

COVID 19 and Acute Ischemia of Lower Limbs

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DOI: [10.36347/sjmc.2023.v11i05.070](https://doi.org/10.36347/sjmc.2023.v11i05.070)

| Received: 11.04.2023 | Accepted: 20.05.2023 | Published: 30.05.2023

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Abstract

Case Report

COVID19 infection does not only affect the airways but it appears to progress to systemic disease in some patients. Pulmonary embolism remains the most commonly described event in patients with COVID-19 in intensive care, however, arterial thrombosis of the upper and lower limbs remains an unrecognized complication. Patients with this condition who have other risk factors must imperatively receive thromboprophylaxis based on low molecular weight heparin. We report here a case of bilateral acute ischemia of the lower limbs following covid 19 infection.

Keywords: COVID 19, Acute ischemia, Lower limbs, Thromboprophylaxis, Pulmonary embolism, CT angiography, Amputation.

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INTRODUCTION

The coronavirus pandemic (COVID-19) started in Wuhan, China, at the end of December 2019 before spreading quickly in the world. The salivary droplets and contact are the main means of transmission of this new virus [1].

COVID19 infection does not only affect the airways but it appears to progress to systemic disease in some patients, with severe complications such as acute respiratory distress syndrome (ARDS) and multi-organ failure [2].

Thrombotic complications secondary to a hypercoagulable state have recently been reported. Pulmonary embolism remains the most commonly described event in patients with COVID-19 in intensive care, however, arterial thrombosis of the upper and lower limbs remains an unrecognized complication [2].

We report here a case of bilateral acute ischemia of the lower limbs following covid 19 infection.

CASE REPORT

64-year-old patient with cardiovascular risk factors such as age, male gender, and chronic smoking who weaned off 1 year ago. He presented to the emergency room with a picture of flu syndrome made up of dry cough with fever at 39°, liquid diarrhea and anosmia.

On admission the patient is conscious with a FR=23cycles/min HR=80 B/min.

La Sa O₂=90% in ambient air.

The diagnosis of the COVID19 infection was confirmed by the PCR + test supplemented by a chest CT scan showing bilateral COVID19 type pneumonitis classified Corads 5 severe (Figure 1).

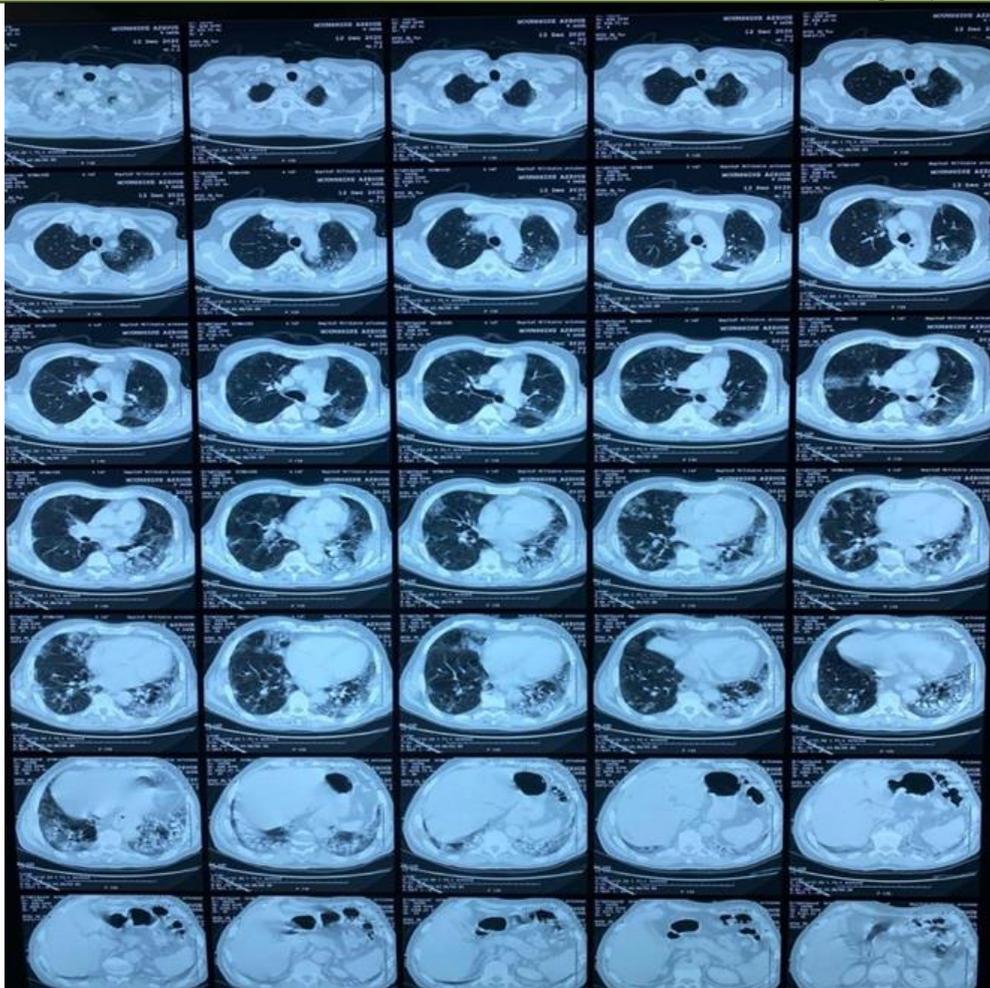


Figure 1: Thoracic TDM with bilateral pneumonia type COVID19

The patient presents 5 days after his admission to a brutal installation of pain with cyanosis and coldness of the lower limbs, the clinical examination

finds 2 cold and cyanosed limbs with abolition of bilateral distal pulses.



Figure 2: Cyanosis and blistering of the 2 lower limbs

The patient was transferred to the peripheral vascular surgery department of the Avicenne military hospital on day 7 of the onset of his symptoms. The clinical examination found two cold and cyanotic limbs with blisters.

The CT angiography of the lower limbs reveals a filiform opacification of the leg tripods but remains permeable as well as a rarefaction of the bilateral arterial pedal network. There is a discrepancy between the symptomatology and the result of the CT angiography of the lower limbs (Figure 3).



Figure 3: Filiform opacification of the leg tripods on CT angiography

The biological assessment carried out shows lymphopenia characteristic of COVID19 as well as

microcytic anemia and a high level of D-Dimers Table 1.

Table 1: Biological data on admission

Neutrophile	12.53 10 ³ / uL
Lymphocyte	1.07 10 ³ / uL
Hémoglobine	8.3 g/dl
Plaquette	310 10 ³ /uL
TP	14.3 s
D-Dimères	7193 ng/
CRP	162 mg/l
Procalcitonine	0.28 ng/ml

Given the distality of the lesions on the angioscanner of the lower limbs, we opted for a medical treatment based on unfractionated heparin 400Ui/kg/24h with TCA monitoring every 6 hours to adapt the dosage (target TCA 2-3).

The patient then benefited from an amputation of the 2 forefeet.

DISCUSSION

The impact of the COVID19 infection on health in the world has prompted scientists to study this infection even more in order to allow better management of this pandemic.

The inflammatory process has been closely linked to thrombotic complications in humans in several studies. When this inflammatory process damages the endothelium of the micro and macro-vascularization, it disrupts the physiological anti-thrombotic and anti-inflammatory mechanism, which leads to an uncontrolled activation of the thrombotic cascade [3].

Marked increase in D-Dimer and fibrinogen with some degree of thrombin (TP) elongation are hemostatic abnormalities frequently reported in COVID-19 patients and often associated with a high mortality rate [4] in some cases the presence of anti-phospholipid antibodies have been reported [5, 6].

Patients with severe COVID-19 infection may develop disseminated coagulopathy characterized by increased procoagulant factors like fibrinogen and D-dimer leading to thrombosis. This condition has been termed thrombo-inflammation or coagulopathy associated with COVID-19 [7].

Arterial thromboses of the upper and lower limbs have been reported worldwide. To date, there are thromboses of the brachial artery [8] the radial artery [9] the aorta, the iliac and femoral artery [10] the superior mesenteric artery [11, 12] as well as prosthetic vascular grafts [10, 13].

Patients with associated comorbidities such as hypertension, diabetes, cardiovascular disease, chronic respiratory disease, kidney disease, and obesity appear to be at higher risk for occurrence of thrombotic complications [14].

The majority of patients with arterial thrombosis in the literature had preexisting comorbidities, however a minority, including our patient, had no preexisting health conditions or arterial disease.

All hospitalized patients with COVID-19 should receive pharmacological thromboprophylaxis based on low molecular weight heparin (LMWH) taking into account the bleeding risk [15].

Anticoagulant therapy primarily with LMWH appears to be associated with a better prognosis in patients with severe COVID-19 with markedly elevated D-dimer levels [16].

The optimal duration of anticoagulation remains an unknown entity in these patients.

Traditionally, all patients with arterial thrombosis (due to embolic or in situ thrombosis) are treated with lifelong anticoagulation [17]. However, this in-situ thrombosis is different from other usual etiologies.

In our case, we intend to treat this patient with anticoagulation for life.

The establishment of effective prevention and treatment measures for these thromboembolic events remains a challenge due to the lack of clear understanding of their exact mechanism, as well as the scarcity of studies carried out in this direction.

Our case provides additional evidence to the existing literature regarding systemic thromboembolic complications associated with COVID-19 and highlights their adverse prognostic impact.

CONCLUSION

Covid 19 disease can induce coagulation disorders and thus cause thrombosis with severe ischemia.

Patients with this condition who have other risk factors must imperatively receive thromboprophylaxis based on low molecular weight heparin, including the duration of treatment still remains unknown.

REFERENCES

1. Velavan, T. P., & Meyer, C. G. (2020). The COVID-19 epidemic. *Tropical medicine & international health*, 25(3), 278. 10.1111/tmi.13383
2. Bhatraju, P. K., Ghassemieh, B. J., Nichols, M., Kim, R., Jerome, K. R., Nalla, A. K., ... & Mikacenic, C. (2020). Covid-19 in critically ill patients in the Seattle region—case series. *New England Journal of Medicine*, 382(21), 2012-2022.
3. Jackson, S. P., Darbousset, R., & Schoenwaelder, S. M. (2019). Thromboinflammation: challenges of therapeutically targeting coagulation and other host defense mechanisms. *Blood, The Journal of the American Society of Hematology*, 133(9), 906-918. 10.1182/blood-2018-11-882993
4. Zhang, Y., Xiao, M., Zhang, S., Xia, P., Cao, W., Jiang, W., ... & Zhang, S. (2020). Coagulopathy and antiphospholipid antibodies in patients with Covid-19. *New England Journal of Medicine*, 382(17), e38.
5. Ranucci, M., Ballotta, A., Di Dedda, U., Baryshnikova, E., Dei Poli, M., Resta, M., ... & Menicanti, L. (2020). The procoagulant pattern of patients with COVID-19 acute respiratory distress syndrome. *Journal of Thrombosis and Haemostasis*, 18(7), 1747-1751. doi: 10.1111/jth.14854.
6. Bowles, L., Platton, S., Yartey, N., Dave, M., Lee, K., Hart, D. P., ... & MacCallum, P. (2020). Lupus anticoagulant and abnormal coagulation tests in patients with Covid-19. *New England Journal of Medicine*, 383(3), 288-290. doi:10.1056/NEJMc2013656.
7. Connors, J. M., & Levy, J. H. (2020). Thromboinflammation and the hypercoagulability

- of COVID-19. *J thromb Haemost*, 18(7), 1559-1561. doi:10.1111/jth.14849
8. Kaur, P., Qaqa, F., Ramahi, A., Shamoon, Y., Singhal, M., Shamoon, F., ... & Singh, B. (2021). Acute upper limb ischemia in a patient with COVID-19. *Hematology/oncology and stem cell therapy*, 14(4), 348-350.
 9. Schultz, K., & Wolf, J. M. (2020). Digital ischemia in COVID-19 patients: case report. *The Journal of hand surgery*, 45(6), 518-522.
 10. Bellosta, R., Luzzani, L., Natalini, G., Pegorer, M. A., Attisani, L., Cossu, L. G., ... & Piffaretti, G. (2020). Acute limb ischemia in patients with COVID-19 pneumonia. *Journal of vascular surgery*, 72(6), 1864-1872.
 11. Beccara, L., Pacioni, C., Ponton, S., Francavilla, S., & Cuzzoli, A. (2020). Arterial mesenteric thrombosis as a complication of SARS-CoV-2 infection. *European Journal of Case Reports in Internal Medicine*, 7(5), 001690.
 12. de Barry, O., Mekki, A., Diffre, C., Seror, M., El Hajjam, M., & Carlier, R. Y. (2020). Arterial and venous abdominal thrombosis in a 79-year-old woman with COVID-19 pneumonia. *Radiology case reports*, 15(7), 1054-1057.
 13. Giacomelli, E., Dorigo, W., Fargion, A., Calugi, G., Cianchi, G., & Pratesi, C. (2020). Acute thrombosis of an aortic prosthetic graft in a patient with severe COVID-19-related pneumonia. *Annals of Vascular Surgery*, 66, 8-10.
 14. COVID-19 Treatment Guidelines Panel. Coronavirus Disease 2019 (COVID-19) Treatment Guidelines. National Institutes of Health. Published 2020. Accessed May 17, 2020. <https://covid19treatmentguidelines.nih.gov/>
 15. Singh, B., Kaur, P., Ajdir, N., Gupta, S., Maroules, M., & Sultana, Y. (2020). Covid-19 presenting as acute limb ischemia. *Cureus*, 12(7), e9344.
 16. Tang, N., Bai, H., Chen, X., Gong, J., Li, D., & Sun, Z. (2020). Anticoagulant treatment is associated with decreased mortality in severe coronavirus disease 2019 patients with coagulopathy. *Journal of thrombosis and haemostasis*, 18(5), 1094-1099. 10.1111/jth.14817
 17. Björck, M., Earnshaw, J. J., Acosta, S., Gonçalves, F. B., Cochenec, F., Debus, E. S., ... & ESVS Guidelines Committee. (2020). Editor's choice—European Society for Vascular Surgery (ESVS) 2020 clinical practice guidelines on the management of acute limb ischaemia. *European Journal of Vascular and Endovascular Surgery*, 59(2), 173-218.