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THE RATIO OF BASAL AND POSTPRANDIAL GLYCEMIA IN PATIENTS WITH CORONARY HEART DISEASE

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Abstract:

The article analyzes the results of studying the coefficient reflecting the ratio of basal and postprandial glycemia. A representative group of the unorganized male population was examined. A total of 894 people aged 30-69 years were examined. Among them are 124 patients with coronary heart disease. It has been shown that as the age increases, the body's ability to utilize glucose decreases. Glycemic coefficient levels have been determined indicating an increased risk of coronary heart disease. It is recommended to use the glycemic coefficient in prevention programs for type 2 diabetes mellitus and coronary heart disease.

Keywords: Basal glycemia, postprandial glycemia, coefficient, coronary heart disease

RELEVANCE.

The global prevalence of cardiovascular diseases (CVD) continues to increase [1]. At the same time, about 18 million people die from these diseases every year [2]. The main risk factors for high mortality include type 2 diabetes mellitus, prediabetes and metabolic syndrome [3-5]. This situation is aggravated by the increasing prevalence of latent forms of insulin resistance [6,7]. Of particular concern is the increase in the frequency of metabolic syndrome (MS) among the female population [8-11]. The clinical course of MS and the formation of coronary heart disease (CHD) are influenced not only by the presence but also by the severity of its main components [12-14]. One of the most important components of MS is hyperglycemia [15-17]. Glycemic control is a simple and effective method of primary prevention of diabetes mellitus and MS [18-21]. At the same time, not only the glucose level is of interest, but also the ratio of basal and postprandial glycemia levels. With this indicator, you can assess the state of glucose uptake.

THE PURPOSE OF THE STUDY is to study the relationship of coronary heart disease with the coefficient of glucose utilization.

MATERIAL AND METHODS.

The study was conducted among the unorganized population of the city of Tashkent. A representative sample of the male population aged 30-69 years was formed. A total of 894 people were examined. All the examined patients underwent a standard oral glucose tolerance test (OGTT). To study basal and postprandial glycemia, glucose levels in capillary blood were measured on an empty stomach (after at least 12 hours of fasting) as well as 2 hours after a standard glucose load (75 grams).

Immediately after taking a sugar load, the sympathoadrenal phase of the glycemic curve begins, which characterizes blood glucose saturation. This phase lasts for one hour. In response to glucose intake, the pancreas secretes insulin, and the vagoinsular phase of the glycemic curve is triggered. Both phases play an important role in maintaining glucose homeostasis. However, they can be disrupted in a variety of conditions, such as insulin resistance in the form of diabetes mellitus or impaired glucose tolerance. It should be noted that these phases represent a general reflection of complex processes in the body and can transform or change depending on various factors, including nutrition, lifestyle, mental state and others.

Currently, the postglycemic coefficient (Rafalsky coefficient) is used to assess the body's ability to utilize glucose. This coefficient is calculated by dividing the glucose concentration index, determined 2 hours after exercise, by its initial value (on an empty stomach). Thus, the Raphaelsky coefficient takes postprandial glycemia as a reference point. In our opinion, it seems advisable to take the basal glycemic level (fasting glucose/glucose 2 hours after sugar loading) as a reference point. This approach is more consistent with the physiology of the process, as the body's ability to bring glucose levels to their initial level is assessed. In this study, the term "glycemic coefficient" is used. This is done in order to

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eliminate cognitive imbalance when reading this article. In the article, the "glycemic coefficient" is designated as GlicCoef.

The diagnosis of CHD was established on the basis of the patient's stable angina pectoris, ischemic changes on the ECG and a past myocardial infarction. The ECG was evaluated in accordance with the criteria of the Minnesota Code (MC). Various manifestations of CHD were identified by the following signs: transferred (documented) myocardial infarction – categories 1-1.2 MK; stable angina pectoris – the presence of pain syndrome that meets the criteria of the WHO questionnaire (Rose questionnaire), in the absence of categories 1-1.2 MK; pain–free form of CHD – in the presence of ischemic changes on the ECG (categories 4-1,2 and 5-1.2 MK) and in the absence of left ventricular hypertrophy, angina pectoris and categories 1-1.2 MK; possible myocardial infarction in the anamnesis (according to the WHO questionnaire) – in the absence of cicatricial and ischemic changes on the ECG, as well as angina pectoris possible ischemic heart disease – possible cicatricial changes of the myocardium on the ECG (categories 1-2-8 and 1-3 MK), possible myocardial ischemia (categories 4-3, 5-3 MK), arrhythmic form of CHD (categories 6-1,2; 7-1 and 8-3 MK), myocardial ischemia in the presence of left ventricular hypertrophy (categories 4-1,2 and 5-1,2 in the presence of 3-1,3 MK).

Statistical processing was carried out using the MedCalc software (https://www.medcalc.org), developed for biomedical research [22]. Intensive and average values, average indicators of quantitative variables, their standard deviations (M; +δ), as well as percentile distribution data were studied. The Student's criterion (t) was used to assess the statistical significance of the revealed differences in the studied indicators.

RESULTS AND DISCUSSION

The levels of glycemic coefficient (GlicCoef) among people of different ages were studied (Table 1). According to the data obtained, the value of this coefficient decreases as the age increases. In the age groups of 40-49 years and 50-59 years, the GlicCoef value is slightly higher than at the age of 30-39 years. However, these differences turned out to be statistically insignificant. At the same time, significant differences in the value of GlicCoef were found between groups 30-39 years old and 60-69 years old. Based on the data obtained, it can be concluded that as age increases, there is a tendency to decrease the body's ability to utilize the glucose that has entered it. However, this decrease is unreliable. At the same time, it can be concluded that the risk of deterioration of the body's ability to utilize glucose at the age of 60-69 years is significantly higher than in men 30-39 years old.

Table 1.
Indicators of the glycemic coefficient in people of different ages

Возраст	**30–39** years old	**40–49** years old	**50–59** years old	**60–69** years old
n	193	217	297	63
Average	1,143	1,106	1,106	1,030 *
Median	1,113	1,067	1,051	0,971
SD	0,2974	0,3384	0,3703	0,3913
RSD	0,2602	0,3059	0,3348	0,3800
SEM	0,02140	0,02297	0,02149	0,04930
Normal distribution	<0,0001	0,0012	<0,0001	0,0083

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Note: * - indicates the validity of the differences relative to the group 30–39 years old.

A decrease in the body's ability to utilize glucose that has entered it is an indirect indicator of insulin resistance. However, insulin resistance is a risk factor for coronary heart disease (CHD). In this regard, the relationship between the levels of glycemic coefficient and CHD is of interest. Therefore, the frequency of CHD in various quintiles of the GlicCoef distribution was studied (Fig.1). According to the data obtained, the frequency of CHD in the first quintile of GlicCoef was 24.44%. In the second, third and fourth quintiles, the frequency of CHD decreases sequentially (14.92%, 9.55% and 8.47%). It should be noted that this decrease was statistically significant (P <0.05). At the same time, in the fifth quintile of GlicCoef, the frequency of CHD increased again (11.8%).

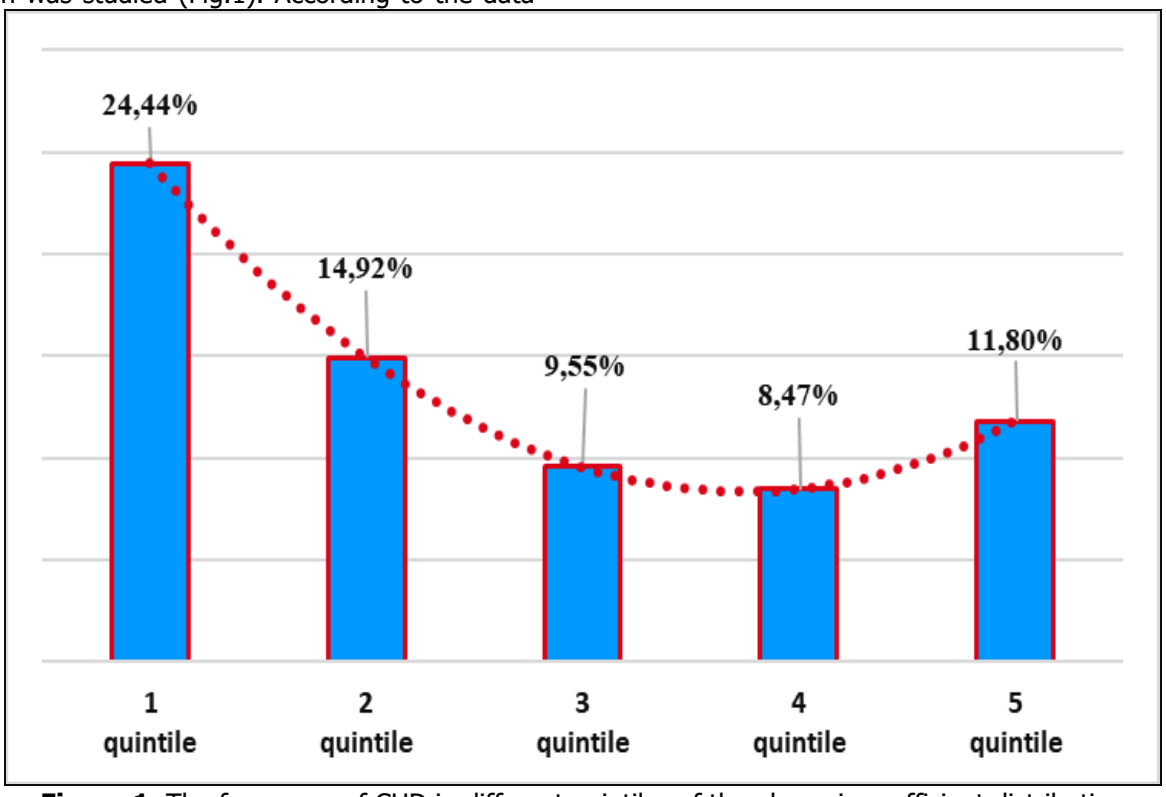

Figure 1. The frequency of CHD in different quintiles of the glycemic coefficient distribution

From the data obtained, it follows that the fourth quintile of GlicCoef is the most favourable in relation to the risk of CHD. The average value of GlicCoef in this quintile is 1.25±0.066. Of particular interest are the results of a study on an increase in the frequency of CHD in the fifth quintile of GlicCoef (11.8%). It should be noted that the differences in this indicator relative to the previous quintile were statistically significant (P<0.05). And this means that this increase in the frequency of CHD is not accidental. Therefore, based on the data obtained, it can be concluded that the risk of CHD decreases as the level of GlicCoef increases. However, an increase in the value of this indicator above 1.62± 0.25 is a factor of increased risk of CHD.

CONCLUSION.

The study showed that as the population ages, there is a decrease in the body's ability to utilize the glucose that has entered it. The glycemic coefficient can be used as an indicator of the risk of coronary heart disease. The values of the glycemic coefficient less and more than 1.25±0.066 can serve as indicators of an increased risk of coronary heart disease. It is recommended that the glycemic coefficient be used in the development and implementation of programs for the prevention of type 2 diabetes mellitus and coronary heart disease.

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