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ISCHEMIC HEART DISEASE AND METABOLIC SYNDROME IN ELDERLY PATIENTS

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Abstract

Relevance. Ischemic heart disease (IHD) and metabolic syndrome (MS) are among the leading causes of death and disability worldwide. Both conditions are urgent due to the commonality of risk factors, the high likelihood of complications, and the need to strengthen prevention, diagnosis, and treatment measures in the healthcare field.

According to the World Health Organization (WHO), in 2021, 32% of all global deaths due to cardiovascular diseases were attributed to IHD. Metabolic syndrome includes conditions such as high blood pressure, hyperglycemia, hyperlipidemia, and obesity [1,5,6].

The relationship between MS and IHD is significant, with the presence of MS increasing the risk of developing IHD by 2-3 times (Grundy et al., 2004 []). MS is widespread globally, with 34.7% of the adult population in the United States being diagnosed. The connection between IHD and MS manifests in the following ways: the increase in IHD among patients with MS is associated with higher activity of the sympathetic nervous system, which exacerbates IHD (Eckel et al., 2005). Elevated blood sugar levels accelerate endothelial damage and the development of atherosclerosis (Reaven GM, 1988). Hypertension, in turn, is noted as associated with IHD and MS, with high levels of angina recorded, increasing the risk of myocardial infarction [2,3,4].Given the above, **the aim of our study** is to examine the spread of MS components among elderly patients suffering from ischemic heart disease (IHD) and metabolic syndrome (MS). The

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study aimed to examine, assess the impact of metabolic syndrome (MS) on the urinary tract infection (UTI), and determine its clinical significance.

Object of the study and methods

A total of 189 elderly patients were involved in the study, and they were divided into two groups based on the presence or absence of MS. The first group consisted of 125 patients with both UTI and MS (the main group), while 64 patients had UTI without MS (the control group). The study examined components of metabolic syndrome, including obesity, hypertension, hyperglycemia, and hyperlipidemia in all patients. Complaints were assessed, and objective indicators such as body mass index (BMI), heart murmurs, and lung wheezing were analyzed. The 95% confidence intervals for each indicator were calculated. All studies were conducted at the City Hospital No. 7 in the Yunusabad district of Tashkent. The inclusion of patients based on age criteria was done according to the WHO's 2016 age classification. Exclusion criteria included middle-aged and young patients, acute myocarditis, acute myocardial infarction (within 30 days of the onset of illness), unstable angina, acute cerebrovascular insufficiency (within 6 months), acute renal failure, acute liver failure, and severe endocrine diseases. The obtained results were statistically processed using Microsoft Excel 2010 and the STATISTICA 6.0 software package. The main characteristics were presented as mean (M) and standard deviation as a quartile. To evaluate the difference in the mean values of independent and paired samples, the Student's paired t-test was used. A p-value of <0.05 was considered statistically significant for all types of analysis.

Obtained Results:

The data obtained (Table 1) shows that stable angina was recorded in 68% of cases in the UTI + MS group, which is significantly higher than in the UTI without MS group (45%, $p<0.01$). The presence of MS is presumed to increase the risk of angina. In the UTI + MS group, 25% of the patients had experienced a myocardial infarction, whereas this figure was 15% in the UTI without MS group ($p<0.05$). This indicates that the presence of MS increases the risk of developing myocardial infarction. Chronic heart failure (CHF) was observed in 35% of cases in the UTI

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+ MS group, which is significantly higher compared to 20% in the UTI without MS group ($p<0.05$). MS may contribute to CHF through increased cardiac load and inflammatory processes.

Clinical Types of Ischemic Heart Disease(IHD)

Heart Rhythm Disorders:Arrhythmias were recorded in 40% of cases in the UTI + MS group, compared to 22% in the UTI without MS group ($p<0.01$). It is hypothesized that cardiac arrhythmias may often result from hypertension or hyperglycemia associated with MS. Asymptomatic ischemia was observed in 20% of the UTI + MS group and 25% in the UTI without MS group. This suggests that among different types of UTI, patients with MS are significantly more likely to experience stable angina, myocardial infarction, CHF, and arrhythmias. Asymptomatic ischemia occurred at similar rates regardless of the presence of MS. These findings indicate that MS is a significant factor in exacerbating UTI complications.

Changes Recorded in the EGG

Electrocardiogram (ECG) Changes in Patients with Ischemic Heart Disease (IHD) and Metabolic Syndrome (MS):

The ECG changes were compared between groups of patients with CHD + MS and those without MS. The findings included the following analyses:

ST Segment Depression: Recorded in 85 patients (56%) in the CHD + MS group, compared to 32 patients (50%) in the CHD without MS group, with a percentage difference of 18% ($p<0.05$). This indicates clearer signs of myocardial ischemia in the CHD + MS group.

T-Wave Inversion: Observed in 69 patients (55%) in the CHD + MS group and in 19 patients (30%) in the CHD without MS group, with a difference of 25% ($p<0.01$). These results confirm stronger electrocardiological manifestations of ischemic disease in the CHD + MS group.

Left Ventricular Hypertrophy: Found in 50 patients (40%) in the CHD + MS group compared to 13 patients (20%) in the CHD without MS group, with a percentage difference of 20% ($p<0.05$). This suggests that heart remodeling associated with hypertension is characteristic of MS.

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Heart Rhythm Disorders: Detected in 52 patients (42%) in the CHD + MS group versus 16 patients (25%) in the CHD without MS group, showing a 17% difference ($p<0.05$). This indicates more frequent electrocardiological disturbances in the CHD + MS group.

Conclusion: ECG changes in the CHD + MS group were significantly more frequent and severe compared to the CHD without MS group. The findings demonstrate that MS has a substantial impact on the electrophysiological state of ischemic disease, confirming its significant role in exacerbating CHD complications.

Echocardiography (Echocardiogram) Results

We analyzed the echocardiography (ECHO) results of the patients involved in the next stage of the study. According to the results, the left ventricular ejection fraction (LVEF) in the CHD + MS group was 49.5 ± 6.2%, significantly lower than in the CHD without MS group (56.3 ± 5.8%, $p < 0.01$). This indicates the severe progression of ischemic disease and decreased pump function of the left ventricle (Table 3).

The thickness of the left ventricular wall in the CHD + MS group was 12.1 ± 1.5 mm, higher than in the CHD without MS group (10.8 ± 1.2 mm, $p < 0.05$). Diastolic dysfunction was observed in 65% of cases in the CHD + MS group, compared to 40% in the CHD without MS group ($p < 0.01$). Diastolic dysfunction indicates a reduced ability of the heart to fill with blood due to ischemic disease and metabolic disturbances.

Left ventricular dilation was recorded in 38% of cases in the CHD + MS group and 20% in the CHD without MS group ($p < 0.05$). This condition appears as a consequence of ischemic damage to the left ventricle and complications of hypertension. Pericardial effusion was present in 15% of the CHD + MS group and 8% of the CHD without MS group ($p > 0.05$), with no significant difference between the cases.

Mitral regurgitation was recorded in 45% of cases in the CHD + MS group and 25% in the CHD without MS group ($p < 0.05$). In conclusion, the ECHO results in CHD + MS patients showed more severe anatomical and functional changes in the heart due to the influence of ischemic disease and metabolic syndrome. The

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low ejection fraction of the left ventricle, hypertrophy, and diastolic dysfunction clearly confirm the negative impact of metabolic syndrome on CHD.

Quality of Life of Patients (Based on SF-36 Scores)

Analyzing the data presented in Table 4, we observe that the Physical Functioning (PF) score in the CHD + MS group was 45 points, significantly lower than the 62 points in the CHD without MS group ($p < 0.01$). Role Physical (RP) score in the CHD + MS group was 50 points, also significantly lower than the 68 points in the CHD without MS group ($p < 0.01$). Patients struggled with household tasks due to obesity, hypertension, and fatigue associated with MS. The General Health (GH) score was 42 points in the CHD + MS group, compared to 58 points in the CHD without MS group ($p < 0.01$). Mental Health (MH) scored 40 points in the CHD + MS group and 55 points in the CHD without MS group ($p < 0.01$), with depression, fatigue, and physical limitations negatively affecting mental well-being. The Bodily Pain (BP) score was 38 points in the CHD + MS group and 50 points in the CHD without MS group ($p < 0.05$). Social Functioning (SF) scored 48 points in the CHD + MS group and 65 points in the CHD without MS group ($p < 0.01$). The overall Health Transition (HT) score was 44 points in the CHD + MS group, compared to 63 points in the CHD without MS group ($p < 0.01$). The general health status was rated lower in the CHD + MS group.

In conclusion, patients in the CHD + MS group scored significantly lower in quality-of-life measures compared to the CHD without MS group. Metabolic syndrome drastically reduces the quality of life physically, mentally, and socially. Summary. It was noted that the rates of stable angina, myocardial infarction, chronic heart failure, and arrhythmias were significantly higher in the CHD + MS group compared to the CHD without MS group. Ischemic changes (ST segment depression, T wave inversion) and heart rhythm disorders were significantly higher in the CHD + MS group, with confirmed reliable differences. The CHD + MS group showed more cases of lower left ventricular ejection fraction, hypertrophy, diastolic dysfunction, and chamber dilation, indicating the severe progression of ischemic disease and the impact of metabolic syndrome. Patients in the CHD + MS group had lower physical, mental, and social quality of life

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scores compared to those without MS, highlighting the strong negative impact of metabolic syndrome on patient quality of life.

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