Metabolic Syndrome: Forecast for the Development of Type 2 Diabetes Mellitus

Fayzullayev Tillo Tog'aymurodovich
assistant, department of internal diseases, Bukhara State Medical Institute

Jalilova Umida Djumayevna
assistant, department of internal diseases, Bukhara State Medical Institute

Abstract: Metabolic syndrome (MS) is a pathological condition associated with increased tissue resistance to the effects of insulin. Gradually, it causes an increase in plasma insulin levels and impaired glucose tolerance. If left untreated, there is a high risk of developing type 2 diabetes. The consequences of the changes are abdominal obesity, arterial hypertension, hyperuricemia (increased concentration of uric acid in the blood). According to WHO, the number of patients with insulin-resistant syndrome who have a high risk of developing type 2 diabetes mellitus is 40-60 million people in Europe. In industrialized countries, the prevalence of metabolic syndrome among people over 30 years of age is 10-20%, in the USA - 34% (44% among people over 50 years of age) [4]. Metabolic syndrome was thought to be a disease of middle-aged people and (mostly) women. However, a survey conducted under the auspices of the American Diabetes Association indicates that the syndrome is showing a steady increase among adolescents and young adults. Thus, according to scientists from the University of Washington, between 1994 and 2000, the incidence of metabolic syndrome among adolescents increased from 4.2 to 6.4%. Nationally, the number of teenagers and young adults with Syndrome X is estimated to be more than 2 million.

Metabolic syndrome is one of the most pressing problems of modern medicine, associated with an unhealthy lifestyle. The concept of a "healthy lifestyle" includes a balanced diet, maintaining normal body weight, regular and age-appropriate physical activity, healthy sleep, and avoiding drinking alcohol and smoking.

Keywords: metabolic syndrome, type 2 diabetes mellitus

Purpose: The risk of developing type 2 diabetes mellitus (T2DM) increases as the components of metabolic syndrome (MS) increase. Prognosis for the development of type 2 diabetes in patients with polyme metabolic disorders is an important medical and social problem.

Materials and methods: we analyzed the flow MS in 634 (336 men and 298 women) patients during a 7-year prospective observation period. By the end of the observation period, type 2 diabetes was diagnosed in 446 (70.3%) sick. Based on discriminant analysis, a prognosis for the development of type 2 diabetes in patients with MS was developed. The prediction equation for DM-2 was the following equation: $G(x) = 0.81 \cdot x_1 + 0.61 \cdot x_2 + 0.31 \cdot x_3 + 0.30 \cdot x_4 + 0.29 \cdot x_5 + 0.22 \cdot x_6 + 0.22 \cdot x_7 + 0.16 \cdot x_8 - 1.21 \cdot x_9 - 0.03 \cdot x_{10}$, where x_1 is postprandial gly-kemia; x_2 - BMI; x_3 - ALT; x_4 - AST; x_5 – presence of LV myocardial hypertrophy (according to ECG data); x_6 — thyroid-stimulating hormone level; x_7 — LV

ejection fraction (according to echocardiography); x8 — fasting glycemia; x9 - family history of DM-2; x10 - number of ventricular extrasystoles (according to HM ECG data).

Results: if the value of G (x) ≥ 53.1, the patient is predicted to have a high risk of developing DM-2, if G (x) <53.1 - the risk development of CD-2 is insignificant. The percentage of correct and incorrect classification in group I was 94.1 and 5.9, respectively, in group II - 97.1 and 3.2, respectively.

Total predictive accuracy of classification amounted to 95.6%. Specificity of the method for patients with MS without development of T2DM was 94.1%, sensitivity - 97.4%, while for patients in group II these figures were 97.1% and 81.9%, respectively. To test the decisive rule for predicting the development of T2DM in patients with MS, we a control group was used, the results obtained indicated the high sensitivity and specificity of the prediction method we developed. Assessing the rank of information content of discriminant variables equation for predicting the development of type 2 diabetes, it should be noted that the most significant in terms of prognosis were indicators of glycemia, body mass index (BMI), laboratory manifestations of steatohepatosis and the presence of a family history of type 2 diabetes.

Conclusions: in our opinion, the absolute value the result of the equation is a stratification indicator of the risk of developing type 2 diabetes in patients with MS.

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