

# Arterial and vein related catheters thrombosis in a patient with COVID-19 : a case report.

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## Case Report

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# Abstract

Patients with acute respiratory distress syndrome due to infection with the novel coronavirus SARS-COV2 are currently considered at high risk of developing thromboembolic complications in both venous and arterial vessels. The use of anticoagulants for preventive or curative purposes should be considered to reduce the risk of thromboembolic events. We report a case of a patient with severe COVID-19 acute respiratory distress syndrome who consecutively developed a right femoral deep vein thrombosis related to the femoral central line and acute ischemia of the left upper limb related to a radial arterial line. He was under a therapeutic dose of low molecular weight heparin twice a day three days before. The femoral vein was free of thrombosis while the central line was placed under a duplex ultrasound.

Thromboembolic events can occur in patients with severe COVID-19 despite therapeutic anticoagulants. Close monitoring of vascular access with duplex ultrasound may be required.

## Background

Coronavirus disease 2019 (COVID-19) is a respiratory tract infection caused by a novel emergent coronavirus. The [2019–20 coronavirus pandemic](#) was confirmed to have spread to [Morocco](#) on 2 March 2020, when the first COVID-19 case was confirmed in [Casablanca](#). Severe SARS COV-2 pneumonia is associated with an increased risk of both venous and arterial thromboembolic events, reaching up to 30% of patients depending on the series (1,2). The reasons are still incomprehensible. Hypercoagulopathy with elevated D-dimer levels is one of the most important clinical features of severe COVID-19 pneumonia associated with an inflammatory syndrome marked by hyperferritinemia and hyperfibrinogenemia (3). Despite the lack of prospective studies to date, experts are currently recommending the use of low molecular weight heparin at twice the usual dose to treat severe COVID-19 patients (4). Clinical experience suggests that this coagulopathy is associated with an increased risk for both venous and arterial thrombosis (5).

## Case Presentation

63 years old, admitted on 25/3/2020 for fever and dyspnea evolving for 2 days. His physical examination on admission found a conscious patient, slightly dyspneic, his respiratory rate was at 22 breaths/minute, SPO2 at 88% in ambient air, his heart rate at 98 cycles/min, his blood pressure was at 120/80 mmHg, he had bilateral snore and crackling rales, the cardiovascular examination found no abnormality, his temperature was at 39°C. Regarding the radiological investigations, the chest X-ray had found multiple bilateral alveolar opacities, the chest CT scan had objectified bilateral and basal peripheral involvement, frosted glass, and crazy paving aspect and multifocal condensates (Figure 1). The electrocardiogram was normal. His laboratory tests are noted in (Table 1). The diagnosis of COVID-19 viral pneumonia was strongly suspected, a nasal swab was performed. He had initially received *supportive oxygen therapy*,

and treatment by chloroquine, azithromycin, aminoacetophenone, and enoxaparin prophylactic dose once daily. On day 2 of admission, the COVID-19 virus was confirmed by RT-PCR. Due to the worsening of his condition 4 days later with the onset of acute respiratory distress syndrome, he was transferred to the intensive care unit. He was intubated and ventilated because of severe hypoxia and the alteration of his neurological status. A right femoral venous line and a left radial arterial catheter were placed under ultrasound without any notable incidents. The cardiac ultrasound was normal, he did not reveal any indirect parameters of pulmonary embolism. Despite optimized ventilation, infusion of neuromuscular blockers, the patient continued to be hypoxic, the CT pulmonary angiography did not be realized. Because pulmonary embolism could not be ruled out, a curative anticoagulant treatment based on enoxaparin at a dose of 6000 UI/12h was given. Besides, on the third day following the placement of the vascular devices, the patient presented a swelling of the right lower limb (figure 2) and left acute upper ischemia (figure 3). The diagnosis of femoral deep vein thrombosis and acute upper limb ischemia was objectified by the duplex ultrasound. On the right lower limb, it showed a non-compressible aspect of the common and superficial femoral vein and popliteal vein with a thrombus image at the level of the superficial femoral vein, common femoral vein and popliteal vein, whereas the deep venous network on the left is compressible with a normal flow from the common femoral vein to distal leg veins. The duplex ultrasound of the left upper limb had objectified total thrombosis of the left radial artery extended to the radiopalmar arch and interdigital arteries. Total thrombosis of the ulnar artery at its distal segment extended to the ulnitopalmar arch. Both catheters were immediately removed. The thrombectomy could not be done because the patient was hemodynamically unstable.

The patient died of multi-organ failure including acute renal failure on the sixth day of his hospitalization in ICU.

## Discussion And Conclusions

Thrombosis related central venous lines are relatively rare and constitute less than 5% in patients without risk factors, malignancy and sepsis are the major risk factors (6). That remains asymptomatic in the majority of cases. Thrombosis on radial arterial catheters is exceptional, especially in the absence of cardiovascular risk factors. In this case the patient developed both arterial and vein thrombosis related to vascular devices despite he was receiving therapeutic anticoagulant. Currently, a French study has found a high rate of thromboembolic events in COVID-19 patients treated with therapeutic anticoagulation (7,8). In summary, thromboembolic events are associated with poor outcome in severe COVID-19 patients. In a proportion of patients, anticoagulants couldn't be effective to prevent nor to treat them. So, more investigations are necessary to determine appropriate measures to manage this complication.

## List Of Abbreviations

CT-Scan : Computed tomography scanner

ICU: Intensive Care Unit

## Declarations

### **Ethics approval and Consent to participate:**

Not applicable.

### **Consent for publication :**

Written informed consent was obtained from the family of the patient for publication of this case report and accompanying images.

### **Availability for supporting data :**

Not applicable.

### **Acknowledgements :**

Not applicable.

### **Competing interests :**

The authors declare no competing interests.

### **Authors' contributions :**

All authors contributed to all stages of development of the case report.

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## Tables

Table 1 : Laboratory findings in the patient with COVID-19

TEST	Normal values	26/03/2020	29/03/2020	30/03/2020	01/04/2020	02/04/2020	03/04/2020	04/04/2020	05/04/2020
Blood leukocyte count, 10 <sup>9</sup> /L	4 - 11	8.40	17.34	22.35	13.08		16.68	18.00	25.15
Lymphocyte, %		14.4	2.7	2.8	6.2		4.2	3.4	
Lymphocyte count 10 <sup>9</sup> /L	1.0 - 4.8	1.21	0.47	0.63	0.81		0.70	0.61	0.63
Neutrophil, %		82.3	95.4	95.4	91.2		92.7	92.5	
Neutrophil count 10 <sup>9</sup> /L	1.4 - 7.7	6.91	16.54	21.32	11.93		15.46	16.65	22.43
Neutrophil to lymphocyte ratio NLR		5.71	35.19	33.84	14.72		22.08	27.29	35.60
Monocyte, %		3.1	1.7	1.6	2.5		2.9	4.0	
Monocyte count, 10 <sup>9</sup> /L	0.18 - 1.00	0.26	0.29	0.36	0.33		0.48	0.72	
Basophil, %		0.2	0.1	0.2	0.1		0.2	0.1	
Basophil count, 10 <sup>9</sup> /L	< 0.11	0.02	0.02	0.04	0.01		0.03	0.02	
Erythrocyte count 10 <sup>6</sup> /μL	4.28 - 6	4.49	4.76	4.44	3.29		3.40	3.39	3.06
Hemoglobin, g/dL	13.0 - 18.0	12.9	13.5	12.7	10.2		9.8	9.7	8.8
Hematocrit, %	39 - 53	38.8	40.7	39.9	31.8		31.9	31.4	29.8
Mean cell volume (MCV), fL	78 - 98	86.4	85.5	89.9	96.7		93.8	92.6	97.4
Mean cell hemoglobin (MCH), pg	26 - 34	28.7	28.4	28.6	31.0		28.8	28.6	28.8
Mean corpuscular hemoglobin concentration (MCHC), g/dL	31.0 - 36.5	33.2	33.2	31.8	32.1		30.7	30.9	29.5
Platelet count 10 <sup>9</sup> /L	150 - 400	322	477	471	106		105	124	117
C-reactive protein level, mg/L	< 8	318.21	483.79	500.55	288.6	177.6		105.70	83.80
Procalcitonine ng/ml	< 0.5	0.35	1.17	3.42	92.04				35.18
Creatinine mg/L	7 - 13	7.53	6.75	12.35	59.98	66.18	72.83	73.46	74.02
Blood urea nitrogen g/L	0.15 - 0.45	0.32	0.38	0.71	1.4	1.69	2.17	2.30	2.31
Alanine aminotransferase U/L									91
Aspartate amino transferase U/L									302
Lactico deshydrogenase U/L								656	2305
Fibrinogen g/L	3.4			6.3					
D-dimer ng/ml	365			10000					
Prothrombin time %	96		95						49
Activated partial thromboplastin time sec	31		30.3						42.4
International Normalized ratio INR	1.04		1.03						1.69
Serum ferritin ng/L	265.29			865.87				2768.00	8123.20
Creatine phosphokinase U/L								2702	2330
Sodium mmol/L	136 - 145	141	139	144	144	140	142	142	139
Potassium mmol/L	3.5 - 5.1	3.3	2.8	2.6	4.1	4.7	5.7	6.1	7.1
Serum chloride meq/L	98 - 107	99	94	99	109	106	109	109	
Troponine I ng/ml									0.168

## Figures



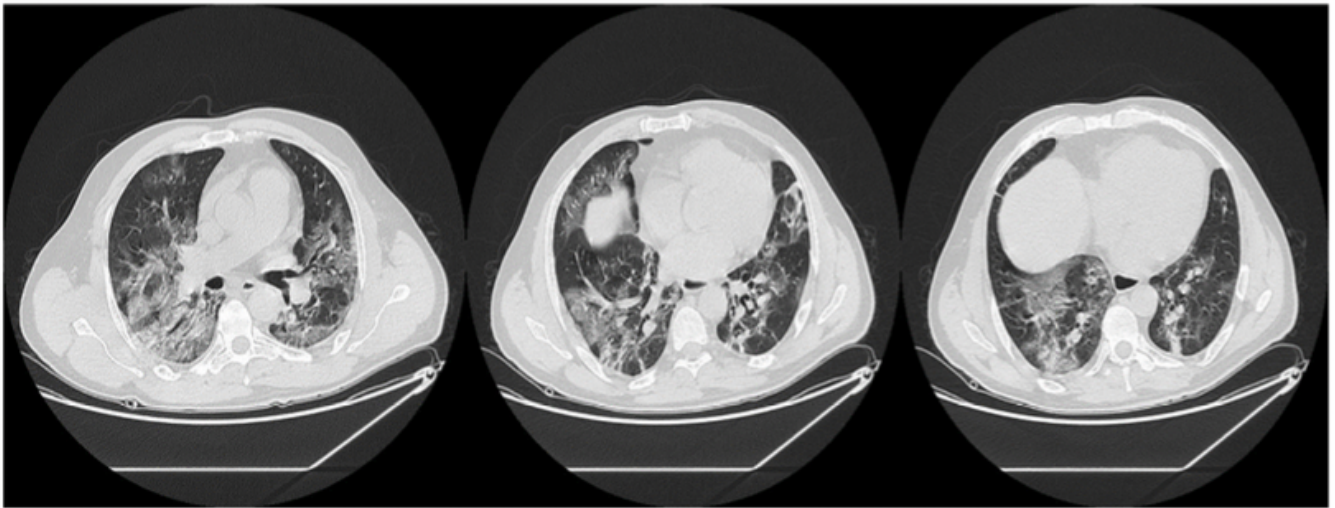


Figure 1 : The chest CT scan on admission : bilateral and basal peripheral involvement, frosted glass, and crazy paving aspect and multifocal condensates

Figure 1

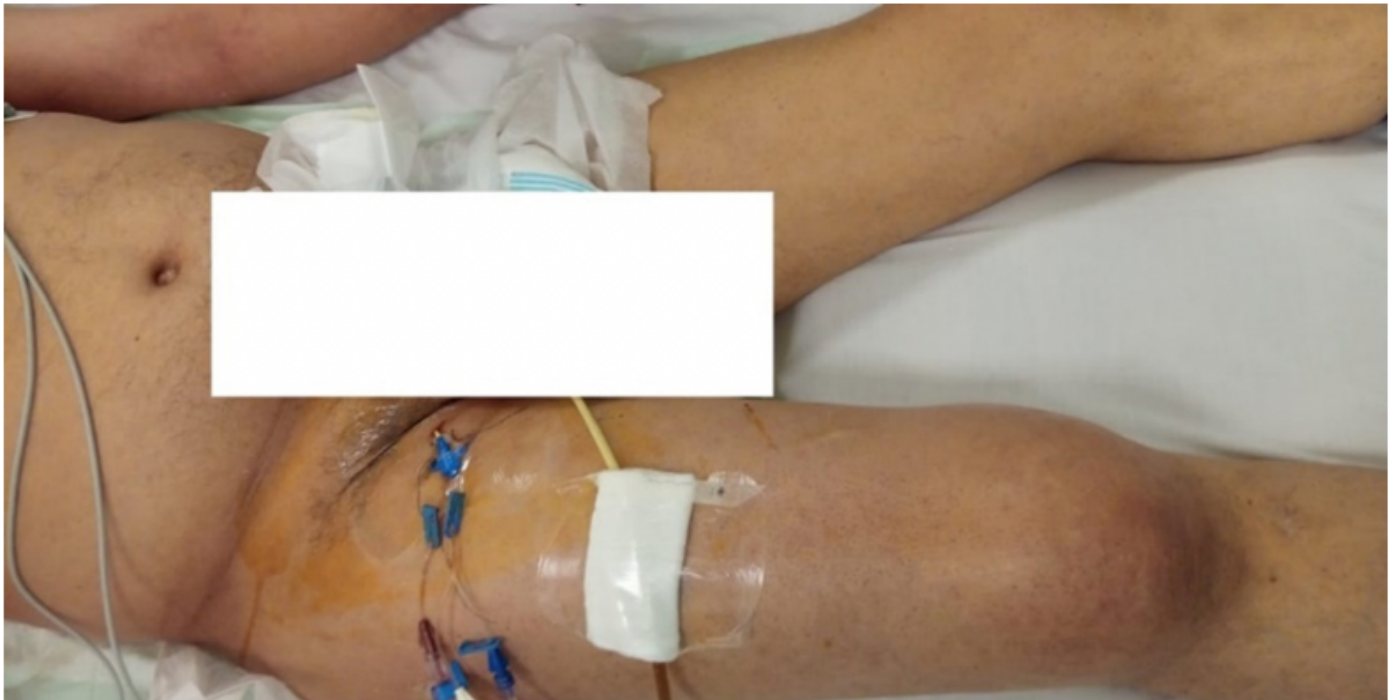


Figure 2: right deep vein thrombosis.

Figure 2



Figure 3: left upper ischemia

Figure 3