E- Global Congress
Hosted online from Dubai, U. A. E., E - Conference.
Date: 30th January 2025
Website: https://eglobalcongress.com/index.php/egc
ISSN (E): 2836-3612

METABOLIC SYNDROME IN WOMEN WITH VITAMIN D DEFICIENCY: ISSUES OF PATHOGENESIS AND DIAGNOSTICS

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Relevance

According to the WHO, 1.7 billion people on the planet are overweight, and by 2025, the number of obese people in the world will reach 300 million people [1]. According to the definition of the World Health Organization, obesity is defined as an unusual or excessive accumulation of fat that can be harmful to health. It is a global medical and social problem for the health of all countries and patients of all ages. The incidence of metabolic syndrome (MS) in the world is almost 40% of the adult population, and obesity is 13% (Lee et al., 2020). The global prevalence of obesity has almost tripled from 1975 to 2016 and continues to increase. In the United States - 42.4% in 2018, in France, the prevalence of obesity among adults was 17% in the same year. Recent studies have shown that both vitamin D deficiency and carriage of certain polymorphisms of the vitamin D receptor gene may be associated with an increase in the fractions of atherogenic blood lipids [2].

To date, the relationship between the concentration of 25 hydroxyvitamin D (25(OH)D) in the blood serum and MS is being actively studied (Maroufi N.F. et al., 2020; Weldegiorgis T.Z. et al., 2022). Thus, the results of the 20-year prospective CARDIA study, which initially included young people at risk of developing CVD, showed that normalization of 25(OH)D levels is associated with a reduced risk of developing AO, carbohydrate metabolism disorders and lipid metabolism disorders (a decrease in the level of high-density lipoprotein cholesterol (HDL-C)) regardless of age, gender, race [3].

ISSN (E): 2836-3612

Objective

To study the features of metabolic syndrome in women with vitamin D deficiency, and to evaluate the relationship of metabolic syndrome with some polymorphisms of the VDR gene.

Materials and methods

A total of 120 patients with metabolic syndrome aged 18 to 50 years were examined, which formed the main study group. All patients were assessed for total cholesterol (TC), triglycerides (TG), high-density lipoproteins (HDL), low-density lipoproteins (LDL), atherogenicity index, fat mass (kg), skeletal muscle mass (kg) by bioimpedance analysis of body composition. Body weight was assessed according to the Quetelet body mass index with additional diagnostics of abdominal obesity, leading symptoms of insulin resistance (acanthosis nigricans of skin folds, papillomatosis, vascular angiomas) in accordance with the current WHO criteria. Levels of vitamin D metabolites 25(OH)D and the presence of VDR gene polymorphisms (FOKLVDR rs10735810, APAL VDR rs7975232) were determined in blood serum.

Results

The results of fundamental and clinical studies have shown that MS is associated with deficiencies of various micronutrients: magnesium, vitamin D and myoinositol [12]. A relationship has also been established between the presence of VDR gene polymorphisms (FOKLVDR rs10735810, APAL VDR rs7975232) and the severity of the clinical picture of metabolic syndrome. Vitamin D and myoinositol deficiencies, especially combined ones, stimulate the development of such MS components as impaired glucose tolerance, dyslipidemia and abdominal obesity. In the examined patients with MS, the level of 25(OH)D in the serum was 16.4±4.4 mmol/l. At the same time, deficiency or insufficient level of 25(OH)D, as well as VDR gene polymorphism were found in 90 out of 120 patients (75.3% of patients).

We identified the following relationships between low 25(OH) vitamin D values, the presence of VDR gene polymorphisms and a number of characteristics of patients with MS. The level of 25(OH)D in serum directly

ISSN (E): 2836-3612

correlated with the presence of hypertension (r=-0.41; p=0.017) and with the level of triglycerides and low-density lipoproteins (r=-0.29; p=0.038), high-density lipoproteins (r=0.2; p=0.031), fat mass (kg) (r=0.23; p=0.034). When comparing the indicators in the groups, it was revealed that lower values of 25(OH)D were observed in patients with high insulin and the severity of clinical manifestations (acanthosis nigricans, papillomatosis, vascular angiomas) and the HOMA index (p=0.013) and with the presence of obesity of the 3rd and 4th degrees (r=-0.47; p=0.029).

Conclusions

Vitamin D insufficiency and deficiency and the presence of VDR gene polymorphisms (FOKLVDR rs10735810, APAL VDR rs7975232) correlate with the main pathological changes in metabolic syndrome, such as arterial hypertension, dyslipidemia, insulin resistance, decreased skeletal muscle mass, abdominal obesity. From a practical point of view, it is advisable to determine the level of vitamin D and the presence of VDR gene polymorphisms in the blood serum of patients with metabolic syndrome, determine the level of fat mass and skeletal muscle mass using the method of bioimpedance analysis of body composition and, accordingly, in case of vitamin D deficiency, carry out correction in a dose of 5,000 IU to 10,000 IU per day. Accordingly, compensation for vitamin D deficiency improves metabolic control.

The study of polymorphisms of genes involved in lipid metabolism, genes regulating eating behavior is applicable for the development of personalized programs for safe weight loss, including individual diets and physical activity. This approach increases patient compliance. Analysis of molecular genetic and metabolic profiles of patients can become part of the prevention of cardiovascular and endocrine complications. Inositols in combination with metformin can act as synergists, which allows for a reduction in the metformin dose, especially in patients with poor tolerance. The effectiveness of D-chiroinositol in the treatment of women with metabolic syndrome is associated with improved tissue sensitivity to insulin and improved ovulatory function, decreased serum androgen concentrations, decreased blood pressure and TG concentrations [4].

Reducing or eliminating refined sugar and simple carbohydrates, increasing the consumption of complex carbohydrates and whole grains (oat, barley, wheat) 3-4 times a week, other changes in diet and lifestyle that will have a positive effect on glucose and insulin levels can have a positive effect on life expectancy and reduce the risk of chronic diseases in women of childbearing age. In addition, regular (daily) 40-minute walking per day:

- burns about 100-120 kcal per day;
- has a vasodilatory effect;
- promotes weight loss and reduces insulin resistance;
- has a positive effect on the brain and nervous system;
- helps prevent hypertension.

References

1. Karonova T.L., Belyaeva O.D., Bystrova A.A., Andreeva A.T., Kozyreva A.A., Tsvetkova E.V., Burmistrova D.A., Kostareva A.A., Shlyakhto E.V. BsmI, ApaI, TaqI, and FokI polymorphisms of the vitamin D receptor gene and blood lipid spectrum parameters in women of late reproductive age. Arterial hypertension. 2019.
2. Povalyaeva A.A., Pigarova E.A., Dzeranova L.K., Rozhinskaya L.Ya. Relationship between vitamin D status and the development and course of type 1 diabetes mellitus. Obesity and metabolism. 2020;17(1):82-87.
3. Zittermann A., Filatova T.E. et al., 2019; Yankovskaya L.V. et al., 2019; Imga N.N. et al., 2019.
4. Agrawal A., Mahey R., Kachhawa G. et al. Comparison of metformin plus myoinositol vs metformin alone in PCOS women undergoing ovulation induction cycles: randomized controlled trial. Gynecol Endocrinol. 2023;35(6):511–514. DOI: 10.1080/09513590.2018.1549656.
5. Khasanova G.Kh. Best Practices in the Dietotherapeutics of Hypertension. Scientific electronic journal "Academic journalism", No. 12-2/2022 / https://aeterna-ufa.ruhttps://aeterna-ufa.ru/events/ap.
6. Khasanova G.Kh. Effect of diet therapy and nutriceutic support in metabolic syndrome in women of fertile age. Galaxy International Interdisciplinary Research Journal (GIIRJ). Vol. 11, Issue 2, Feb. (2023). https://giirj.com/index.php/giirj/article/view/4763.

7. Khasanova G.Kh., Tukhtaeva N.Kh. Metabolic syndrome in women of fertile age: Diet therapy and nutraceutical support. Tibbiyot va sport. Scientific and practical journal. No. 2, 2023.
8. Khasanova G.Kh., Tuxtaeva N.X. Metabolic syndrome and D vitamin metabolism: clinical and laboratory correction. Uzbekistan Cardiology. International Journal of Cardiology. No. 3 / 2023 (69). (Abstracts of the international scientific and practical conference "Preventive cardiology: from primary prevention to cardiac rehabilitation" - Competition of young scientists). - P. 122.