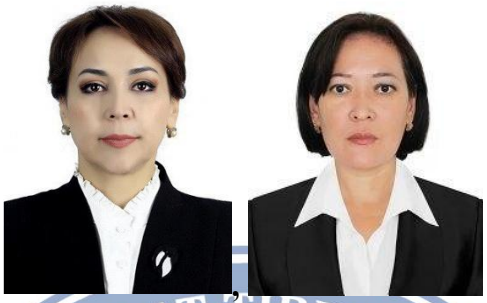
TOSHKENT TIBBIYOT AKADEMIYASI URGANCH FILIALI
JANUBIY OROLBO‘YI TIBBIYOT JURNALI
2 - TOM, MAXSUS SON. 2026
14.00.00 - TIBBIYOT FANLARI ISSN: 3093-8740

UDK: 230-884(eng)3

# CHRONIC OBSTRUCTIVE PULMONARY DISEASE WITH OBESITY COMORBIDITY: RENAL DYSFUNCTION AND OPTIMIZATION OF TREATMENT



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**Abstract**

Chronic obstructive pulmonary disease (COPD) is a major global health problem characterized not only by respiratory impairment but also by systemic complications. When COPD occurs in comorbidity with obesity, metabolic and hemodynamic disturbances become more pronounced, increasing the risk of multi-organ dysfunction, including renal impairment. The aim of this study was to investigate renal dysfunction in COPD patients with obesity and to improve treatment approaches. The findings indicate that combined hypoxia, systemic inflammation, and metabolic disorders contribute to early renal impairment. A комплексный therapeutic approach significantly improves clinical outcomes and renal function indicators.

**Keywords:** COPD, obesity, comorbidity, renal dysfunction, hypoxia, inflammation, treatment.

**Annotatsiya**

O‘pkaning surunkali obstruktiv kasalligi (O‘SOK) nafaqat nafas yetishmovchiligi, balki tizimli asoratlar bilan ham tavsiflanuvchi dolzarb global tibbiy muammodir. O‘SOK semizlik bilan komorbid holatda kechganda metabolik va gemodinamik buzilishlar yanada kuchayib, ko‘p a’zoli disfunktsiya, jumladan buyraklar faoliyatining buzilishi xavfini oshiradi. Ushbu tadqiqotning maqsadi semizlik bilan kechuvchi O‘SOK bemorlarida buyraklar disfunktsiyasini o‘rganish va davolash yondashuvlarini takomillashtirishdan iborat edi. Tadqiqot natijalari birgalikdagi gipoksiya, tizimli yallig‘lanish va metabolik buzilishlar buyraklarning erta zararlanishiga olib kelishini ko‘rsatdi. Kompleks terapevtik yondashuv klinik natijalar va buyrak faoliyati ko‘rsatkichlarini sezilarli darajada yaxshilaydi.

**Kalit so‘zlar:** O‘SOK, semizlik, komorbidlik, buyraklar disfunktsiyasi, gipoksiya, yallig‘lanish, davolash.

**Аннотация**

Хроническая обструктивная болезнь лёгких (ХОБЛ) является одной из актуальных глобальных медицинских проблем, характеризующейся не только нарушением функции дыхания, но и системными осложнениями. При сочетании ХОБЛ с ожирением метаболические и гемодинамические нарушения становятся более выраженными, что повышает риск полиорганной дисфункции, включая поражение почек. Целью данного исследования было

изучение почечной дисфункции у пациентов с ХОБЛ в сочетании с ожирением и совершенствование подходов к лечению. Полученные результаты показали, что сочетанное влияние гипоксии, системного воспаления и метаболических нарушений способствует раннему поражению почек. Комплексный терапевтический подход значительно улучшает клинические результаты и показатели функции почек.

**Ключевые слова:** ХОБЛ, ожирение, коморбидность, дисфункция почек, гипоксия, воспаление, лечение.

## Introduction

Chronic obstructive pulmonary disease (COPD) is a progressive respiratory disorder characterized by persistent airflow limitation and chronic inflammation of the airways. It is one of the leading causes of morbidity and mortality worldwide[1].[1] In addition to pulmonary manifestations, COPD is increasingly recognized as a systemic disease affecting multiple organs, including the cardiovascular and renal systems [2].

Obesity is a common comorbid condition in patients with COPD and is associated with metabolic syndrome, insulin resistance, and chronic low-grade inflammation [3]. When COPD coexists with obesity, the combined effects of hypoxia, oxidative stress, and metabolic imbalance may aggravate systemic complications. [7] One of the important but often underestimated complications is renal dysfunction. [6]

Renal impairment in COPD patients may result from chronic hypoxemia, systemic inflammation, endothelial dysfunction, and altered hemodynamics [4] . Early detection and proper management of renal dysfunction are essential to prevent progression to chronic kidney disease and improve patient outcomes. [5]

**Purpose of the Study**

The aim of this study was to evaluate renal dysfunction in patients with COPD combined with obesity and to develop improved treatment strategies.

**Materials and Methods**

This study included patients diagnosed with chronic obstructive pulmonary disease combined with obesity. Clinical evaluation was performed on the basis of medical history, physical examination, and assessment of the severity of respiratory symptoms. The diagnosis of COPD was established according to accepted clinical and functional criteria, while obesity was determined using body mass index values.

All patients underwent a comprehensive examination that included assessment of pulmonary and renal function. Pulmonary status was evaluated by spirometry, with measurement of forced expiratory volume and other indicators of bronchial obstruction. Blood gas analysis was used to determine the degree of hypoxemia and respiratory insufficiency. Renal function was assessed through serum creatinine, blood urea, estimated glomerular filtration rate, urinalysis, and microalbuminuria. In addition, biochemical blood tests were performed to evaluate metabolic disturbances, including glucose and lipid profile changes.

The relationship between the severity of COPD, the degree of obesity, and renal dysfunction was analyzed. Special attention was given to the influence of chronic hypoxia, systemic inflammation, and metabolic disorders on kidney function. The obtained clinical and laboratory data were compared in order to identify the main factors associated with renal impairment in this category of patients.

The treatment strategy was based on a comprehensive approach. All patients received standard therapy for COPD, including bronchodilator and anti-inflammatory treatment. At the same time,

[1] Global Initiative for Chronic Obstructive Lung Disease (GOLD). Global Strategy for the Diagnosis, Management, and Prevention of COPD. 2023.

measures aimed at correcting metabolic disorders, reducing body weight, improving oxygenation, and protecting renal function were included. The effectiveness of treatment was evaluated by repeated assessment of respiratory symptoms, laboratory parameters, and renal function indicators.

The collected data were processed using generally accepted methods of medical and biological statistics. Comparative analysis was performed to determine the significance of differences between the studied indicators and to evaluate the effectiveness of the proposed treatment approach.

**Results**

The results showed that patients with COPD and obesity demonstrated significant signs of renal dysfunction compared to those without comorbidity. Elevated serum creatinine and reduced glomerular filtration rate were observed in a considerable number of patients.

Hypoxemia was identified as a key factor contributing to renal hypoperfusion and functional decline. In addition, obesity-related metabolic disturbances, including insulin resistance and dyslipidemia, further aggravated renal impairment [5].

Microalbuminuria was detected in several patients, indicating early kidney damage. The severity of renal dysfunction correlated with the stage of COPD and the degree of obesity.

Implementation of комплексный treatment led to improvement in respiratory function, stabilization of metabolic parameters, and partial recovery of renal function indicators. Weight reduction and metabolic control played a significant role in improving overall outcomes.

**Discussion**

The findings of this study confirm that COPD combined with obesity significantly increases the risk of renal dysfunction. Chronic hypoxia leads to reduced oxygen delivery to renal tissues, resulting in nephron damage and decreased filtration capacity [6].

Systemic inflammation, which is characteristic of both COPD and obesity, contributes to endothelial dysfunction and microvascular damage. This process affects renal circulation and accelerates the progression of kidney impairment.

Obesity further exacerbates the condition by increasing intrarenal pressure, promoting sodium retention, and altering hormonal regulation, including activation of the renin-angiotensin-aldosterone system [7].

The study highlights the importance of early detection of renal dysfunction in COPD patients, especially those with obesity. Regular monitoring of renal function markers such as GFR and microalbuminuria is essential.

A multidisciplinary approach is required for effective management. Treatment should not be limited to respiratory therapy but must also include metabolic correction, weight control, and renal protection strategies.

**Conclusion**

In conclusion, chronic obstructive pulmonary disease in comorbidity with obesity represents a clinically complex condition that significantly increases the risk of renal dysfunction. The results of the study suggest that the coexistence of these two pathologies creates unfavorable pathophysiological conditions characterized by chronic hypoxia, systemic inflammation, oxidative stress, metabolic imbalance, and hemodynamic alterations. Together, these factors contribute to the gradual impairment of renal function and may accelerate the development of chronic kidney disease if not recognized in time.

The study demonstrated that renal dysfunction in patients with COPD and obesity may develop at early stages and often remains clinically underestimated. Changes such as elevated serum creatinine, decreased glomerular filtration rate, and the presence of microalbuminuria indicate that the kidneys are involved in the systemic pathological process. These findings confirm that renal impairment should be considered an important component of the comorbid course of COPD, especially in patients with excessive body weight and metabolic abnormalities.

It was also established that the severity of renal dysfunction is closely associated with the degree of respiratory insufficiency, chronic hypoxemia, and obesity-related metabolic disturbances. This indicates that worsening pulmonary function and increased body mass not only complicate the clinical course of COPD but also create additional stress on renal hemodynamics and filtration processes. Therefore, the assessment of kidney function should become a routine part of the clinical examination of such patients.

An important conclusion of this study is that treatment optimization must be based on a comprehensive and multidisciplinary approach. Standard COPD therapy alone is not sufficient in patients with obesity and renal dysfunction. The most effective management strategy should combine bronchodilator and anti-inflammatory treatment with correction of metabolic disorders, body weight reduction, oxygenation support, and nephroprotective interventions. Such an integrated therapeutic approach contributes not only to the improvement of respiratory status but also to stabilization of renal function and overall clinical condition.

Special importance should be given to early diagnosis and continuous monitoring. Regular evaluation of renal markers, including serum creatinine, glomerular filtration rate, and microalbuminuria, may help detect early kidney damage and prevent its progression. In addition, control of body weight, blood pressure, glucose metabolism, and lipid profile should be included in long-term patient management, since these factors have a direct impact on both pulmonary and renal outcomes.

Thus, the findings of this study highlight that COPD associated with obesity should be regarded as a systemic disorder requiring broader clinical attention than respiratory symptoms alone. Renal dysfunction in these patients is both a consequence of systemic pathological mechanisms and an additional factor worsening prognosis. Timely recognition of this complication and implementation of individualized treatment strategies can significantly improve quality of life, reduce the risk of severe complications, and contribute to better long-term outcomes.

Further research is needed to clarify the molecular and clinical mechanisms linking COPD, obesity, and renal dysfunction, as well as to develop more effective preventive and therapeutic protocols for this growing group of comorbid patients.

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