



## Case Report

## An acute lower limb ischemia revealing a covid-19 infection: A case report

Rim EL Mesnaoui<sup>a,1</sup>, Soumaila Nikiema<sup>b,1,\*</sup>, Desire Massimbo<sup>c</sup>, Abbas EL Mesnaoui<sup>a</sup><sup>a</sup> Ibn Sina Hospital, Department of Vascular Surgery, Mohammed V University, Morocco<sup>b</sup> Ibn Sina Hospital, Department of Cardiology, Department of Cardiology B, Mohammed V University, Morocco<sup>c</sup> Mohammed V Military Instruction Hospital, Department of Cardiology, Morocco

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## A B S T R A C T

**Introduction:** Covid-19 is associated with thrombo-embolic events. These complications are either venous or arterial. By this case report, we aim to highlight the physiopathology and the epidemiology of covid-19 related thromboembolic complications.

**Case report:** We report a case of a 65 years old patient who was admitted for lower limb ischemia complicating a covid-19 infection. Computed tomography of the aorta and lower limbs showed thrombosis of the femoral artery extended to the popliteal artery and leg arteries. Despite a surgical embolectomy the patient rethromboses twice leading to a thigh amputation.

**Discussion:** Several hypotheses have been put forward to explain Covid 19-related thromboembolic events. About 3% of patients develop arterial thrombosis. Raffaello Bellosta and al. reported the incidence of acute limb ischemia has significantly increased during the COVID-19 pandemic in the Italian Lombardy region.

**Conclusion:** The coagulopathy responsible for venous and arterial thrombosis is a well-established complication of COVID-19. Arterial thromboembolic complications can be either stroke, acute coronary syndrome or peripheral acute ischemia. Therefore, patients with covid19 should be monitored more closely for thromboembolic complications.

## 1. Introduction

Covid-19 is associated with thrombo-embolic events. Gregory Piazza and al. reported a high occurrence of Major arterial or venous thromboembolism in patients of covid-19 despite a high utilization rate of thromboprophylaxis [1]. Arterial thromboembolic complications are uncommon compared to venous ones [2]. A. Saidini and al. reported in retrospective study an occurrence of 0.3% of peripheral arterial thrombosis among covid-19 patients [3]. The pathophysiology of Covid 19-related thromboembolic events is yet to be clarified. We report a case of an acute limb ischemia complicating covid-19. This case report aims to add to the existing literature of covid-19 thrombo-embolic events by exposing the physiopathology and the epidemiology of covid-19 thrombo-embolic complications. Our study has been reported in line with the SCARE 2020 criteria [4].

## 2. Case presentation

We report a case of acute lower limb ischemia in relation to a mural

thrombus of the descending thoracic aorta embolizing after a Covid 19 infection.

This is a 65 year old diabetic patient with no other medical nor surgical past history admitted with subacute ischemia of the right lower limb. Note that the patient consulted on his own. The onset of symptoms was one week prior to hospitalization and on admission his general condition was preserved. The right forefoot was cold and cyanotic, the popliteal pulse and the right distal pulses were abolished, the rest of the clinical examination was unremarkable.

Computed tomography scan of the lower limbs showed thrombosis of the right femoral artery extended to the popliteal artery and leg arteries (Fig. 1).

The transthoracic echocardiography was unremarkable.

The patient went through a surgical embolectomy by a well experienced professor of vascular surgery at university teaching hospital. The postoperative course was simple with warming of the limb and reappearance of pulses.

The holter ECG was unremarkable and the patient was discharged on low molecular weight heparin with a transthoracic echocardiography

\* Corresponding author.

E-mail address: [Soum.Nik@gmail.com](mailto:Soum.Nik@gmail.com) (S. Nikiema).

<sup>1</sup> Rim El Mesnaoui and Soumaila Nikiema are joint first authors.



**Fig. 1.** Cupuliform arrest at the right femoropopliteal junction (this is shown by the red arrow). (For interpretation of the references to colour in this figure legend, the reader is referred to the Web version of this article.)

appointment. On day 4 of the operation, the patient had a recurrence of ischemia of the same limb with pain in the right hypochondrium. The angioscan of the aorta and the lower limb showed rethrombosis of the superficial femoral aorta and the popliteal artery and a splenic infarction (Fig. 2).

In spite of a surgical revision, the patient rethromboses a third time

with an evolution towards exceeded ischemia leading to a thigh amputation.

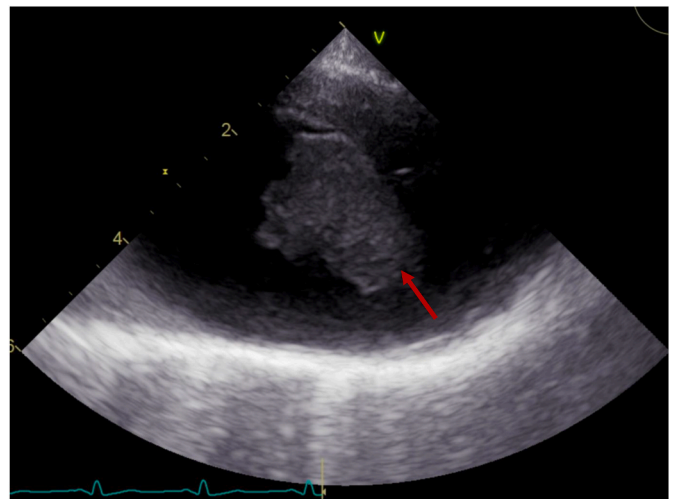
Transoesophageal echocardiography revealed a large thrombus adherent to the posterior wall of the descending thoracic aorta (Fig. 3).

Thoracic angioscan confirmed the existence of a mural thrombus obstructing 70% of the lumen of the thoracic aorta and also found lesions suggestive of a Covid 19 infection (Fig. 4a and b).

Extensive questioning also revealed a symptomatology suggestive of Covid 19, confirmed by positive serology. A surgical thrombectomy was indicated but the patient refused the procedure and was discharged on oral anticoagulants. The patient was then lost sight of.

### 3. Discussion

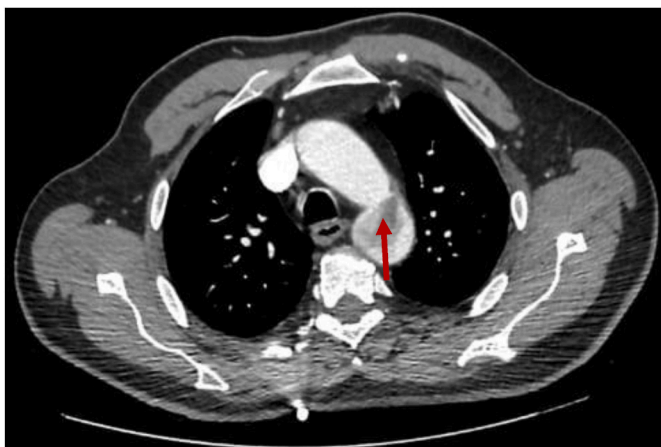
The pathophysiology of Covid 19-related thromboembolic events remains debated. However, several hypotheses have already been put forward: a state of hypercoagulability secondary to a significant inflammatory response (thrombo-inflammation or immuno-thrombosis) and to the cytokine storm, hypo-fibrinolysis due to high levels of PAI-1 (plasminogen activator inhibitor-1) or direct aggression of the vascular endothelium by the virus [5].



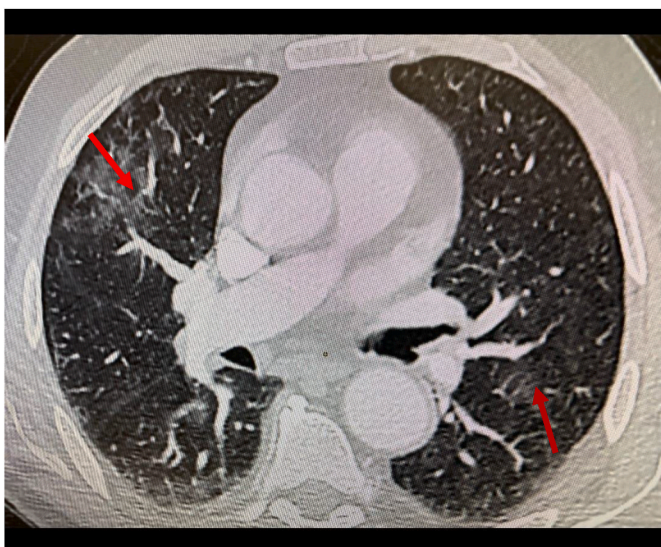
**Fig. 3.** Transoesophageal echocardiography showing a thrombus of the thoracic aorta (this is shown by the red arrow). (For interpretation of the references to colour in this figure legend, the reader is referred to the Web version of this article.)



**Fig. 2.** Splenic infarction (this is shown by the arrows).



**Fig. 4a.** Thoracic angioscanner showing a thrombus of the thoracic aorta (the thrombus is shown by the red arrow). (For interpretation of the references to colour in this figure legend, the reader is referred to the Web version of this article.)



**Fig. 4b.** Ground glass on chest CT (The ground glass is shown by the red arrows). (For interpretation of the references to colour in this figure legend, the reader is referred to the Web version of this article.)

About 3% of patients develop arterial thrombosis due to platelet activation, an inflammatory state (as evidenced by a large increase in fibrinogen) and possibly a role for anti-phospholipid antibodies [6].

Deep vein thrombosis and/or pulmonary embolism are also observed with great frequency: in the intensive care unit, nearly 20% of patients develop pulmonary embolism, despite anticoagulation [7]. Arterial thromboembolic complications can be either stroke, acute coronary syndrome or peripheral acute ischemia. It has been noted a covid-19 related stroke in young patients. The mean patient age in several thrombectomy case series of COVID-19 (mean age of 52.8 years in a series from New York City [8], mean age of 59.5 years in a series from Paris [9], is younger than the typical population having this procedure [10].

In a study conducted by Shahram Majidi and al. titled « Emergent Large Vessel Occlusion Stroke During New York City's COVID-19 Outbreak: Clinical Characteristics and Paraclinical Findings », forty-five consecutive emergent large vessel occlusion (ELVO) patients presented during the observation period. Fifty-three percent of patients tested positive for COVID-19. Total patients' mean ( $\pm$ SD) age was 66

( $\pm$ 17). Patients with COVID-19 were significantly younger than patients without COVID-19,  $59 \pm 13$  versus  $74 \pm 17$  (odds ratio [95% CI], 0.94 [0.81–0.98];  $P = 0.004$ ). In comparison to a similar time duration before the COVID-19 outbreak, a 2-fold increase in the total number of ELVO was observed (estimate: 0.78 [95% CI, 0.47–1.08],  $P \leq 0.0001$ ). However, Adnan I. and al. reported that Acute ischemic stroke was infrequent in patients with COVID-19 and usually occurs in the presence of other cardiovascular risk factors analysing data of 27676 patients from 54 health care facilities [11].

Concerning acute coronary syndrome, covid-19 patients present multiple microthrombosis, coronary spasm, systemic inflammatory response, which lead to rupture of the atherosclerotic plaque [12]. However, in COVID-19, ACS without atherothrombosis also occurs [13].

Tedeshi and al. reported a case of a 60 year-old-male without any cardiovascular risk factor and no cardiac history admitted for covid-19 who presented during the hospitalization an infero-posterolateral STEMI. The angiography showed an acute massive thrombosis of a dominant right coronary artery without clear evidence of atherosclerosis [14].

In a study conducted by Muhammad Rashid and al., a total of 12 958 patients were hospitalized with acute coronary syndrome during the study period, of which 517 (4.0%) were COVID-19-positive and were more likely to present with non-ST-elevation acute myocardial infarction [15].

Concerning acute limb ischemia, Raffaello Bellosta and al. reported the incidence of acute limb ischemia has significantly increased during the COVID-19 pandemic in the Italian Lombardy region [16] E.Gonzalez Canas and al. reported two cases of acute limb ischemia with the thoracic aorta thrombosis associated with covid-19 [17].

#### 4. Conclusion

The coagulopathy responsible for venous and arterial thrombosis is a well-established complication of COVID-19. Arterial thromboembolic complications can be either stroke, acute coronary syndrome or peripheral acute ischemia. These complications occur even under thromboprophylaxis. Therefore, patients with covid19 should be monitored more closely for thromboembolic complications. Recommendations are found in the literature regarding the prophylaxis and treatment of these complications.

#### Ethical approval

This is a case report.

#### Please state any sources of funding for your research

No any source of funding

#### Author contribution

All authors have contributed to this case report.

#### Registration of research studies

1. Name of the registry:
2. Unique Identifying number or registration ID:
3. Hyperlink to your specific registration (must be publicly accessible and will be checked):

#### Guarantor

All authors are guarantors.

## Consent

Informed consent was obtained from the patient for publication of this case report and any accompanying images.

## Declaration of competing interest

No conflict interest.

## Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.amsu.2022.104445>.

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