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COVID-19 INFECTION AND BUERGER`S SYNDROME: A CASE REPORT

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Abstract

COVID-19 caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) is responsible for the recent global pandemic, with increasing number of cases reported globally. Our understanding of this novel respiratory virus deepens, it is increasingly clear that its effects extend beyond that of the respiratory system and can be extended to the almost all organ systems. SARS-CoV-2 causes lung inflammation which progresses to cytokine storm in the most severe cases. The lungs of patients with COVID-19 show extensive alveolar and interstitial inflammation. COVID-19 causes a spectrum of complications, with frequent involvement of the hemostatic system and there is a high incidence of venous thromboembolism in hospitalized COVID-19 patients, particularly those with severe illness. There is evidence of current body knowledge that COVID-19 induced by microvascular angiopathy can lead to a wide range of tissue pathology and clinical complications, such as Kawasaki disease, Buerger's syndrome and other systemic inflammatory disorders. Thromboangiitis obliterans (TAO) or Buerger's disease is a segmental occlusive inflammatory condition of arteries and veins, characterized by thrombosis and recanalization of the affected vessels. Limb infection at diagnosis was associated with a 4-fold higher risk of amputation. Smoking cessation was strongly associated with a lower rate of vascular events and amputation. TAO appears more likely to be a systemic disorder rather than a localized vasculopathy. Therefore, treatment protocols based on systemic treatment of TAO patients may be more helpful than localized treatment, such as bypass surgery and endovascular procedures.

We present a case of a 53-years-old male with positive SARS-CoV-2 PCR test. Furter examination showed that patient had pneumonia, moreover, based on the duplex scan results the diagnosis of thromboangiitis obliterans (TAO) or Buerger's disease was confirmed. This disease itself is associated with a high risk of thrombosis and alongside with COVID-19 can cause unpredictable outcome. Patient underwent the day-round observation, received the appropriate treatment and was successfully discharged from the hospital on the day 11.

Keywords: *Buerger`s syndrome, COVID-19, pneumonia*

Introduction

An unprecedented outbreak of pneumonia of unknown etiology in Wuhan City, Hubei province in China emerged in December 2019. A novel coronavirus was identified as the causative agent and was subsequently termed COVID-19 by the World Health Organization [*Sohrabia C. et al.,*

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2000]. COVID-19 caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) is responsible for the recent global pandemic, with increasing number of cases reported globally exceeding 500 million and more than 6 million number of deaths globally on 24 April 2022 [https://www.worldometers.info/coronavirus/]. Apart from being a global health concern, COVID-19 is having major consequences on the world economy, and experts have predicted that COVID-19 will lower global gross domestic product growth by one-half a percentage point for 2020 (from 2.9% to 2.4%) [*Gupta M. et al., 2020*]. Considering the main symptoms of COVID-19 such as fever, cough, fatigue, and dyspnea can have a key role in early detection of this disease and prevent the transmission of the disease to other people [*Alimohamadi Y. et al., 2020*]. SARS-CoV-2 causes lung inflammation which progresses to cytokine storm in the most severe cases. The lungs of patients with COVID-19 show extensive alveolar and interstitial inflammation. COVID-19 causes a spectrum of complications, with frequent involvement of the hemostatic system and there is a high incidence of venous thromboembolism in hospitalized COVID-19 patients, particularly those with severe illness, with incidence of 16-69% thrombotic complication in patients with COVID-19 admitted to intensive care [Cheng N. et al., 2022, Wool G., Miller J., 2020, Kashi M. et al., 2020]. Clinical features associated with COVID-19 suggest that endothelial cell dysfunction and microvascular thrombosis are to a large extent contributing to resultant multi-organ complications [*Ali M., Spinler S., 2021; Gomez-Mesa J. et al., 2021*]. There is evidence of current body knowledge that COVID-19 induced by microvascular angiopathy can lead to a wide range of tissue pathology and clinical complications, such as Kawasaki disease, Buerger's syndrome and other systemic inflammatory disorders [*Levi M. et al., 2020; Nalugo M. et al., 2021*]. TAO or Buerger's disease is a segmental occlusive inflammatory condition of arteries and veins, characterized by thrombosis and recanalization of the affected vessels. It is a non-atherosclerotic inflammatory disease affecting small and medium sized arteries and veins of upper and lower extremities [*Arkkila P., 2006*]. The clinical criteria include: age under 45 years; current or recent history of tobacco use; presence of distal-extremity ischemia indicated by claudication, pain at rest, ischemic ulcers or gangrenes and documented by non-invasive vascular testing; exclusion of autoimmune diseases, hypercoagulable states and diabetes mellitus; exclusion of a proximal source of emboli by echocardiography or arteriography; consistent arteriographic findings in the clinically involved and non-involved limbs. The disease is found worldwide, the prevalence among all patients with peripheral arterial disease ranges from values as low as 0.5 to 5.6% in Western Europe to values as high as 45 to 63% in India, 16 to 66% in Korea and Japan, and 80% among Ashkenazi Jews [*Cachovan M., 1988, Matsushita M. et al., 1998*]. The etiology of TAO is unknown, but use or exposure to tobacco is central to the initiation and progression of the disease. The French nationwide study shows that 34% of TAO patents are likely to experience an amputation within 15 years of initial diagnosis. Nonwhite patients and limb infection at diagnosis were independently associated with the occurrence of vascular events. Limb infection at diagnosis was associated with a 4-fold higher risk of amputation. The study further confirmed that smoking cessation was strongly associated with a lower rate of vascular events and amputation [*Jonkour A. et al., 2018*]. If the patient smokes, stopping completely is an essential first step of treatment. TAO appears more likely to be a systemic disorder rather than a localized vasculopathy. Therefore, treatment protocols based on syshelpful than localize temic treat-

To overcome it is possible, due to the uniting the knowledge and will of all doctors in the world

Table 1

Laboratory results of the patient

Lab. test	Value		Normal	Unit
	Admission	Discharge		
Red blood cell (RBC)	5.71	4.62	*3.5-5.6*	*x 10^6/uL*
Hemoglobin (HGB)	167	134	*112-152*	*g/L*
Hematocrit (HCT)	48.9	40.2	*26.5-35.4*	*%*
White blood cell (WBC)	5.66	8.21	*4-9*	*x 10^3/uL*
Platelet (PLT)	240	338	*180-400*	*x 10^9/uL*
Na	144	142	*135-155*	*mmol/L*
K	4	4.1	*3.4-5.3*	*mmol/L*
Ca	2.48	2.58	*2.1-2.6*	*mmol/L*
D-dimer	0.419	0.302	*0-0.5*	*ug FEU/ml*
Ferritin	176.1		*13-350*	*ng/ml*
Alanine-aminotransferase (ALT)	39.4	36.8	*0.1-41*	*U/L*
Aspartate-aminotransferase (AST)	36.8	20.4	*0.1-50*	*U/L*
Creatinine	74	67	*44-100*	*umol/L*
Glucose	6.07		*4.11-6.05*	*mmol/L*
Total protein	73.9		*66-87*	*g/L*
C-reactive protein (CRP)	0.83	1.74	*0-5*	*mg/L*
Cholesterol	4.06		*0-5.17*	*mmol/L*
Prothrombin time (PT)	14.5		*12-16*	*´´ sec*
Index prothrombin time (iPT)	86		*80-120*	*%*
Fibrinogen (FG)	392		*200-400*	*mg%*
International normalized ratio (INR)	1.10		*0.9-1.5*	
Activated partial thromboplastin time (APTT)	40.6		*26-35*	*´´ or sec*

ment of TAO patients may be more d treatment, such as bypass surgery and endovascular procedures. Also, the high level of IL-22, the trigger of TAO development may be an infectious pathogen [*Keramat S. et al., 2019*].

We are reporting the first known hospitalized case of COVID-19 pneumonia with Buerger's syndrome.

Case Presentation

A 53-years-old male with positive severe acute respiratory syndrome coronavirus 2 polymerase chain reaction (PCR) test was admitted to the COVID-19 department of Mikaelyan Institute of Surgery with the following complaints: high fever, weakness, cough, sever pain in legs lasted for 7-8 days. Patient was vaccinated with 2 doses of Sinopharm vaccine. Life history revealed no allergy to drugs, no smoking and alcohol abuse, time to time patient had pain in legs. His vital signs showed Ps=88*bpm*, BP=140/90*mmHg*, t=38^0*C*, SpO_2=93% (O_2-). Physical examination: clear consciousness, skin is pale without any exanthema, breathlessness, week breathing by lung`s auscultation. Laboratory findings were presented in the Table 1.

His electrocardiogram reported no pathology with the heart rate of 60. Chest computer tomography showed bilateral COVID-19 like pneumonia with a lesion up to 1-5%.

Because of the continuing pain in legs patient was examined by the vascular surgeon who recommended the duplex scan of the lower extremi-

ties. Duplex was performed on the 4th day of hospitalization and showed obliterating endarteritis - TAO, obliteration of distal 1/3 of right and left tibialis posterior arteria. Based on the patient's history, results of clinical examination and duplex scan the diagnosis was made – Buerger`s syndrome. The patient improved on symptomatic treatment with Aspirin Cardio, Rivaroxaban 10mg, fever reducing drugs and oxygen therapy. Patient has been discharged from the hospital at the after 11 days with improvement.

DISCUSSION

In available literature we could not find the cases of combination of COVID-19 and TAO. There are no guidelines for the management and treatment of such patients. At the same time these diseases separately are associated with the high risk of thrombosis. That is why reporting of such cases is very important for general practitioners as it highlights the benefit of multidisciplinary approach while treating the patient with COVID-19. The use of antiaggregant or anticoagulative treatment should be considered in combination of COVID-19 pneumonia and Buerger`s syndrome but at the same time the doses, the choice of drug, the duration of hospitalization for the observation is the matter of debates. Development of the national and international registers for the rare cases and combination of the diseases will help the doctors, scientists and leadership to develop the standard operational procedures for the management of these cases.

CONCLUSION

The Buerger`s syndrome itself is associated with a high risk of thrombosis and alongside with COVID-19 can cause unpredictable outcome. There are no guidelines for the management and treatment of the patients with COVID-19 and Buerger`s syndrome. Reporting of such cases is very important for general practitioners as it highlights the benefit of multidisciplinary approach while treating the patient with COVID-19. The use of antiaggregant and anticoagulative treatment should be considered. The timely diagnosis, management and treatment of the patients are the milestones for the favorable outcome.

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