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ESPECIALLY CHANGES GOMOCYSTEINE IN WOMEN OF CHILDBEARING AGE WITH METABOLIC SYNDROME

Mukhamedova N.H.¹, Shukurova U.P.², Sobirova M.R.³

(Republic of Uzbekistan) Email: Mukhamedova457@scientifictext.ru

¹Mukhamedova Nurkhan Halimovna – Doctor of Medical Sciences, Associate Professor,
DEPARTMENT OF MEDICAL AND BIOLOGICAL CHEMISTRY,
TASHKENT MEDICAL ACADEMY;

²Shukurova Umida Pulatovna - Teacher of the highest Category;

³Sobirova Munisa Rikhsievna - Teacher of the highest Category,
DEPARTMENT OF OBSTETRICS AND GYNECOLOGY,
ABU ALI IBN SINO I. REPUBLIC HEALTH TECHNICUM,
TASHKENT, REPUBLIC OF UZBEKISTAN

Abstract: as you know, metabolic syndrome occurs in almost 15-20% of the world's population, approximately 30-35% is the cause of reproductive disorders. According to the literature published in recent years, an important role in the development of reproductive disorders is played by hyperhomocysteinemia, which is a risk factor for early development and rapid progression of atherosclerosis, thrombosis and obliteration of arteries and veins, ischemia and myocardial organs, and reproductive system disorders.

The article discloses information about the dependence of hyperhomocysteinemia to a large extent with overweight, which is associated with impaired carbohydrate and lipid metabolism and a high risk of vascular disorders and dysfunctional endocrine disorders in the reproductive organs.

Keywords: hyperhomocysteinemia, carbohydrate and lipid metabolism, metabolic syndrome, reproductive disorders, endocrine disorders.

ОСОБЕННОСТИ ИЗМЕНЕНИЯ ГОМОЦИСТЕИНА У ЖЕНЩИН ДЕТОРОДНОГО ВОЗРАСТА С МЕТАБОЛИЧЕСКИМ СИНДРОМОМ

Мухамедова Н.Н.¹, Шукурова У.П.², Собирова М.Р.³

(Республика Узбекистан)

¹Мухамедова Нурхан Халимовна - доктор медицинских наук, доцент,
кафедра медицинской и биологической химии,
Ташкентская медицинская академия;

²Шукурова Умид Пулатовна – преподаватель высшей категории;

³Собирова Муниса Рихсиевна - преподаватель высшей категории,
кафедра акушерства и гинекологии,

1-й Республиканский техникум общественного здравоохранения им. Абу Али ибн Сина,
г. Ташкент, Республика Узбекистан

Аннотация: как известно, метаболический синдром встречается почти у 15-20% населения мира, примерно 30-35% является причиной репродуктивных нарушений. Согласно литературным данным, опубликованным в последние годы, важную роль в развитии репродуктивных нарушений играет гипергомоцистеинемия, которая является фактором риска раннего развития и быстрого прогрессирования атеросклероза, тромбоза и облитерации артерий и вен, ишемии и органов миокарда, поражений репродуктивной системы.

В статье раскрывается информации о зависимости гипергомоцистеинемии в значительной степени с избыточной массой тела, которая ассоциируется с

нарушением углеводного и липидного обмена и высоким риском сосудистых нарушений и дисфункциональных эндокринных нарушений в репродуктивных органах.

Ключевые слова: гипергомоцистеинемия, углеводного и липидного обмена, метаболический синдром, репродуктивные нарушения, эндокринные нарушения.

Metabolic syndrome (MS) is found in almost 15-20% of the world's population, approximately 30-35% is the cause of reproductive disorders [1]. On the proposal of the WHO working group proposed to be signs of MS consider Immune, visceral (abdominal) obesity, and/ or body mass index (BMI) greater than 30kg/m², impaired glucose metabolism or diabetes mellitus (DM) type 2, hypertension, dyslipidemia, microalbuminuria, changing hemostasis hyperuricemia [2].

According to the literature published in recent years, an important role in the development of MS plays hyperhomocysteinemia (HHC) Homocysteine (HC) is a neuropeptidogen, containing amino acid, is formed due to demethylation of methionine. DCs present in the plasma in various forms (fractions); 1% circulate in the free thiol form; 70-80% associated disulfidnyimi bridges to plasma proteins, usually albumin; the remaining 20-30% combined either with each other, forming a dimer GC or other thiols, having in its composition incorporates cysteine [3]. The level of overall GC plasma glucose normally ranges from 5 to 15 mmol/l. Increase in HC concentration to 16-30 mmol/l indicates the development of soft, more than 31 to 100 mmol/l - moderate, more than 100 mmol/l - a heavy GC.

Currently GGC is a risk factor for early development and rapid progression of atherosclerosis, thrombosis and obliteration of arteries and veins, ischemia and myocardial organs, lesions of the reproductive system [4,5]. However, in the literature available to us, we did not find information about the features of level changes DCs in the blood plasma of women of childbearing age with MS.

The purpose of the study. Determination of the absolute GC content in the blood plasma of women of childbearing age with MS.

Material and methods. The study included 63 women aged 25 to 35 years ($29,9 \pm 4,83$ years). Criteria for inclusion of women in the study were determined according to the study determined according to the WHO classification [6]. The control group consisted 20 apparently healthy women of comparable age who gave informed consent to the study. Patients compared groups conducted a general examination, including measurement of height, calculated body mass index (Quetelet index). The level of immunoreactive insulin (IRI) was assessed in normal ELISA on computerized device AT-858 (LTD, China) with a test system using Insulin DSL-1-1600. For the diagnosis of carbohydrate metabolism conducted a two-hour oral glucose tolerance test (NSH) with a load of 75g glucose as recommended by WHO [7]. To assess insulin resistance (IR) was used homeostatic model proposed by D. Mattheros, - HOMA index, which was calculated by the formula: HOMA index = $xIRI/22,5$ glucose. IR was determined by HOMA index values over 2,77 [8]. Caro index determined by the formula: Index Caro = glucose (mmol/l) / IRI (mU/ml). IR was defined as index values less than 0,33 Caro [9]. The content of total cholesterol (TC), cholesterol (LDL), high density lipoprotein (HDL), and triglycerides (TG) were determined by enzymatic method fermentanalizatore Cobas Integra "Roche"; TCH- using test system "Roche-Chol-2", HDL-with the test system "Roche-HDL-Cplus 2 gen", TG - using test systems "Roche". LDL cholesterol and very low-density lipoprotein (LDL and VLDL) and atherogenic index (SC) was calculated by the Friedewald formula [10]. Level determined by GC on ELISA analyzer AT-858 (LTD, China) using kits Homocystein ("AXSIS"), the result is expressed in mol/l.

The results were processed statistically using Student's t-test. Differences were considered significant at $p < 0,05$.

Results and discussion. Studies have shown that women with a core group of heavy concentration of MS was 75,3% higher than in controls ($p < 0,001$) (Table).

Table 1. Carbohydrate-immune exchange, *M±m*

| The | Control group, n=20 | Core group, n=63 | P |
|------------------|---------------------|------------------|-------|
| GC | 9,3±0,09 | 16,3±0,79 | 0,001 |
| Glucose, mmol/l: | | | |
| - fasting | 5,13±0,19 | 6,19±0,24 | 0,05 |
| - after 2 h | 5,91±0,17 | 7,42±0,26 | 0,01 |
| IRI, mU/L | 6,51±0,15 | 12,04±0,43 | 0,001 |
| HOMA index | 1,26±0,04 | 3,15±0,09 | 0,001 |
| Index Caro | 0,75±0,03 | 0,52±0,02 | 0,001 |
| TC, mmol/l | 5,88±0,14 | 5,93±0,24 | 0,5 |
| LDL-C, mmol/l | 1,72±0,05 | 1,41±0,03 | 0,001 |
| TG, mmol/l | 1,09±0,03 | 1,76±0,04 | 0,001 |
| LDL | 4,38±0,16 | 5,14±0,113 | 0,001 |
| VLDL | 0,49±0,02 | 0,70±0,03 | 0,001 |
| SC | 3,51±0,10 | 3,96±0,03 | 0,001 |

While 28 (44,4%) patients revealed normogomotsisteineemiya (NGC)-HZ level they fluctuated in the range of 10-15 mkmmol/l, 1,35 (55,6%) patients with HHC-from 15 to 60 mkmmol/l. HHC has largely been associated with excess body weight (BW). The control group had 3 overweight (15,0%) out of 20 patients (BMI 24,0-28,5 kg/m²), 2 (10,0%) women had a lower BMI of 25,0 kg/m², normal MT was the remaining 15 (75,0%; $X^2 = 5,618$; $p=0,026$). In the main group 13 are obese (20,6%) patients (BMI ≥ 30 kg/m²), 9 patients were overweight (BMI- 26-29,7 kg/m²). In the case it is these women mostly detected GHz. Direct correlation between HHC and BMI ($R^2=0,48$; $p<0,01$).

At the same time found a direct strong correlation with GC, IRI ($r=0,81$; $p<0,001$), HOMA index and Caro ($r=0,82$ и $0,81$; $p<0,001$). The high value of IRI, HOMA index (more than 2,77) and Caro (below 0,75) served as important indicators of the development of women of childbearing age MS, as evidenced by the different incidence of MI in individuals control and basic groups: TS absent, respectively, in 16 (80%) and (3,2%) patients ($X^2=18,645$; $df=1$; $p<0,000$).

A number of authors [5, 11] found that HHC is an important independent risk factor for the development and rapid progression of atherosclerosis and contributes to obliteration and thrombosis of arteries and veins with the development of myocardial ischemia and internal organs. However, it remains unclear the impact of GC on various units homeostasis depends on the age, particularly in women of childbearing age. In this regard, of particular interest is to study the influence on the level of GC parameters childbearing homeostasis, particularly at the level of glucose, indicators of cholesterol metabolism in women of childbearing age in the development of MS. As a result of our study patients compared groups established significant differences in glucose, HDL cholesterol, LDL and VLDL, TG and SC. Among patients with MS, these figures are statistically different from control values ($X^2=49,861$; $df=1$; $p<0,000$).

It should be noted that the content of total cholesterol in women of childbearing age with MS does not differ from the control values. To a large extent this is due to opposite changes the center of the studied lipid fractions: increases the level of atherogenic fractions (HSLPNP, HSLPONP, TG) and reduction of antiatherogenic index-SC. Observed features simultaneously indicate that women of childbearing age lipid metabolism associated with risk factors-LR and compensatory hyperlipidemia. Significant role in the development of dyslipidemia, apparently, takes increasing levels of HC. In women of childbearing age with a high content associated with a strong direct correlation with LDL-C- $r = 0,83$ ($p<0,001$), with VLDL - $r=0,86$ ($p<0,001$), TG- $r=0,79$ ($p<0,01$) and a strong inverse correlation with the index dependence HDLC- $r=0,88$ ($p<0,001$).

Consequently, revealed in women of childbearing age with MS violation carbohydrate-lipid metabolism and IR associated with HHC and violation TS and carbohydrate-lipid metabolism contribute to the formation of estrogen- one of the functions of the most important factors regulating the function of the reproductive system. HHC promotes damage to the system-level vessel walls. When interacting with the oxidized products of glycolysis HHC can cause damage to endothelial cells and heart disease, endocrine disorders. Thus, studies have found that the formation of MS in women of childbearing age is characterized by HHC which associates in violation of the dynamic development in carbohydrate and lipid metabolism and the development of TS. Identified violations can cause dysfunctional disorders of the reproductive system.

1. Women of childbearing age with MS revealed a high content of GC, 44,4% of the patients had normogomotsisteinemiya (GC within 10-15 mkmmol/l), 55,6% – gipertsisteinemiya (GC 15-60 mkmmol/l), which was associated ($p<0,05$) with exponents TS, carbohydrate and lipid metabolism.

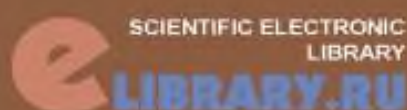
2. Detected in the blood plasma of women of childbearing age with MS GHZ indicators a high risk of vascular disorders and dysfunctional endokrin disorders in the reproductive organs.

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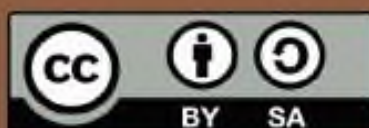
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