

## DIAGNOSTIC VALUE OF CATESTATIN LEVEL IN CARDIORENAL SYNDROME WITH EXCESS WEIGHT

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**Abstract:** *Excess body weight and obesity are one of the most common problems in modern medicine, which are important risk factors for the development of diseases of the cardiovascular and renal systems. Cardiorenal syndrome is an interconnected pathological process between these two systems, and its early diagnosis and prognostic assessment are of current importance.*

*The purpose of this study is to assess the diagnostic value of the level of catestatin in cardiorenal syndrome against the background of excess body weight. Within the framework of the study, the concentration of catestatin, indicators of cardiac and renal function, and metabolic changes in patients were studied. The obtained results showed a change in the level of catestatin in patients with excess body weight and its association with cardiorenal disorders.*

**Keywords:** *cardiorenal syndrome, catestatin, excess body weight, obesity, diagnostics, biomarkers, cardiovascular system, kidney function, oxidative stress, metabolic disorders.*

**Introduction.** Cardiorenal syndrome (CRS) is one of the pressing problems of modern cardiology and nephrology, characterized by interconnected disorders of cardiac and renal function. According to the World Health Organization, renal dysfunction is observed in 40-50% of patients with

cardiovascular diseases[1,2,5]. Excess body weight and obesity are independent risk factors for the development of CRS, as they exacerbate metabolic disorders, systemic inflammation, and oxidative stress processes. Currently, the need for new biomarkers for early diagnosis and assessment of the prognosis of CRS is increasing. Catestatin is a biologically active fragment of chromogranin A, possessing cardioprotective, antiadrenaline, and antiatherosclerotic properties[3,4].

**The purpose of the study** was to determine the diagnostic significance of the biomarker catestatin in patients with cardiorenal syndrome against the background of excess body weight and to assess its relationship with the severity of the disease.

**Materials and methods.** The study was conducted at the Bukhara State Medical Institute in 2023-2025. The study involved 130 patients diagnosed with CRS with excess body weight (IWT 25-29.9 kg/m<sup>2</sup>) and obesity of the 1st category (IWT 30-34.9 kg/m<sup>2</sup>). Of these, 70 (53.8%) were men and 60 (46.2%) were women, with an average age of  $58.4 \pm 7.3$  years. The control group consisted of 40 healthy individuals of the same age and sex. All patients underwent the following examinations: a complete clinical examination, anthropometric measurements (height, weight, BMI calculation, waist circumference), blood pressure monitoring, electrocardiography, echocardiography (ECG) with LVEF, assessment of diastolic function. Laboratory tests: general and biochemical blood analysis, urine analysis, creatinine, urea, electrolytes, lipid profile, glycemic profile, C-reactive protein (CRP). The glomerular filtration rate (GFR) was calculated using the CKD-EPI formula. The concentration of catestatin was determined by ELISA in intravenous blood serum. NT-proBNP levels were measured by the immunochemiluminescent method.

**Results.** Clinical characteristics of patients: average BMI  $31.7 \pm 3.4$  kg/m<sup>2</sup>, waist circumference  $104.3 \pm 8.7$  cm in men,  $98.6 \pm 9.2$  cm in women. Arterial hypertension was noted in 118 (90.8%) patients, type II diabetes mellitus in 54 (41.5%) patients. LVEF averaged  $46.8 \pm 8.2\%$ , with a decreased ejection fraction in 78 (60%) patients.

The level of catestatin in patients with CRS was statistically significantly lower than in the control group:  $18.4 \pm 4.6$  ng/ml and  $34.2 \pm 5.8$  ng/ml, respectively ( $p < 0.001$ ). The level of catestatin in men was slightly higher than in women ( $19.2 \pm 4.8$  ng/ml and  $17.5 \pm 4.2$  ng/ml,  $p < 0.05$ ).

When dividing patients into groups according to BMI, the following results were obtained: in the group with excess body weight ( $n=72$ ), the level of catestatin was  $20.1 \pm 4.2$  ng/ml, in the group with obesity I degree ( $n=58$ ) -  $16.2 \pm 4.4$  ng/ml ( $p < 0.001$ ). This indicates a progressive decrease in the level of catestatin with an increase in BMI.

Depending on the SKF level, patients were divided into 3 groups: SKF  $>60$  ml/min/1.73m<sup>2</sup> ( $n=42$ ), CRS 45-60 ml/min/1.73m<sup>2</sup> ( $n=51$ ), SKF 30-44 ml/min/1.73m<sup>2</sup> ( $n=37$ ). The level of catestatin in these groups was  $22.3 \pm 3.8$  ng/ml,  $18.1 \pm 3.6$  ng/ml, and  $14.2 \pm 4.1$  ng/ml, respectively ( $p < 0.001$ ). Correlation analysis showed a moderate direct correlation between the concentration of catestatin and CKF ( $r=0.68$ ,  $p < 0.001$ ).

NT-proBNP levels were significantly higher in patients with CRS and averaged  $1847 \pm 624$  pg/ml ( $78 \pm 34$  pg/ml in the control group,  $p < 0.001$ ). An inverse correlation was found between catestatin and NT-proBNP ( $r=-0.54$ ,  $p < 0.01$ ), which indicates a decrease in the level of catestatin with the aggravation of heart failure.

There was a moderate direct correlation between LVEF and catestatin ( $r=0.51$ ,  $p < 0.01$ ). In patients with LVEF  $<40\%$  ( $n=38$ ), the level of catestatin

was  $14.6 \pm 3.8$  ng/ml, in the group with LVEF 40-50% ( $n=52$ ) -  $18.2 \pm 4.1$  ng/ml, in the group with LVEF  $>50\%$  ( $n=40$ ) -  $22.8 \pm 4.6$  ng/ml ( $p < 0.001$ ).

**Conclusion.** In patients with cardiorenal syndrome against the background of excess body weight, the level of catestatin was significantly reduced compared to the control group. The concentration of catestatin shows a direct correlation with CRS ( $r=0.68$ ,  $p < 0.001$ ), NT-proBNP and CRS, which confirms its reflection of the severity of cardiorenal dysfunction. With an increase in the level of excess body weight, the level of catestatin progressively decreases, which indicates a negative impact of metabolic disorders on the synthesis and secretion of catestatin. Catestatin is a promising diagnostic biomarker for CRS against the background of excess body weight and allows for an objective assessment of the severity of the disease.

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