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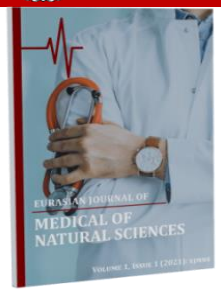

CHANGE IN CLINICAL AND BIOCHEMICAL INDICATORS IN PATIENTS WITH CHRONIC HEART FAILURE DEPENDING ON RENAL FUNCTION

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ABSTRACT

The article presents the results of the analysis of clinical and laboratory parameters in 158 patients with chronic heart failure (CHF) depending on the eGFR level. The patients were divided into four groups. A statistically significant correlation was established between a decrease in eGFR and an increase in the level of congestion markers (CA125), uric acid, phosphorus, iPTH, as well as the frequency of albuminuria. Changes in hemodynamic parameters and nutritional status were also identified, reflecting the progression of heart and kidney failure.

Conclusion. The article presents the results of the analysis of clinical and laboratory indicators depending on the level of glomerular filtration rate (hGFT), calculated in 158 patients with chronic heart failure (CHF). The patients were divided into four groups. A statistically significant correlation was revealed between a decrease in hGFR and congestive markers (CA125), uric acid, phosphorus, iPTH levels, and albuminuria. Changes were also noted in hemodynamic and nutritional indicators, reflecting the progressive course of heart and kidney failure.

Relevance. The combination of chronic heart failure (CHF) and chronic kidney disease (CKD) significantly worsens the patient's prognosis, contributing to myocardial remodeling, progressive stagnation, and activation of neurohumoral mechanisms. Understanding the pathophysiological changes reflected in clinical and laboratory parameters is crucial for choosing management tactics for such patients.

Particular attention has recently begun to be paid to carbohydrate antigen 125 (CA125) - a marker traditionally used exclusively in oncology, primarily for ovarian tumors. However, accumulated clinical observations indicate that CA125 can act as an informative biomarker of venous congestion and systemic inflammation in patients with heart failure. At the same time, in the vast majority of studies, it was practically not considered in the context of a combination of SLE and renal dysfunction, which limits the understanding of its pathophysiological role in this complex clinical situation.

Thus, assessing the significance of CA125 in patients with SLE against a background of varying degrees of eGFR decrease represents a new and relevant direction that opens up possibilities for more accurate risk stratification and monitoring of patients' condition under conditions of multi-organ pathology.

Research objective. Assess the clinical and biochemical indicators in patients with SLE, depending on the calculated glomerular filtration rate (GFR), as well as the diagnostic and prognostic significance of CA125 levels as a marker of venous congestion in patients with combined cardiac and renal dysfunction.

Materials and methods. The study included 158 patients with NYHA CVD FC II-III who received standard therapy. The calculated CFT was determined by the formula CKD-EPI. Patients were divided into four groups:

- Group 1 - eGFR ≥ 60 ml/min/1.73 m2 (n=65),
- Group 2 - eGFR 45-59 ml/min (n=30),
- Group 3 - eGFR 30-44 ml/min (n=38),
- Group 4 - eGFR < 30 ml/min (n=25).

Assessment of clinical indicators (NYHA, BP, HR, BMI, congestion severity), as well as biochemical parameters: CA125, uric acid, HbA1c, total protein, albumin, total cholesterol, phosphorus, iPTH, and albuminuria, was conducted.

Research results.

Clinical characteristics.

The majority of patients (n=105) were NYHA functional class II, while NYHA functional class III was registered in 30 individuals, and NYHA functional class I was registered in 22 patients. The average systolic blood pressure (SAB) was 121 mm Hg, demonstrating a downward trend in groups with more severe eGFR disorders. The heart rate increased depending on the deterioration of kidney function. The severity of congestion also increased with the transition to lower eGFR values.

Table

Biochemical indicators of patients depending on the level of eGFR

Indicator	Total (n = 158)	Group 1 (≥60)	Group 2 (45-59)	Gr. 3 (30-44)	Gr. 4 (<30)	p-value
CA125, units/ml	15 [9-28]	12 [8-19].	15 [10-28]	17 [11-35]	25 [13-62]	<.001
Uric acid, mmol/l	0.38 [0.30-0.48]	0.32 [0.25-0.38]	0.39 [0.31-0.48]	0.42 [0.35-0.53]	0.48 [0.37-0.58]	<.001
HbA1c, %	6.0 [5.5-6.5]	5.8 [5.5-6.3]	6.1 [5.6-6.6]	6.1 [5.6-6.6]	6.1 [5.5-7.1]	<.001
Total protein, g/l	69 [66-73]	69 [66-72].	69 [66-72].	70 [66-74]	69 [64-72]	.551.
Albumin, g/l	41 [38-44]	42 [39-45]	41 [38-44]	40 [38-43]	39 [36-42].	<.001
Total cholesterol, mmol/l	3.86 [3.21-4.68]	3.91 [3.39-4.90].	3.76 [2.98-4.50].	3.88 [3.34-4.56]	3.62 [3.00-4.58]	<.001
Phosphorus, mmol/l	1.13 [1.00-1.26]	1.13 [1.00-1.23]	1.13 [0.97-1.20]	1.13 [1.00-1.26]	1.23 [1.13-1.42]	<.001
iPTH, pg/ml	78 [40-128]	53 [28-87].	79 [35-126]	111 [66-166]	129 [77-216].	<.001

Albuminuria, %	37.3.	27.7.	36.7.	39.5	44.0	.003

The median level of CA125 increased from 12 units/ml in patients with normal eGFR to 25 units/ml with eGFR <30 ml/min/1.73 m2 ($p<0.05$). Similar positive dynamics were observed for uric acid (5.4 to 8.0 g/dl), phosphorus (3.5 to 3.8 mg/dl), and iPTH (53 to 129 pg/ml). The frequency of albuminuria was 27.7% in the group with eGFR ≥ 60 and reached 44.0% in the group with eGFR <30 ($p=0.003$). Albumin levels decreased as kidney function deteriorated, while HbA1c and cholesterol showed minor but significant changes.

Discussion. The results of our study confirm that a decrease in the calculated glomerular filtration rate (GFR) in patients with SLE is accompanied by complex clinical and biochemical changes reflecting the progression of both heart and renal failure. The most significant differences were recorded in the levels of CA125, uric acid, albumin, iPTH, and the frequency of albuminuria.

An increase in CA125 concentration in groups with lower eGFR may indicate not only an increase in venous congestion but also involvement of mesothelial cells in the systemic inflammatory response. This is consistent with literature data, where CA125 is considered a universal marker of congestive heart failure and an unfavorable prognosis.

Hyperuricemia observed in patients with eGFR < 45 ml/min/1.73 m2 reflects the combined effect of reduced renal clearance and increased tissue catabolism. As is known, an increase in uric acid levels in patients with SLE is associated with an increased risk of hospitalization and mortality.

The decrease in albumin levels in patients with severe CKD confirms the presence of a chronic inflammatory syndrome and protein loss in urine. Hypoalbuminemia is associated with deterioration of tissue trophism, increased frequency of hospital outcomes, and reduced response to therapy.

A significant increase in iPTH levels in patients with eGFR < 44 ml/min/1.73 m2 indicates the development of secondary hyperparathyroidism, contributing to vascular calcification and myocardial remodeling.

The increasing frequency of albuminuria confirms the progressive glomerular damage and emphasizes the need for early detection and control of this condition.

Conclusion. A comprehensive assessment of clinical and laboratory indicators in patients with SLE allows for the identification of key mechanisms for the progression of both heart and renal failure. The use of CA125 as an accessible and sensitive marker of venous congestion is of particular importance, especially in patients with a concurrent decrease in eGFR. The identified correlation between increased CA125 levels and the degree of renal dysfunction emphasizes its diagnostic and prognostic value. Increased levels of congestive, inflammatory, and metabolic markers require a personalized approach to treatment and dynamic monitoring of such patients with cardionephrological comorbidity.

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