



Case Report

Acute Upper Limb Arterial Thrombosis: A Complication of COVID-19

Catherine Paschoud¹, Pierre-Henri Morère², Christophe Marti³, Omar Kherad^{1*}

¹Internal Medicine Division, Hôpital de La Tour, Geneva Switzerland

²Division of Radiology, Hôpital de La Tour, Geneva Switzerland

³General Internal Medicine Division, Geneva University Hospital, Geneva, Switzerland

*Corresponding author: Omar Kherad, Internal Medicine Division, Hôpital de La Tour and University of Geneva, Geneva Switzerland

Citation: Paschoud C, Morère PH, Marti C, Kherad O (2023) Acute Upper Limb Arterial Thrombosis: A Complication of COVID-19 Ann Case Report 8: 1285. DOI: 10.29011/2574-7754.101285

Received: 23 April 2023; **Accepted:** 27 April 2023; **Published:** 01 May 2023

Abstract

Presentation of COVID-19 ranges from asymptomatic/simple cold symptoms to an acute respiratory distress syndrome, requiring intubation. Several extra-respiratory complications have been described, with thromboembolic events being the most feared one. We describe a case of an unvaccinated man in his 60s who developed thrombotic occlusions of the left upper limb and mesenteric artery in the context of an acute COVID-19 infection, despite intermediate-dose thromboprophylaxis. CT angiogram showed complete occlusion of the left radial and cubital arteries with multiple thromboses in the aorta. Successful endovascular embolectomy via brachial artery was performed with favorable angiographic and clinical results. Awareness of COVID-19-associated arterial thrombosis risk is essential to rapidly recognize and treat this limb-threatening complication.

Keywords: Arterial Thrombosis; COVID-19; SARS-COV2

Introduction

The coronavirus disease-2019 (COVID-19) caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) spread from China to various continents, directing the World Health Organization (WHO) to declare COVID-19 as a pandemic on March 11, 2020 [1]. COVID-19 is challenging as its presentations range from asymptomatic/mild symptoms to severe illness and mortality [2]. Common complications include pneumonia, acute respiratory distress syndrome, cardiac injury, arrhythmia, septic shock, liver dysfunction, acute kidney injury, and multi-organ failure [3]. There is a substantial pool of evidence of venous thrombotic and thromboembolic events in patients with COVID-19, [4] but there are a few scattered reports on upper limb arterial thrombosis in these patients [5,6].

Awareness of COVID-19-associated upper limb arterial thrombosis risk is crucial to expeditiously recognize and treat

this limb-threatening complication that might compromise the patient's prognosis.

Case Presentation

A Caucasian patient in his 60s with a medical history of gastroesophageal reflux disease presented to the hospital with complaints of dyspnea, fever and fatigue for 5 days. On physical examination, he had a mild hypoxemia (SpO₂ 89% in ambient air), the pulse was regular at 116/minute, the blood pressure 130/90 mmHg, the breathing rate 25/minute, and the temperature 38.6°C. Nasopharyngeal swab (RT-PCR) was positive for SARS-COV2 and DDimers were slightly elevated (618mcg/L). On chest computed tomography (CT), lung involvement was estimated at about 30% with classical ground glass opacity and pulmonary embolism was ruled out. Dexamethasone (6 mg/day) and enoxaparin (40 mg/day) were initiated. During the following days, the patient's condition worsened, requiring high flow nasal cannula therapy (FiO₂ 50%, flow 40 L/min, SpO₂ 94%). Following local guidelines, tocilizumab (600mg twice) was introduced.

Monoclonal antibodies (casirivimab and imdevimab) were not indicated because of positive COVID-19 anti-spike antibodies.

After eleven days, the patient developed sudden pain in his left upper limb, with clinical pulselessness and pallor, suggestive of arterial ischemia. CT angiogram showed complete occlusion of the left radial and cubital arteries with multiple thromboses in the aorta. Successful endovascular embolectomy via brachial artery was performed without concomitant altepase-with favorable angiographic (Figures 1a and 1b) and clinical results. A therapeutic dose of enoxaparin (1mg/kg 2x/day) was introduced.

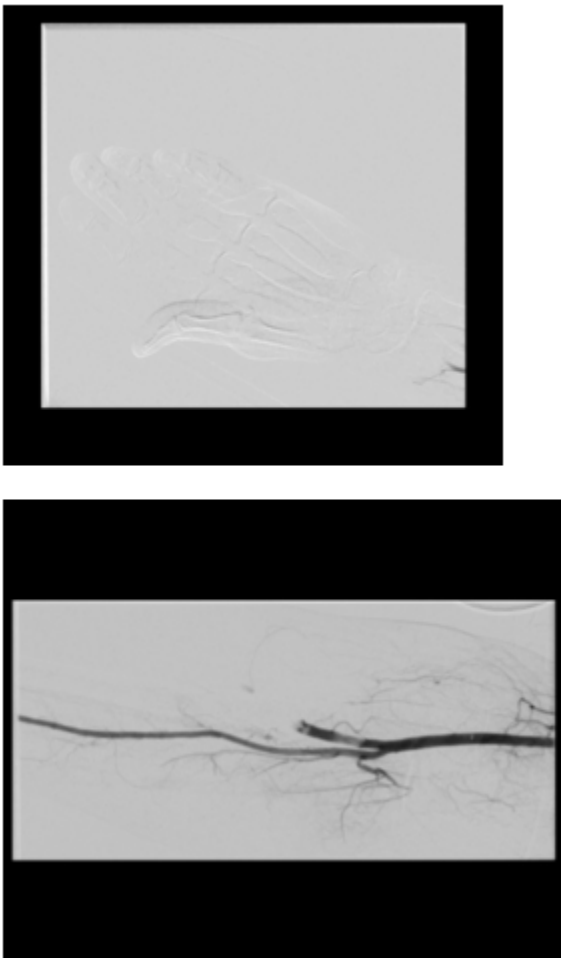


Figure 1A: Upper left limb arteriography confirming occlusion of the left radial and cubital arteries.

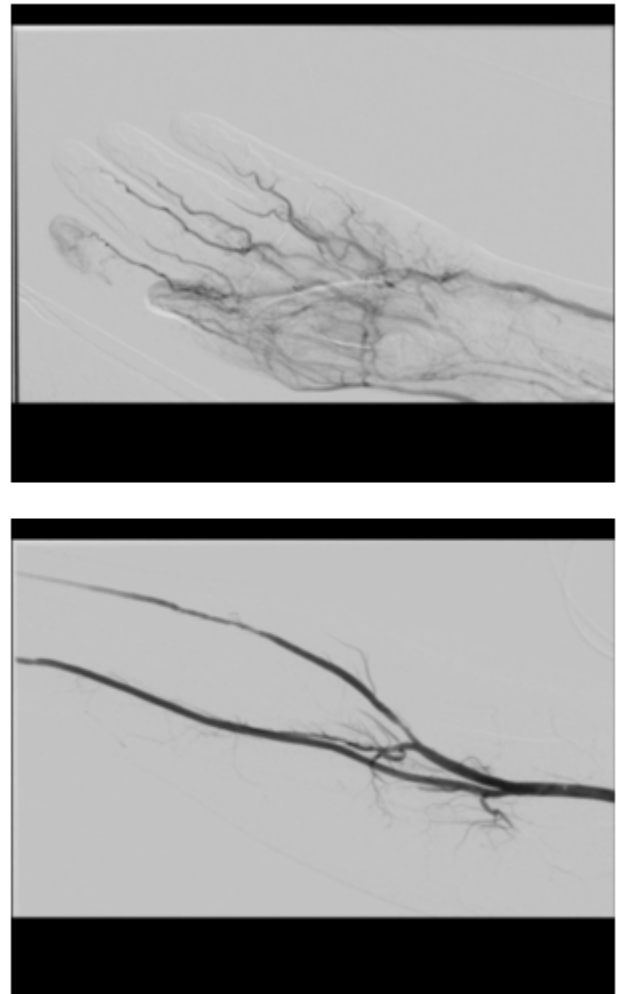


Figure 1B: Results after Embolectomy.

On day 12, he developed new arterial thrombi in the superior mesenteric artery leading to mesenteric ischemia. The patient was referred to a tertiary center to undergo abdominal surgery with small bowel resection and ileostomy. Antiphospholipids antibodies dosing was negative and antiplatelet therapy (aspirin 100mg/day) was added. Electrocardiogram (ECG) and Holter monitor did not reveal arrhythmia. The patient's condition finally improved, and he was transferred on day 36 to rehabilitation with persisting post-intubation swallowing disorders and left cubital hypoesthesia due to ICU polyneuropathy.

Discussion

Our patient presented with thrombotic occlusions of the left upper limb and mesenteric artery in the context of an acute COVID-19 infection, despite intermediate-dose thromboprophylaxis.

Thromboembolic events represent a common complication of COVID-19, with an overall venous thromboembolism rate of 21% and arterial thromboembolism rate of 2%, [7] even in patients without a history of thrombosis or inherited thrombophilia and despite prophylactic anticoagulation [8]. Thromboembolic events occur approximately five times more frequently in COVID positive patients [9]. Guidelines regarding anticoagulation in in-COVID-19 patients have been regularly updated with regards to conflicting results in the literature. According to our local guidelines, patients admitted to hospital with COVID-19 should have a daily dose of low-molecular-weight heparin or unfractionated heparin, [10] even if young and without comorbidities.

Thrombotic events, explained through coagulation disorders in the course of a COVID-19 infection are not perfectly understood yet, despite unrestrained research on understanding the SARS-COV-2 physiology mechanisms for the past 2 years. The complex relationship between the virus and the host-mainly the endothelium, the immune system and the coagulation system-seems to be at stake. Each component of the host appears to activate independently a procoagulant stake, with a wide range of clinical consequences, such as micro- and macrothrombotic events, thus leading to a multilocalized immunothrombotic process [11].

Association between IL6-receptors antagonists such as tocilizumab and transient elevation of D-Dimer have been previously described with a trend toward increased thromboembolism events [12,13] The exact effect on coagulation of tocilizumab in COVID-19 patients is unknown. We cannot then ascertain the thromboembolic events might have been caused by this medication.

Several cases of acute arterial limb thrombosis have been described, more commonly in lower extremities but also in upper limbs with a high probability of limb loss [5,14]. Low suspicion threshold, prompt diagnosis, and proper therapy initiation are the cornerstone of its correct management [15]. The degree of ischemia must dictate if an image (most commonly CT) is required or if vascular surgery or interventional radiology is necessary, in addition to therapeutic anticoagulation [16]. Awareness of COVID-19-associated arterial thrombosis risk is essential to rapidly recognize and treat this limb-threatening complication.

Conclusion

All hospitalized patients for COVID-19 should undergo thromboprophylaxis with low-molecular-weight or unfractionated

heparin. Despite prophylactic anticoagulation, multiple arterial thrombosis can occur in COVID-19 patients most commonly in lower but also in upper extremities. A low threshold of suspicion with prompt initiation of treatment is the cornerstone of the management of these patients.

Acknowledgments

The patient gave us a consent form for the publication of this case report. All authors participated equally in the redaction of this case report.

References

1. WHO Director-General's opening remarks at the media briefing on COVID-19 -11 March 2020
2. Singh R, Kang A, Luo X, Jeyanathan M, Gillgrass A, et al. (2021) COVID-19: Current knowledge in clinical features, immunological responses, and vaccine development. *FASEB J* 35: e21409
3. Chams N, Chams S, Badran R, Shams A, Araji A, et al. (2020) COVID-19: A Multidisciplinary Review. *Front Public Health* 8: 383.
4. Middeldorp S, Coppens M, Haaps TF, Foppen M, Vlaar AP, et al. (2020) Incidence of venous thromboembolism in hospitalized patients with COVID-19. *J Thromb Haemost* 18: 1995-2002.
5. Ramachandran R, Vasudevan Pillai A, Raja S, Sailesh S (2021) Axillary artery thrombosis resulting in upper limb amputation as a COVID-19 sequela. *BMJ Case Rep* 14: e240981.
6. Ribeiro SB, Domingos LF, Moreno J. (2022) Arterial thrombosis in COVID-19: keep in mind to stay vigilant. *Postgrad Med J* 98: e69-e69.
7. Malas MB, Naazie IN, Elsayed N, Mathlouthi A, Marmor R, et al. (2020) Thromboembolism risk of COVID-19 is high and associated with a higher risk of mortality: A systematic review and meta-analysis. *EClinicalMedicine* 29: 100639.
8. Griffin DO, Jensen A, Khan M, Chin J, Chin K, et al. (2020) Arterial thromboembolic complications in COVID-19 in low-risk patients despite prophylaxis. *Br J Haematol* 190: e11-e13.
9. Bellosta R, Luzzani L, Natalini G, Pegorer MA, Attisani L, et al. (2020) Acute limb ischemia in patients with COVID-19 pneumonia. *J Vasc Surg* 72: 1864-1872.
10. Shibeeb S and Ahmad MN (2021) Thrombotic and Hypercoagulability Complications of COVID-19: An Update. *J Blood Med* 12: 785-793.
11. Alnima T, Mulder MMG, Bussel BCT van, Cate H ten. (2022) COVID-19 Coagulopathy: From Pathogenesis to Treatment. *Acta Haematol* 145: 1-15.
12. Chan KH, Patel B, Podel B, Szablea ME, Shaaban HS, et al. (2021) Tocilizumab and Thromboembolism in COVID-19: A Retrospective Hospital-Based Cohort Analysis. *Cureus* 13: e15208.
13. Atallah B, El Nekidy W, Mallah SI, Cherfan A, AbdelWareth L, et al. (2020) Thrombotic events following tocilizumab therapy in critically ill COVID-19 patients: a Façade for prognostic markers. *Thromb J* 18: 22.
14. Monteiro Dias L, Martins J, Castro R, Mesquita A (2021) Multiple arterial thrombosis in a patient with COVID-19. *BMJ Case Rep* 14: e244024.

15. Creager MA, Belkin M, Bluth EI, Casey DE, Chaturvedi S, et al. (2012) 2012 ACCF/AHA/ACR/SCAI/SIR/STS/SVM/SVN/SVS Key Data Elements and Definitions for Peripheral Atherosclerotic Vascular Disease. *Circulation* 125: 395-467.
16. Ilonzo N, Rao A, Safir S, Vouyouka A, Phair J, et al. (2021) Acute thrombotic manifestations of coronavirus disease 2019 infection: Experience at a large New York City health care system. *J Vasc Surg* 73: 789-796.