

# Simultaneous STEMI and Left Upper Limb Ischemia in a COVID-19 Patient: A Case Report

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## Abstract

SARS-CoV-2 may establish a hypercoagulable state and disrupts hemostasis, predisposing patients to thrombotic events.

A 64-year-old man with a history of diabetes, hypertension, and coronary artery bypass surgery presented with lethargy, terminated ventricular tachycardia, and acute left upper limb ischemia (ALI). His ECG demonstrated anterior Acute Myocardial Infarction (AMI).

We diagnosed COVID-19 according to typical chest Computed Tomography (CT) scan findings (peripheral ground-glass opacities) alongside common clinical features and a history of recent contact with coronavirus disease 2019 (COVID-19) patient. His AMI, unlike his ALI, did respond to fibrinolytic therapy.

Thereby, the patient underwent an emergent embolectomy, which saved his limb. He was under COVID-19 treatment and limb physiotherapy for 12 days. He was discharged on day 13 of admission and recovered from AMI, ALI, and COVID-19 with a 25% ejection fraction.

We reported this case to emphasize the extent of thrombotic events in COVID-19 patients and the emergent multi-disciplinary care they may need. Thrombolytic therapy could be an option in prolonged ischemia if advanced interventional equipment is not available.

**Keywords:** STEMI • Acute limb ischemia • COVID-19

## Introduction

Coronavirus disease-2019 (COVID-19), caused by SARS-CoV2, has been shown to result in coagulation abnormalities predisposing patients to both venous and arterial thrombosis [1-3].

There are few reports of acute ST-Segment Elevation Myocardial Infarction (STEMI) and acute limb ischemia in patients with COVID-19 [5].

To our knowledge, the simultaneous occurrence of STEMI and acute limb ischemia is previously unreported clinical presentation in COVID-Herein we present the first case of COVID-19 manifesting with simultaneous STEMI and limb ischemia in a post Coronary Artery Bypass Graft (CABG) patient.

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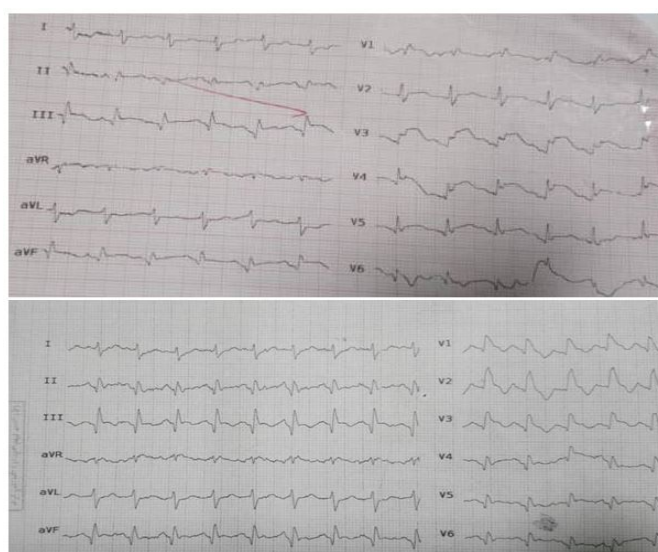
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## Case Presentation

A 64-year-old male patient was brought to the hospital by Emergency Medical Services (EMS) due to lethargy and terminated ventricular tachycardia. The patient had experienced sudden onset chest pain, left upper limb numbness, and pain three hours prior to admission. His wife called EMS after two and a half hours of the onset of the symptoms. During transportation in the ambulance, the patient became apneic and pulseless, losing consciousness. The paramedics immediately initiated Cardiopulmonary Resuscitation (CPR). The Automated External Defibrillator (AED) detected ventricular tachycardia, leading to the administration of three synchronized Direct Current (DC) shocks, two minutes apart, and a 300 mg dose of amiodarone. Sinus rhythm was restored within seven minutes of CPR, resulting in an improvement in the patient's level of consciousness. He was then transported to the nearest hospital [6].

Upon arrival at the emergency department, the patient presented with a blood pressure of 100/60 mmHg, heart rate of 89 beats per minute, respiratory rate of 18 breaths per minute, and oxygen saturation of 85%. He appeared lethargic and confused, exhibiting symptoms consistent with chronic stable angina. In his past medical history, he had hypertension and diabetes but was not taking any antihypertensive medications. He was being treated with insulin for his diabetes and had undergone Coronary Artery Bypass Graft (CABG) surgery six years ago. Additionally, he was a current smoker and addicted to opium. It was noted that he had recently been in close contact with a COVID-19 patient. His current medications include insulin, nitroglycerin, and aspirin. During physical examination, it was observed that his left lower limb had been amputated due to diabetic foot complications. His left upper limb appeared pale and cold with sensory and motor dysfunction. Both radial and brachial pulses were absent in that limb [7]. The initial Electrocardiogram (ECG) revealed ST-segment elevations consistent with anterior ST-Elevation Myocardial Infarction (STEMI) as well as pathologic Q waves in the inferior leads (Figure 1).



**Figure 1.** The figure shows electrocardiogram.

To manage Acute Coronary Syndrome (ACS), the patient initially received aspirin 325 mg, clopidogrel 300 mg, atorvastatin 80 mg, and bisoprolol 2.5 mg. Intravenous amiodarone was also administered with a loading dose of 300 mg followed by an infusion at a rate of 1 mg/min for six hours and then reduced to 0.5 mg/min for another 18 hours.

After initial evaluations in the hospital setting, a brain CT scan without contrast was performed to assess post-CPR reduced consciousness while a chest CT scan without contrast aimed to evaluate COVID-19 pneumonia due to recent contact with an infected individual. The brain imaging showed no evidence of intracranial hemorrhage or ischemia related to CPR while the chest CT scan revealed bilateral pleural-based ground-glass opacities consistent with COVID-19 pneumonia [8].

Despite later testing negative for SARS-CoV-2 using RT-PCR testing method for COVID-19 diagnosis according to typical chest CT scan findings along with clinical presentation confirmed COVID-19 infection as chest CT scans are considered more sensitive than SARS-CoV-2 RT-PCR tests for diagnosing COVID-19. Three hours after admission to the hospital, there was an improvement in the patient's level of consciousness; however, his left upper limb became cyanotic. Due to a lack of available cardiologists and vascular surgeons at that facility, he was transferred to Rajaei Heart Center in Karaj, Iran.

Upon presentation at Rajaei Heart Center Hospital, the patient remained conscious but had a blood pressure reading of 85/60 mmHg along with a heart rate of 134 beats per minute, respiratory rate of 20 breaths per minute, and oxygen.

The patient in this case had an emergent embolectomy performed by a vascular surgeon to restore blood flow to the limb. Following the procedure, the limb warmed up and pulses became palpable again. However, laboratory studies showed elevated white blood cell count, lymphocyte count, and creatinine levels. The initial troponin I test was negative but later became positive, indicating cardiac involvement.

Due to the patient's stable condition and impaired renal function, Coronary Angiography (CAG) was postponed. The patient was admitted to the ICU and given various medications including aspirin, clopidogrel, bisoprolol, atorvastatin, amiodarone, enoxaparin, vancomycin, dexamethasone, Favipiravir, interferon beta 1a, and insulin. Physiotherapy was initiated to improve muscle strength [9].

After clinical improvement and normalization of creatinine levels on day 10, CAG was performed. The results revealed a totally occluded mid Left Anterior Descending Artery (LAD) with a patent Left Internal Mammary Artery (LIMA) graft. Previous Saphenous Vein Grafts (SVG) on Obtuse Marginal (OM) and Posterior Descending Artery (PDA) were occluded. The Left Circumflex Artery (LCX) had a significant proximal lesion and the Right Coronary Artery (RCA) was completely blocked.

Given the occluded SVGs and history of chronic angina, Percutaneous Coronary Intervention (PCI) was performed on the LCX lesion. On day 11, the patient was transferred to the ward and after 13 days of admission, he was discharged fully recovered from COVID-19, Myocardial Infarction (MI), and limb ischemia.

## Discussion

We present a case of a COVID-19 patient with simultaneous Acute Limb Ischemia (ALI) and Acute Myocardial Infarction (AMI) who had a LIMA graft to the LAD. We treated the patient with a thrombolytic agent and performed an emergent embolectomy. ALI in the presence of STEMI is rare and is usually caused by thromboembolism from a cardiac source, such as LA or LV thrombus [10]. In this case, the patient had occlusion of the proximal arteries in the left upper limb due to a history of CABG with a LIMA graft. The preferred treatment for such cases is simultaneous vascular surgery and angiography in a hybrid Cath-lab, followed by primary PCI with percutaneous thrombectomy if available. Other options include thrombolytic therapy or primary PCI followed by embolectomy. However, in this case, we did not have access to a hybrid Cath-lab or thrombectomy instrument, so we opted for thrombolytic therapy followed by emergent embolectomy due to the progression of ALI. Thrombolytic treatment helped salvage the limb despite prolonged ischemia, and there were no significant signs of tissue loss after embolectomy. Coronary angiography did not reveal any recent plaque rupture or culprit lesion that could explain the anterior STEMI in this patient, and there was no significant stenosis in the LIMA graft. A possible underlying cause could be a high clot burden proximal to the LIMA on the left subclavian artery, which may have migrated to other arteries after thrombolytic therapy, resulting in unchanged ALI but subsided AMI [11-13].

On the other hand, a less probable scenario is simultaneous thromboembolism to LIMA and the distal sub-clavian artery. Coagulation abnormality is proposed to be secondary to inflammation, platelet activation, endothelial dysfunction, and stasis. SARS-CoV-2 establishes a hypercoagulable state throughout the body. Thus COVID-19 patient is susceptible to arterial and venous thrombosis. The hypercoagulable state of COVID-19 infection, alongside apical cap akinesia, might have led to thrombus formation in this patient.

## Conclusion

We report the first case of simultaneous AMI and ALI in a COVID-19 patient. We reported this case to emphasize thromboembolic events in COVID-19 patients and the emergent multi-disciplinary care they may need. Acute thromboembolic events may be the primary presentation of COVID-19. Simultaneous AMI and ALI may occur in post-CABG patients in the setting of hypercoagulability.

## Informed Consent

Written informed consent was obtained from the patients for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

## Conflicts of Interest

N/A

## Sources of Funding

N/A

## Ethical Approval

Our study is a case report without any intervention on the patient, and informed consent has been obtained for publication.

## Reference

1. Cantador, Estefania, Alberto Nunez, Pilar Sobrino, and Victoria Espejo, et al. "Incidence and consequences of systemic arterial thrombotic events in COVID-19 patients." *J Thromb Thrombolysis* 50 (2020): 543-547.
2. Helms, Julie, Charles Tacquard, Francois Severac, and Ian Leonard-Lorant, et al. "High risk of thrombosis in patients with severe SARS-CoV-2 infection: a multicenter prospective cohort study." *Intensive Care Med* 46 (2020): 1089-1098.
3. Klok FA, MJHA Kruij, NJM Van der Meer, and MS Arbous, et al. "Incidence of thrombotic complications in critically ill ICU patients with COVID-19." *Thromb Res* 191 (2020): 145-147.
4. Maier, Suellen Rodrigues de Oliveira, Joao Paulo Ferreira Rodrigues, and Mayara Rocha Siqueira Sudre, et al. "Cardiac complications in patients with COVID-19: an integrative literature review." *Aquichan* 20 (2020): 2043.
5. Mietto, Cristina, Valentina Salice, Matteo Ferraris, and Gianmarco Zuccon, et al. "Acute lower limb ischemia as clinical presentation of COVID-19 infection." *Ann Vasc Surg* 69 (2020): 80-84.
6. Poortahmasebi, Vahdat, Milad Zandi, Saber Soltani, and Seyed Mohammad Jazayeri, et al. "Clinical performance of RT-PCR and chest CT scan for COVID-19 diagnosis; a systematic review." *Front Emerg Med* 4 (2020): e57-e57.
7. Herpe, Guillaume, Mathieu Lederlin, Mathieu Naudin, and Mickael Ohana, et al. "Efficacy of chest CT for COVID-19 pneumonia diagnosis in France." *Radiology* 298 (2021): E81-E87.
8. Ai, Tao, Zhenlu Yang, Hongyan Hou, and Chenao Zhan, et al. "Correlation of chest CT and RT-PCR testing for coronavirus disease 2019 (COVID-19) in China: a report of 1014 cases." *Radiology* 296 (2020): E32-E40.
9. Abou-Ismael, Mouhamed Yazan, Akiva Diamond, and Sargam Kapoor, et al. "The hypercoagulable state in COVID-19: Incidence, pathophysiology, and management." *Thromb Res* 194 (2020): 101-115.
10. Spiezia, Luca, Annalisa Boscolo, Francesco Poletto, and Lorenzo Cerruti, et al. "COVID-19-related severe hypercoagulability in patients admitted to intensive care unit for acute respiratory failure." *Thromb Haemost* 120 (2020): 998-1000.
11. Connors, Jean M, and Jerrold H Levy. "Thromboinflammation and the hypercoagulability of COVID-19." *J Thromb Haemost* 18 (2020): 1559-1561.
12. Panigada, Mauro, Nicola Bottino, Paola Tagliabue, and Giacomo Grasselli, et al. "Hypercoagulability of COVID-19 patients in intensive care unit: a report of thromboelastography findings and other parameters of hemostasis." *J Thromb Haemost* 18 (2020): 1738-1742.

13. Singhanian, Namrata, Saurabh Bansal, Divya P. Nimmatoori, and Abutaleb A.Ejaz, et al. "Current overview on hypercoagulability in COVID-19." *Am J Cardiovasc Drugs* 20 (2020): 393-403.

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