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THROMBOEMBOLIC DISEASES ON THE BACKGROUND OF COVID -19

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Abstract
Currently, it can be noted that COVID-19 is, without exaggeration, the most serious challenge to the international system of practical healthcare in its recent history. Extremely high morbidity and mortality rates dictate the need for a more detailed study of the pathogenetic aspects of the developing infectious disaster. In addition to respiratory distress syndrome, systemic inflammatory reaction syndrome, COVID-19 is characterized by polyvalent disorders of the mechanisms of systemic hemostasis, which is reflected in the increase in the number of venous thromboembolic complications in the overall structure of morbidity and mortality. The above literature review summarizes information on COVID-19-associated coagulopathy and its effect on changes in the clinical and epidemiological characteristics of venous thromboembolic complications.

Keywords: COVID-19; SARS-CoV-2; venous thromboembolic complications; Co-associated coagulopathy.

Introduction

The pandemic of the new coronavirus infection (COVID-19) has disrupted the usual algorithm of providing medical care to the population. Clinicians are faced with a new disease, which is characterized by a wide range of clinical syndromes: from upper respiratory tract infection to life-threatening cardiovascular complications. Such complications include deep vein thrombosis (DVT) and pulmonary embolism (PE) [1,2]. The main pathogenetic factors of COVID-19 include changes in the vascular endothelium, which affect the entire vascular system and lead to microthrombosis, mainly localized in the pulmonary microcirculation system. COVID-19-related coagulopathy, endothelial dysfunction, and immune thrombosis are typical examples of thrombosis and inflammation mutually reinforcing each other [3].

The purpose of the study

To analyze the course of the new coronavirus infection (COVID-19) in patients with VTEO during the first and second waves of the COVID-19 pandemic, identify the features of laboratory parameters, and evaluate the structure of VTEO.

Research materials and methods

The study included data on patients of the first wave hospitalized from April to August 2020 (1,839 patients), and the second wave from January to May 2021 (840 people). Ultrasound examination of the venous system of the lower extremities was performed not routinely in all patients with a new coronavirus infection, but only in the presence of clinical signs of DVT (edema, pain). The patients received complex drug therapy aimed at treating the underlying and concomitant diseases

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and their complications. Anticoagulant, antiviral, antibacterial, hormonal therapy, proton pump blockers, insulin therapy according to indications, antitussive agents, infusion therapy up to 1500 ml per day, oxygen insufflation depending on the level of saturation and severity of the underlying disease were prescribed. Retrospectively, according to the case histories, the risk of VTEO was assessed on the Padua scale. The research protocol is registered in the database clinicaltrials.gov ID NCT 05143567. Statistical data analysis was performed using the Statistica 10 for Windows and Microsoft Exel software. Quantitative variables were described in the form of the following values: the number of cases, absolute and relative values (percentages), the average value and its standard deviation.

The results of the study

In patients with COVID-19 during the first wave, 27 (1.5%) symptomatic VTEO were detected, confirmed instrumentally. The average age of patients with VTE was 68 (58-72) years, among them the proportion of women was 59%. During the second wave of COVID-19, the number of such cases was 13 (1.5%). The average age of the patients was 74 (65-81) years, among them the majority were male (61.5%). Community-acquired pneumonia was instrumentally verified in all patients with VTEO according to CT data. Among patients with VTEO during the first wave, a fatal outcome was recorded in 10 (37%) cases, during the second wave — in 11 (85%) cases. Retrospectively, according to medical documentation, an assessment of the risk of VTEO on the Padua scale was carried out. High risk of VTEO on the Padua scale (from 4 to 9 points) It was observed in 70% of patients with VTE during the first wave of the pandemic, in 85% during the second wave. The average values of laboratory parameters in patients with VTEO during the first wave were as follows: blood leukocytes — 9,2·109 / l (6.9— 14.3); CRP — 77.5 mg/l (26-159); fibrinogen — 593.5 mg/ml (500-700); ferritin — 1132.6 mcg/l (165-1753). Patients with VTE during the second wave were characterized by: moderate leukocytosis — 12,2·109 / l (7-19), increased fibrinogen levels — 544 mg/dl (405-781), as well as high levels of CRP — 102.75 mg/ml (80-163) and ferritin — 510 mcg/l (230-566).

Discussion

The global COVID-19 pandemic represents the greatest medical problem of recent years. The development of coagulopathy with thrombotic complications, such as DVT and PE, is associated with an unfavorable prognosis of the disease and high mortality [5]. According to a meta—analysis of 42 studies, which included information on 8,271 patients, the incidence of VTE was 21%, DVT — 20%, PE — 13% and arterial thrombosis - 2%. At the same time, the number of similar complications among patients of the intensive care unit (ICU) increased to 31; 28; 19 and 5%, respectively. According to sectional studies, the frequency of DVT was 35%, and PE was 22%. It was noted that the presence of any thrombotic event increased the risk of death by 1.74 times (95% CI 1.01—2.98) [6]. According to the present study, mortality in patients with VTE was significantly higher during the second wave of new coronavirus infection compared to the first (85 vs. 37%). This is probably due to the higher incidence of PE in this category of patients (30% of cases in the first wave and 54% in the second wave of the pandemic). Isolated PE without sources in the lower extremities was detected in 22% of cases in the first wave of the disease and in 15.4% in the second, and 1 (7.6%) case of renal vein thrombosis was recorded. D. Wichmann et al. [7] during autopsy, PE was registered in 58% of cases, while the authors noted that these patients had

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not been diagnosed with DVT during their lifetime. The identification of asymptomatic forms of DVT remains a difficult and unresolved task in many medical institutions.

Conclusion

Patients with a new coronavirus infection with the development of VTE have a high mortality rate. During the second wave of the pandemic, mortality among patients with VTE increased, which may be associated with both thrombotic complications and concomitant cardiovascular pathology.

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