

Coronavirus Pandemic

Arterial mesenteric thrombosis in COVID-19 positive patient: A case report

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Abstract

COVID-19 has resulted in the death of a number of people around the world. Complications of COVID-19 including coagulopathy may contribute to the development of arterial ischemic events. Mesenteric thrombosis is a late complication of the disease. This clinical case presented the role of hypercoagulation in the clinical picture of the COVID-19 patients, which increased the risk of death.

Key words: COVID-19; mesenteric thrombosis; bilateral interstitial pneumonia.

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Introduction

COVID-19, which leads to acute respiratory syndrome SARS-CoV-2, was firstly described in Wuhan, Hubei Province, China. Until today COVID-19 has been the cause of death for several people across the world. Respiratory disorders are more common in the clinical picture of the disease. Rare cases of ischemic complications of the gastrointestinal tract have been described. Mesenteric thrombosis is a late complication of the disease. COVID-19 PCR negative patients have already been hospitalized again with clinical manifestations of acute abdomen with mesenteric vascular thrombosis due to coagulopathy, typical for COVID-19 [1]. In some cases, the manifestations of hypercoagulation is presented with cerebral, aortic, and mesenteric vascular thrombosis [2-3]. Disease provoked different venous and arterial thrombosis, however, most often it was manifested by pulmonary artery thrombosis and venous thrombosis [4-5]. Patients with respiratory disorders experienced high mortality in pre-operative, operative, and post-operative periods. The clinical case is related to COVID-19 interstitial pneumonia patient with arterial mesenteric thrombosis as a late complication of the disease, which subsequently leads to the patient's death.

Clinical case

An 89-years-old patient complains of fever, dyspnea, and weakness for one month. On 20th May 2020 nasopharynx PCR was found positive for SARS-CoV-2 and the patient was admitted to "St. Grigor Lusavorich" medical center. In objective examination - skin and visible mucous membranes were pale. Breathing was frequent, and SpO₂ was 72% without oxygen inhalation and 92-93% with 10 L/min oxygen inhalation. Heartbeats were rhythmic and low, BP 110/80 mmHg, pulse 103 bpm, body temperature 36.9 °C. During the palpation of the abdomen, no tenderness was detected. She had a history of bronchial asthma and arterial hypertension.

Chest X-ray was typical for bilateral viral interstitial pneumonia. Bilateral hydrothorax also was detected.

ECG: sinus rhythm, 91 bpm, left axis deviation.

CT scan: bilateral viral interstitial pneumonia, bilateral hydrothorax.

Blood tests: hemoglobin 142 g/L, erythrocyte 3.7×10^{12} , hematocrit 39%, leukocyte 10.8×10^9 , platelet 3.09×10^{14} . General protein 44.8 g/L, general bilirubin 12 mmol/L, ALT 36.5, AST 35.7. Glucose 5.3 mmol/L, urine 4.3 mmol/L, creatinine 49.3 mmol/L. Coagulogram: INR 1.0, APTT 27, Pt 87%, Na 133.9 mmol/L, K 3.4 mmol/L, Ca 1.54 mmol/L, CRP 13.35 mg/L, D-dimer 0.52 mg/mL.

Clinical diagnosis: COVID-19. Bilateral subtotal interstitial pneumonia, bilateral hydrothorax, acute respiratory failure 3rd degree. Lymphostasis of lower extremities. Bronchial asthma. Arterial hypertension.

Treatment: Azithromycin, hydroxychloroquine, levofloxacin, anticoagulants, glucocorticosteroids, and diuretics. During the therapy the patient's condition was unstable.

On 1 June 2020, 2 June 2020, and 6 June 2020 nasopharynx PCR was negative for SARS-CoV-2. On 8 June 2020, the patient was admitted to “Mikaelyan University Institute of Surgery” to continue further treatment. The patient’s condition, while being admitted to “Mikaelyan University Institute of Surgery”, was severe. In objective examination - skin and visible mucous membranes were pale. There was no-expressed lower extremities edema. Auscultation of the lungs revealed diminished vesicular breathing, crepitation in the right basal region, percussion revealed dullness of the sound. SpO₂ with 10 L/min O₂ inhalation) was 91% and 69% without oxygen inhalation. Heartbeats were rhythmic, diminished, BP 140/90 mm, pulse 88 bpm. The liver and spleen were not palpated. There were postoperative scars on the anterior wall of the abdomen, and a postoperative hernia. A urinary catheter was installed.

Investigations

ECG: sinus rhythm 80 bpm, regular, (-T) in aVL, diminished voltage of ECG.

Echocardiography revealed expressed concentric hypertrophy of the left ventricle. Dilation of the left atrium and right chambers of the heart. The contractility of the left ventricle was above average. EF- 45-50%. Doppler: diastolic dysfunction type 1. Mitral regurgitation I degree, aortic regurgitation I degree, tricuspid regurgitation I degree. The vena cava inferior was not enlarged, it collapsed > 50%. No fluid was found in the pericardial cavity. The interatrial and interventricular septa were complete.

Blood test: Hb 131 g/L, RBC $3.70 \times 10^6/\mu\text{L}$, WBC $8.34 \times 10^3/\mu\text{L}$, ESR 16 mm/h, HCT 40.8 %, PLT $2.42 \times 10^{11}/\text{L}$.

Blood biochemical test: ALT 27.1 mmol/L, AST 31.3 mmol/L, direct bilirubin 3.6 $\mu\text{mol/L}$, total bilirubin 7.7- 8.1 $\mu\text{mol/L}$, creatinine 65.43 $\mu\text{mol/L}$, glucose 4.85 mmol/L, CRP 24 mg/L, K 4.5-5.0 mmol/L, Na 138-137 mmol/L, Ca 2.36 mmol/L, albumin 27.96-30.52 g/L. Fibrinogen 505-306 mg%, prothrombin time 13.5-12.3 seconds, prothrombin index 89-106%, INR 1.08-0.96, APTT 20.1 seconds.

Urinalysis: protein 0.132, leukocyte 15-20, smooth epithelial cells 6-7, erythrocyte modified 6-10.

Clinical diagnosis: Bilateral interstitial pneumonia, associated with COVID-19, bilateral hydrothorax. Bronchial asthma, moderate persistent severity. Lymphostasis of the lower extremities. Arterial hypertension 1st degree. Condition after multiple laparotomies. Postoperative hernia.

Treatment: Glucocorticoids, antibiotics, diuretics, anticoagulants, PPI. The result of the treatment was the improvement of the patient’s condition. Complaints decreased, SpO₂ (without oxygen inhalation) improved from 69% to 79%, auscultation of the lungs also revealed positive dynamics.

In the seventh day after admission to the hospital the patient complained of nausea, vomiting, and abdominal pain, that became severe.

In objective examination the skin was pale, tongue was dry, abdomen was distended, a postoperative ventral hernia was found in the mesogastral region. Palpation of abdomen revealed rebound tenderness, percussion-tympanic sound. Stool was absent in previous two days. Bowel obstruction and peritonitis were suspected. The CT scan was recommended for the determination of the cause of abdominal pathology.

The CT scan with contrast revealed: ventral hernia with involvement of the lower 1/3rd of the stomach, small bowel, proximal and middle parts of the colon transversus. Typical picture of ischemic colitis, a 1.0×0.8 cm thrombus at the level of bifurcation of the superior mesenteric artery from the abdominal aorta, which lead to 50% local stenosis of the aorta; a local thrombus in arteria iliaca communis dextra, which lead to 60% stenosis; condition after left hemi hepatectomy; bilateral hydrothorax; bilateral interstitial pneumonia.

After CT scan examination patient was taken into intensive care unit. Apnea and asystole was registered in ICU during one hour after examination. CPR was done, that was non-effective and biological death was registered.

Diagnosis

Acute arterial mesenteric thrombosis. Bilateral interstitial pneumonia, associated with COVID-19, bilateral hydrothorax. Bronchial asthma, moderate persistent severity. Lymphostasis of the lower extremities. Arterial hypertension 1st degree. Condition after multiple laparotomies. Postoperative hernia.

Pathomorphological diagnosis

Acute thrombosis of the superior mesenteric artery, necrosis of the small intestine, acute serous

hemorrhagic peritonitis, postoperative hernia of the anterior abdominal wall, bilateral pneumofibrosis and bilateral hydrothorax.

Discussion

COVID-19 is associated with a large and misleading field of symptoms [6] and complications including coagulopathy [7]. Several case reports describe the occurrence of acute arterial occlusions in the aorta and mesenteric and cerebral arteries [5,8-14]. Several case reports describe the occurrence of acute arterial occlusions in the aorta and mesenteric and cerebral arteries [5,8-14].

Complications from COVID-19, including coagulopathy, may contribute to the development of arterial ischemic events [5-15]. Moreover, COVID-19 causes elevated cytokine levels, including but not limited to tumor necrosis factor α , interleukin (IL) 1 β , IL-6, and interferon γ [16]. Previous research has shown that elevated levels of exogenous tumor necrosis factor α may exacerbate focal ischemic injury in stroke as well as intestinal ischemia in an experimental setting [17-19]. Likewise, IL-1 β administration leads to increased infarct size, whereas lack of IL-1 β reduces infarct size in experimental focal cerebral ischemia models [20].

Hypercoagulation in COVID-19 patients has not been adequately studied yet; the pathogenetic aspects are not clear yet. The few clinical cases, which were described may not fully answer many questions. Retrospective and prospective studies, which involve a large cohort of the population are necessary. In any case, prior investigations in COVID-19 patients have revealed, that coagulation control and the usage of the anticoagulants is necessary during the treatment period [21]. Guidance for considerations in the preventive and therapeutic use of antithrombotic agents as well as potential drug interactions between antiplatelet agents and investigational therapies for COVID-19 has recently been published [20].

This clinical case presented the role of hypercoagulation in the clinical picture of COVID-19 patients, which increased the risk of death. Is very important, that hypercoagulation emerged as a late complication of the disease. In this case, the patient had a positive dynamics after one month of treatment and had already tested negative for COVID-19, but suddenly the patient's condition worsened with the clinical picture of an acute abdomen. The first manifestation of the gastrointestinal tract ischemic disease was the appearance of the postoperative hernia gap. The diagnosis of mesenteric thrombosis was constituted by CT scan and pathomorphological data

(upper mesenteric-acute thrombosis, small bowel necrosis).

Conclusions

Based on this case and a few other cases, titration of the doses of the anticoagulants is necessary in cases with the development of arterial mesenteric thrombosis, as a complication of SARS-CoV-2. Thrombotic complications should be suspected if the patient has abdominal distension or pain. CT scan is essential in managing COVID-19 and early detection of thrombotic complications.

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