

Case Report

Concomitant acute limb ischemia and myocardial infarction: another challenge of COVID-19's hypercoagulability

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Abstract: The COVID-19, actual pandemic due to SARS COV 2 is associated with numerous thromboembolic complications. Although venous thrombosis including pulmonary embolisms have been widely described, arterial localization seems rarely reported. Acute limb ischemia and myocardial infarction are two major consequences of arterial thrombosis and their concomitant occurrence among COVID-19 patients is extremely rare. It is an evident aspect of hypercoagulability and a real challenge to physicians. We herein describe the management of a 77 years old COVID-19 patient presenting an acute lower limb ischemia with concomitant myocardial infarction. He underwent coronary angiography with subsequent stent placement then was transferred to the operating room where a thrombectomy was performed. The outcome was poor as the cardiogenic shock persisted in addition to a reperfusion syndrome with multiorgan failure.

Keywords: COVID-19, acute limb ischemia, acute myocardial infarction, hypercoagulability

Introduction

The COVID-19, actual pandemic due to SARS COV 2 is associated with numerous thromboembolic complications. Although venous thrombosis including pulmonary embolisms have been widely described, the incidence of arterial localization seems unclear.

In fact, case reports describe arterial thrombosis including acute limb ischemia, acute myocardial infarction and acute splenic and renal infarctions. However, concomitant acute limb ischemia and myocardial infarction remains rarely reported.

These complications usually occur despite of anticoagulant and antiplatelet therapy, highlighting the complexity of COVID-19's hypercoagulability.

We herein present a case report about concomitant acute limb ischemia and myocardial

infarction describing the new challenges we had to face regarding these complications.

Case presentation

A 77 years old male patient, with a known medical history of diabetes and hypertension was admitted to our ICU for acute respiratory distress syndrome (ARDS). PCR on nasopharyngeal swab identified SARS-COV-2 infection. The chest computed tomography showed bilateral ground glass opacities with a crazy paving aspect (**Figure 1**).

The patient was conscious with a GCS at 15/15 and polypneic at 42 cycles per minute, Pulse oximetry showed an oxygen saturation of 75%. Blood pressure was 150/80 mmHg and heart rate 136 beats per minute. Capillary glycemia was at 2,4 g/L. Body temperature was 38.8°C.

We initiated oxygen therapy using a high concentration mask (15 l/min) and secured venous

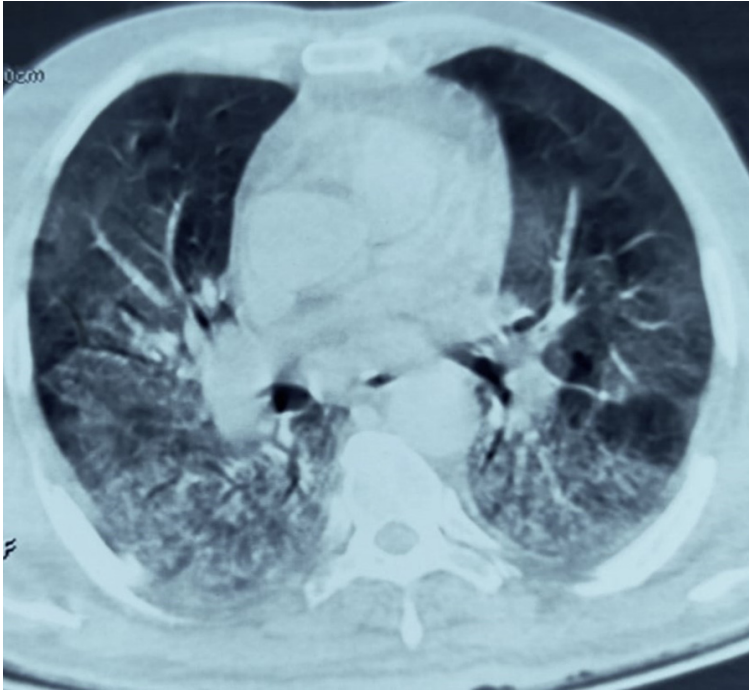


Figure 1. Chest computed tomography identified bilateral ground glass opacities with a crazy paving aspect.

access. We administrated specific treatment associating Hydroxychloroquine and Azithromycin according to our hospital's protocol. We performed an arterial blood gas exam that showed respiratory alkalosis with hypoxemia ($\text{PaO}_2 = 39 \text{ mmHg}$).

Blood tests showed Hyperferritinemia (3780 ng/ml), elevated CRP (337 mg/l), and hyperfibrinemia (8,69 g/l).

On day 2 after admission, IL-6 was elevated to 119 pg/ml and therefore Tocilizumad was administrated.

On the third day of admission, the patient presented acute respiratory deterioration, and thus was intubated, and protective mechanical ventilation was initiated.

ECG showed an ST elevation on leads V1, V2, V3 (**Figure 2**) and transthoracic echocardiography showed apical akinesis with severe impaired fractional ejection and no thrombus formation.

Clinical examination showed pallor, cold and marbling on the left leg. Femoral pulse was not

perceptible. Doppler auscultation on femoral artery was inaudible and thrombus was visualized (**Figure 3**).

We concluded to a concomitant acute lower limb ischemia and myocardial infarction, and computed tomography angiography revealed common iliac artery occlusion (**Figure 4**).

Elevation of creatinine kinase (CPK) and lactate dehydrogenase (LDH) were identified on blood tests findings. Hepatic cytolysis was also present with Aspartate aminotransferase (ASAT) level at 406 U/L and Alanine aminotransferase (ALAT) at 114 U/L. Troponin's level was elevated at 5000. Creatinine's level was 38 mg/dL and Urea was 34.9 mg/l. D-dimer's level was 1570.

Immediate revascularization for both AMI and ALI was planned. Under general anesthesia, coronary intervention was initiated by cardiologists. Coronary angiography (CAG) was performed through radial artery catheterization and detected the total occlusion of the inter-ventricular artery (IVA). Balloon angioplasty with subsequent stent placement was performed. Due to the absence of a hybrid operating room in our facility, the patient was then transferred to the operating room where embolectomy was performed using a Fogarty catheter.

The patient received a 5000 UI bolus of heparin during intervention and then was put under continuous heparin infusion of 18 UI/Kg/h. He also received antiaggregant therapy associating Aspirin and Clopidogrel.

The outcome was poor, and the patient died few hours later due to a persistent cardiogenic shock associated to a reperfusion syndrome with multiorgan failure in a severely hypoxemic patient.

Discussion

COVID-19 patients with acute respiratory failure present with severe hypercoagulability.

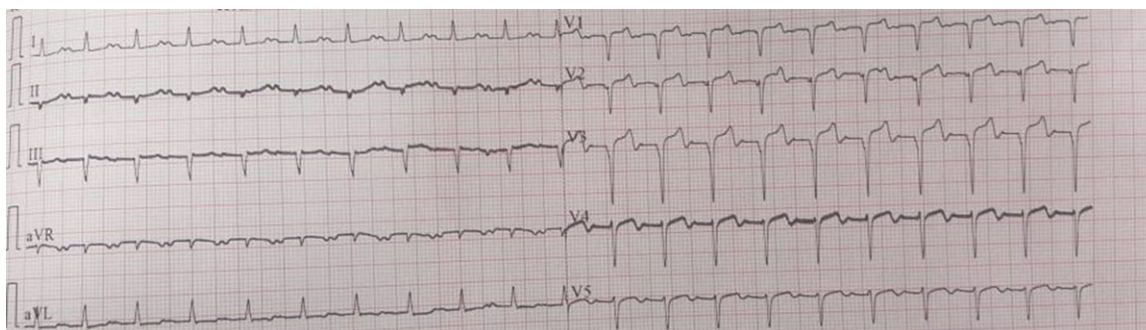


Figure 2. Electrocardiogram on admission showing ST elevation in leads V1, V2, V3.

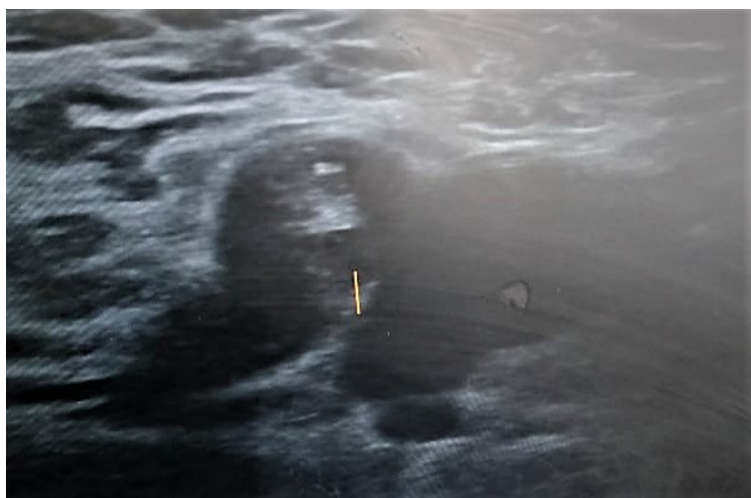


Figure 3. Femoral artery thrombus identified on ultrasonography.

Thrombin generation and fibrin deposition in alveolar and interstitial lung spaces, in addition to microcirculation thrombosis may contribute to worsen respiratory failure [1]. Additionally, a procoagulant state leading to major thromboembolic manifestations have been reported among COVID-19 patients despite of anticoagulant therapy [2].

Multisite arterial thrombosis is rarely reported in the literature and their management in a new challenge faced by physicians caring for COVID-19's critically ill patients.

Many case reports described renal and splenic infarctions, acute upper or lower limb ischemia, large vessel ischemic strokes and acute myocardial infarctions [3-5]. However, concomitant acute limb ischemia and acute myocardial infarction remains rarely reported. Although acute myocardial infarction could be a leading cause of limb ischemia, the association of

these two major complications is exceptional [6].

In our case report, we had to transfer our patient from the ICU to the Cath lab where he underwent coronary angiography with percutaneous coronary intervention. Balloon angioplasty and stent placement was performed. We then transferred the patient to the emergency operating room to benefit from Fogarty thrombectomy. The outcome was poor, and the patient died few hours later.

This challenging procedure with multiple transfers was also described by *Marco Angelillis et al* reporting a case of multiple arterial thrombosis in an 83 years old patient with coronavirus disease with a poor outcome [7]. The patient developed multiorgan failure and died 3 days after admission.

In a similar case, *Keisuke Miyake et al* described simultaneous revascularization for both AMI and ALI in a hybrid operating room, and due to the risk of reperfusion syndrome they initiated immediate intraoperative hemodialysis. The procedure was associated with a favorable outcome.

In our case, it was not possible due to the absence of a hybrid operating room in our facility.

Conclusion

Concomitant ALI and AMI is rarely reported among COVID-19 patients. It is related to the



Figure 4. Occlusion of common Iliac artery.

hypercoagulability state frequently noted in these patients. While simultaneous revascularization with intraoperative dialysis may offer a better outcome. Morbidity and mortality rates remain very high.

Disclosure of conflict of interest

None.

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