

## Left Ventricular Apical Mass with Normal Ejection Fraction in a Suspected COVID-19 Patient Suffering from Acute Ischemic Stroke

### INTRODUCTION

The coronavirus disease-2019 (COVID-19) has become a global health problem worldwide. Although it is primarily a lung disease that affects the respiratory system, the activation of inflammatory and procoagulant pathways and subsequent disruption of vascular endothelium may prone COVID-19 patients to vascular complications such as stroke.<sup>1</sup> For instance, an increasing line of evidence suggests an independent association between ischemic stroke and COVID-19.<sup>2</sup>

Intracardiac masses are of various etiologies mainly including thrombus, tumors, and vegetations, and transthoracic echocardiography (TTE) constitutes an invaluable tool during diagnostic workup that helps to specify the location, shape, and mobility of the mass.<sup>3</sup> However, making an exact diagnosis may be challenging in some circumstances, especially in the era of COVID-19 pandemic. Herein, we describe a case of an acute ischemic stroke and suspected COVID-19 patient whom we detected left ventricular (LV) apical mass in the setting of normal left ventricular ejection fraction (LVEF).

### CASE REPORT

A 70-year-old male patient was admitted to the emergency department with the complaint of numbness in his right leg which started 2 days ago. Initial evaluation revealed a heart rate of 81 beats per minute and blood pressure of 110/70 mm Hg. He had no fever or tachypnea, and ambient oxygen saturation was 96%. Physical examination at admission revealed normal heart and respiratory sounds and clear peripheral pulses, but neurological examination revealed 4/5 motor force in his right lower extremity. He was on acetylsalicylic acid, oral antidiabetic, verapamil plus trandolapril, and alpha-blocker treatment due to hypertension, diabetes mellitus, and benign prostate hyperplasia. In his detailed anamnesis, the patient and his relatives expressed that he suffered from an emotionally distressing condition a few months ago. Otherwise, he was a healthy man with no chest pain, dyspnea, palpitation, and/or weight loss. There were no abnormalities in blood tests at admission except increased liver function tests, ferritin, sedimentation rate, and C-reactive protein (CRP). Cranial computed tomography (CT) was unremarkable for an acute pathology, but diffusion magnetic resonance imaging (MRI) was indicative of lacunar infarction in the left occipital region. Afterward, the patient was diagnosed with acute ischemic stroke and hospitalized by the neurology department. The National Institutes of Health Stroke Scale score was 2 and he was managed with antithrombotic therapy, anticoagulants, blood pressure control, intravenous fluids, and supportive care. Radiological evaluation was performed in order to examine the source of embolism, and carotid vertebral ultrasonography demonstrated minimal heterogeneous plaques in carotid arteries. 12-lead electrocardiography showed a normal sinus rhythm, but TTE revealed a sessile and highly mobile mass in the LV apex with normal LVEF (Figure 1 and Video 1). The mass was considered as a thrombus that could cause systemic embolism, and therefore, surgical excision was planned. During surgical preparations, chest

### CASE REPORT



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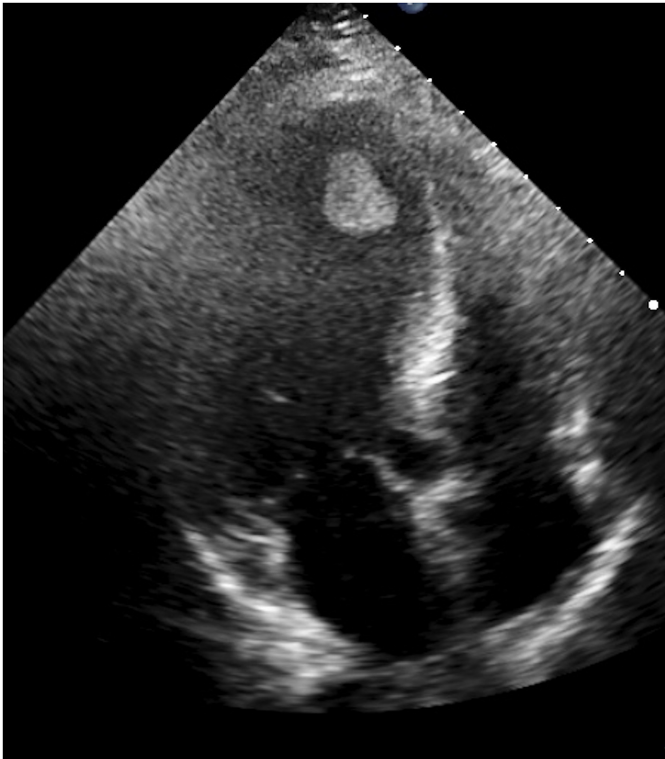
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**Figure 1. Transthoracic echocardiography imaging of a mass in left ventricular apex.**

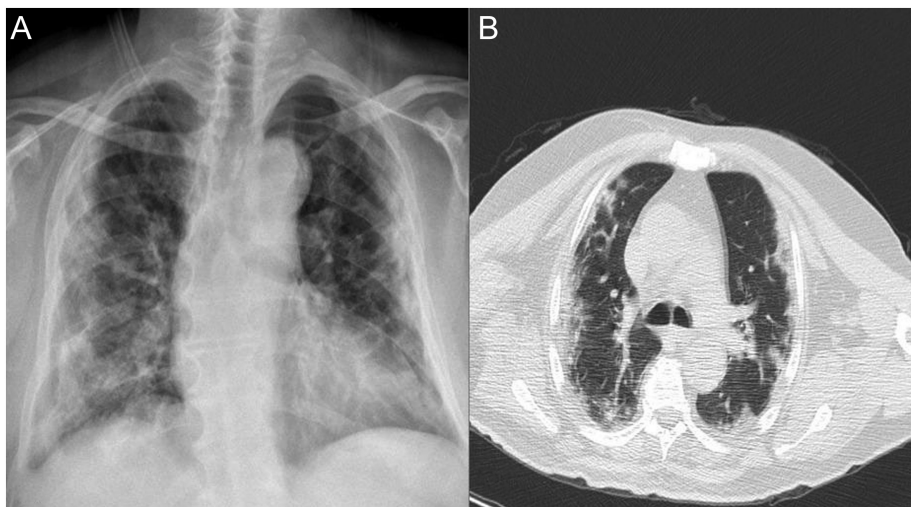
radiography was consistent with bilateral opacifications and consolidations with a lower zone dominance, and subsequent pulmonary thorax CT imaging demonstrated common ground-glass densities accompanying interstitial lung disease (Figure 2). These findings were considered suspicious for COVID-19 by the pulmonologist and infectious diseases specialist. However, polymerase chain reaction (PCR) tests of COVID-19 obtained at 24-hour intervals were negative for 2 times, and multiple tests were planned due to high suspicion of infection. On the other hand, the patient denied

any interventional and/or surgical procedure and refused to stay in the hospital. He was diagnosed as asymptomatic suspected COVID-19 and discharged from the hospital with anticoagulant and antiviral therapy and suggested for a quarantine period. He was followed up through telephone visits and he was still alive at the 6-month visit. Informed consent was obtained from the patient.

## DISCUSSION

Differentiating cardiac masses require clinical suspicion and appropriate echocardiographic and radiological workup. However, making an exact diagnosis may be challenging in some circumstances especially when diverse clinical conditions and comorbidities exist. In this regard, our case report describes a diagnostic dilemma and conflict in which multiple conditions exist such as suspected COVID-19 and LV apical mass in the setting of normal LVEF.

Transthoracic echocardiography is an invaluable tool for the determination and evaluation of intracardiac masses regarding the location, shape, attachment, and mobility of the mass. Although thrombus is the most common intracardiac mass and is usually associated with atherosclerotic cardiovascular diseases, cardiomyopathies, and hypercoagulable situations, an intracardiac mass, specifically located in LV, should be differentiated from primary or metastatic tumors, congenital residues, and hypertrophic muscle masses.<sup>3</sup> In our case, we defined LV apical mass as thrombus on TTE due to its increased echogenicity compared to local tissue and its well-delineated borders and this thrombus was defined as the possible source of embolism. However, it should be noted that LV apical thrombus in the setting of normal LVEF is a very rare condition. There are approximately 35 cases in the literature and the majority of these patients presented with embolic complications. Besides, there was an underlying medical condition that made these patients prone to thrombotic conditions such as inflammatory diseases, malignancy, blood dyscrasias, hypercoagulable states, and drug usage.<sup>4</sup> In our patient, there was no identifiable risk factor



**Figure 2. A. Bilateral opacifications and consolidations with a lower zone dominance in chest radiography. B. Common ground-glass densities accompanying interstitial lung disease in pulmonary thorax computed tomography imaging.**

and/or disease for thrombus formation except suspected COVID-19. Besides, anamnesis of an emotionally distressing condition that occurred a few months ago made us think Takotsubo cardiomyopathy is a possible source of thrombus which we recognized during the LV functional recovery phase. It should be underlined that Takotsubo cardiomyopathy may cause LV apical thrombus formation and thromboembolic complications may occur albeit rare.<sup>5</sup> On the other hand, a recent case of a COVID-19 pneumonia patient described Takotsubo Syndrome and accompanying LV apical thrombus. The patient was managed with parenteral anti-coagulation and resolution of thrombus and improvement in LVEF were demonstrated during follow-up.<sup>6</sup>

The increasing line of evidence suggests that COVID-19 may predispose patients to thromboembolism through the activation of inflammatory response with coagulation abnormalities. The underlying mechanism of this proneness is not fully known, but this pattern is associated with a poor prognosis.<sup>1,6</sup> For instance, clinical data suggest a relationship between COVID-19 and ischemic stroke.<sup>2</sup> In our patient, there was an inflammatory response activation as demonstrated by increased ferritin, sedimentation rate, and CRP levels. However, D-dimer and fibrinogen levels were within normal limits. On the other hand, there were no clinical signs and symptoms of COVID-19, and PCR tests were negative 2 times. Therefore, the patient was diagnosed as suspected COVID-19. At this point, it should be underlined that in the early phases of infection and/or with a low viral load, PCR tests may be negative despite significant findings on chest CT.<sup>7</sup>

There remain significant limitations regarding the management of cases that need to be mentioned. Although a multidisciplinary approach was adopted including emergency department, neurology, radiology, cardiology, and cardiovascular surgery clinics, only echocardiographic imaging was performed. Multimodality imaging such as cardiac MRI or transesophageal echocardiography could be beneficial

in this patient for differentiating the mass with the cost of transmission of infection. However, histopathological imaging had been planned after surgical excision. Due to the unwillingness of the patient, we could not perform follow-up clinical and echocardiographic examinations although the patient was contacted through telephone visits.

In conclusion, differential diagnosis of left ventricular masses in the setting of normal LVEF might be challenging in some circumstances, especially in the era of the COVID-19 pandemic.

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**Informed Consent:** Informed consent was obtained from the patient.

**Video 1:** Transthoracic echocardiography imaging of a sessile and highly mobile mass in left ventricular apex with normal left ventricular ejection fraction.

## REFERENCES

1. Libby P, Lüscher T. COVID-19 is, in the end, an endothelial disease. *Eur Heart J*. 2020;41(32):3038-3044. [\[CrossRef\]](#)
2. Belani P, Schefflein J, Kihira S, et al. COVID-19 is an independent risk factor for acute ischemic stroke. *AJNR Am J Neuroradiol*. 2020;41(8):1361-1364. [\[CrossRef\]](#)
3. Peters PJ, Reinhardt S. The echocardiographic evaluation of intracardiac masses: a review. *J Am Soc Echocardiogr*. 2006;19(2):230-240. [\[CrossRef\]](#)
4. Svendsen C, Pauley E, Stouffer GA. Left ventricular thrombus formation in the setting of normal systolic function. *JACC Case Rep*. 2020;2(10):1470-1474. [\[CrossRef\]](#)
5. de Gregorio C, Grimaldi P, Lentini C. Left ventricular thrombus formation and cardioembolic complications in patients with takotsubo-like syndrome: a systematic review. *Int J Cardiol*. 2008;131(1):18-24. [\[CrossRef\]](#)
6. Bernardi N, Calvi E, Cimino G, et al. COVID-19 pneumonia, takotsubo syndrome, and left ventricle thrombi. *JACC Case Rep*. 2020;2(9):1359-1364. [\[CrossRef\]](#)
7. Huang P, Liu T, Huang L, et al. Use of chest CT in combination with negative RT-PCR assay for the 2019 novel coronavirus but high clinical suspicion. *Radiology*. 2020;295(1):22-23. [\[CrossRef\]](#)