American Journal of Medicine and Medical Sciences 2025, 15(12): 4575-4577
DOI: 10.5923/j.ajmms.20251512.81

Influence of the Postovide Syndrome on Metabolic Parameters and the Risk of Cardiometabolic Complications in Obesity Patients

Khairullaeva G. S.

Bukhara State Medical Institute, Bukhara, Uzbekistan

Abstract The study showed that in patients with COVID-19, the severity of metabolic and inflammatory disorders directly depends on the degree of obesity. An increase in body mass index is accompanied by an increase in insulin resistance, hypertriglyceridemia, and systemic inflammation, which forms an unfavorable clinical and metabolic profile and contributes to the aggravation of the disease. The obtained results confirm the need for early diagnosis and comprehensive metabolic correction in COVID-19 patients with obesity.

Keywords COVID-19, Obesity, Body mass index, Insulin resistance, HOMA-IR, Dyslipidemia, Triglycerides, Systemic inflammation, CRP, Post-COVID period

1. Introduction

Post-covid syndrome is considered one of the most significant consequences of a previous SARS-CoV-2 infection, accompanied by prolonged metabolic disorders and increased cardiometabolic risks [1-3]. A special risk group is formed by obese patients, in whom COVID-19 enhances initial metabolic disorders, including insulin resistance, dyslipidemia, and chronic subclinical inflammation [2,4,5]. Modern studies show that even 3-6 months after recovery, such patients maintain elevated levels of pro-inflammatory cytokines, lipid profile and endothelial function disorders, which contributes to accelerated formation of the atherogenic phenotype and increases the likelihood of cardiovascular complications [3,6,7,8]. Considering the widespread prevalence of obesity and the high risk of long-term consequences of COVID-19, studying metabolic changes in the post-COVID period has important clinical significance and allows for the optimization of preventive and therapeutic approaches.

The purpose of the study is to assess the impact of post-COVID syndrome on lipid and carbohydrate metabolism, systemic inflammation indicators, and the formation of cardiometabolic risks in obese patients to justify optimal approaches to their early diagnosis and correction.

2. Materials and Methods of Research

The study was conducted under multicenter observation and included 168 patients who had COVID-19 of varying severity and had signs of lipid metabolism disorders. The selection was carried out on the basis of the infectious diseases hospital and the consultative and diagnostic center. The age of the examined varied from 28 to 72 years (average age 49.6 ± 12.1 years); among them were 92 men (54.8%) and 76 women (45.2%). Inclusion criteria included laboratory -confirmed SARS-CoV-2 (PCR), presence of dyslipidemia or obesity (MI≥ 30 kg/m2), and consent to participate in the study.

To analyze the characteristics of lipid metabolism, patients were divided into three groups. Group I (n=54) included patients with normal body weight and moderate dyslipidemia in COVID-19; Group II (n=62) - patients with obesity of I-II degree, who had COVID-19 in moderate form; Group III (n=52) consisted of patients with obesity of the III degree and pronounced lipid profile disorders who had a severe form of the disease. This distribution made it possible to assess the influence of the degree of obesity and the severity of metabolic disorders on the clinical course of COVID-19.

3. Research Results

During the acute phase of COVID-19, patients exhibited pronounced metabolic and inflammatory disorders, the degree of which increased proportionally to the increase in body weight (Table 1).

Analysis of the initial data revealed significant differences in metabolic and inflammatory status between patient groups

* Corresponding author:
gulruh_xayrullayeva@bsmi.uz (Khairullaeva G. S.)
Received: Nov. 17, 2025; Accepted: Dec. 12, 2025; Published: Dec. 25, 2025
Published online at http://journal.sapub.org/ajmms

($p<0.001$ for all indicators), reflecting the influence of obesity on the severity of metabolic disorders in COVID-19.

In patients of Group I, the body mass index corresponded to excess body weight, while HOMA-IR values indicated moderate insulin resistance. Triglyceride levels and CRP concentration were characterized by a moderate increase, reflecting the moderate degree of systemic inflammation typical for the uncomplicated course of COVID-19.

In group II, which included patients with obesity of I-II degree, a significant increase in BMI and the insulin resistance index was noted. An increase in triglyceride levels against the background of CRP growth indicated the formation of pronounced metabolic dysfunction associated with an increased inflammatory response.

The most unfavorable initial indicators were identified in patients of Group III. They recorded maximum BMI values and HOMA-IR, reflecting deep insulin resistance, as well as the highest levels of triglycerides and CRP, indicating pronounced systemic inflammation. The combination of these changes forms a high-risk metabolic-inflammatory phenotype, contributing to the aggravation of COVID-19 and an increase in the likelihood of complications.

To more deeply assess the vascular and thrombotic mechanisms underlying the complicated course of COVID-19 in obese patients, an analysis of endothelial function and hemostasis system indicators was conducted. Considering the proven role of endothelial dysfunction and hypercoagulation in the pathogenesis of COVID-19, the inclusion of these markers made it possible to clarify the degree of vascular damage and thrombotic risk depending on the severity of metabolic disorders (Table 2).

The obtained data indicate a progressive activation of the coagulation cascade and an increase in endothelial dysfunction as the degree of obesity increases. In patients of Group I, hemostasis indicators were within moderate activation, which corresponded to a relatively favorable course of COVID-19.

In group II, a significant increase in the levels of D-dimer and fibrinogen was noted, indicating the activation of intravascular coagulation processes. Simultaneously, an increase in von Willebrand factor was recorded, reflecting endothelial damage and increased adhesive properties of the vascular wall.

The most pronounced changes were detected in patients of Group III, where the level of D-dimer exceeded the indicators of Group I by more than 2 times, and fibrinogen reached maximum values ($p<0.001$). A significant increase in von Willebrand factor against the background of a significant decrease in the concentration of stable nitrogen oxide metabolites indicated a profound endothelial dysfunction, a decrease in the vasodilating and antithrombotic activity of the endothelium. These changes reflect a high risk of thrombotic complications and vascular disorders in patients with severe obesity and COVID-19.

To assess the dynamics of metabolic and inflammatory changes in the post-COVID period, patients were re-examined 90 days after the acute phase of the disease. The analysis is aimed at determining the effectiveness of complex metabolic correction and restoration of homeostatic mechanisms in patients of different groups (Table 3).

In the post-COVID period, all examined patients showed positive dynamics in metabolic and inflammatory indicators, which indicates the effectiveness of the ongoing therapeutic and preventive measures.

Table 1. Initial metabolic indicators of patients in acute COVID-19 (before correction)

Indicator	Group I	Group II	Group III	p
BMI, kg/m2	27.6 ±1.8	33.4 ±2.6	39.8 ±3.4	<0.001
HOMA-IR	2.4 ±0.6	3.8 ±0.9	5.2 ±1.3	<0.001
Triglycerides, mmol/l	1.42 ±0.31	1.86 ±0.44	2.39 ±0.58	<0.001
CRP, mg/l	18.4 ±6.2	31.7 ±9.4	48.9 ±12.6	<0.001

Table 2. Endothelial function and hemostasis indicators

Indicator	Group I	Group II	Group III	p
D-dimer, ng/ml	420 ±110	680 ±190	980 ±260	<0.001
Fibrinogen, g/l	3.6 ±0.7	4.5 ±0.9	5.3 ±1.1	<0.001
Von Willebrand factor, %	118 ±24	146 ±31	178 ±38	<0.001
NO (nitrites/nitrates), μmol/l	32.4 ±6.1	27.8 ±5.6	22.3 ±4.9	<0.01

Table 3. Dynamics of metabolic indicators in the post-COVID period

Indicator	Group I	Group II	Group III	p.
Decrease in BMI, kg/m2	−0.8 ± 0.4	−1.9 ± 0.7	−2.6 ± 0.9	<0.01
HOMA-IR decrease, %	−12.4	-21.6.	−29.8	<0.01
Decrease in TG, %	−9.8	−18.3	−27.4.	<0.001
Decrease in CRP, %	-24.6.	−38.1.	−46.9	<0.001

In patients of Group I, a moderate decrease in body mass index and insulin resistance indicators was observed, reflecting a partial restoration of metabolic balance after the infection.

In group II, the dynamics were more pronounced: a decrease in BMI and HOMA-IR indicators was accompanied by a significant decrease in triglycerides and CRP, indicating a decrease in inflammatory activity and an improvement in tissue sensitivity to insulin.

The most significant positive dynamics were recorded in patients of Group III, where the decrease in insulin resistance, triglycerides, and CRP reached maximum values ($p<0.001$). This confirms that complex metabolic correction in the post-COVID period is especially effective in patients with severe obesity, allowing for a reduction in the severity of chronic inflammation and a decrease in the risk of developing long-term cardiometabolic complications.

4. Conclusions

The obtained data indicate that the initial state of metabolic and inflammatory status in COVID-19 patients is closely related to the degree of obesity. As the body mass index increases, there is a progressive increase in insulin resistance, hypertriglyceridemia, and systemic inflammation, which forms an unfavorable metabolic-inflammatory phenotype of the patient and contributes to a more severe course of the infection. The identified patterns emphasize the importance of early assessment of metabolic indicators and the need for timely correction of identified disorders in patients with obesity in the acute and post-COVID periods.

REFERENCES

[1] Nalbandian A., Sehgal K., Gupta A., et al. Post-acute COVID-19 syndrome. Nat Med. 2021; 27 (4): 601-615.

[2] Stefan N., Birkenfeld A.L., Schulze M.B. Global pandemics interconnected: obesity, metabolic syndrome and COVID-19. Nat Rev Endocrinol. 2021; 17 (3): 135-149.

[3] Xie Y., Xu E., Al-Aly Z. Risks of mental health outcomes in people with COVID-19: cohort study. BMJ. 2022; 376: e068993.

[4] Raveendran A.V., Jayadevan R., Sashidharan S. Long COVID: An Overview. Diabetes Metab Syndr. 2021; 15 (3): 869-875.

[5] Davis H.E., Assaf G.S., McCorkell L., et al. Characterizing long COVID in an international cohort. EClinical Medicine. 2021; 38: 101019.

[6] Dennis A., Wamil M., Alberts J., et al. Multiorgan impairment in low-risk individuals with long-term COVID. BMJ Open. 2021; 11: e048391.

[7] Sudre C.H., Murray B., Varsavsky T., et al. Attributes and predictors of long COVID. Nat Med. 2021; 27 (4): 626-631.

[8] Zhou F., Yu T., Du R., et al. Clinical course and risk factors for mortality in adult COVID-19 patients. Lancet. 2020; 395 (10229): 1054-1062.