise.

Conclusions

1. Various categories of hyperglycemia are widespread in the studied population. Along with such generally recognized categories of hyperglycemia as DM, fasting hyperglycemia and hyperglycemia 2 hours after glucose loading, hyperglycemia 1 hour after glucose loading is also quite common.

2. The study of hyperglycemia 1 hour after glucose loading is important, because this category of hyperglycemia, on the one hand, is widespread in the population (21.8%), and on the other hand, it can transform into hyperglycemia 2 hours after the load and in diabetes.

3. In all categories of hyperglycemia, there is a higher frequency of the main components of MS: hypertension, BMI, obesity, including abdominal, hyperlipidemia. These components are more associated with post-exercise hyperglycemia, including the violation of the sympathoadrenal phase of the glycemic curve.

4. There is a certain relationship between the violation of various phases of the glycemic curve and diabetes on the one hand and body weight on the other.

5. The high incidence of cases of BMI and obesity in the group of people with IGT 1 hour after glucose loading indicates that when assessing and correcting BMI and obesity, the presence of both DM and IGT 2 hours after glucose loading should be taken into account in the patient, and NTG 1 hour after glucose loading.

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