

# Right Atrial Thrombus in a Patient after COVID-19 Pneumonia

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## Abstract

Significant coagulopathy and hyperinflammation are found in patients with coronavirus disease 2019 (COVID-19).[1] In these patients have been reported vascular complications such as myocardial ischemia, ischemic stroke, systemic arterial thrombi, pulmonary thromboembolism, and deep vein thrombosis

**Keywords:** right atrial thrombus; covid-19; imaging

## Introduction

Significant coagulopathy and hyperinflammation are found in patients with coronavirus disease 2019 (COVID-19).[1] In these patients have been reported vascular complications such as myocardial ischemia, ischemic stroke, systemic arterial thrombi, pulmonary thromboembolism, and deep vein thrombosis. [2,3,4] Incidence of thrombotic complications in patients with COVID-19 requiring ICU admission is high, ranging to 31%. [ 4.]

Intracardiac thrombus caused by SARS-CoV-2 infection is a serious and life-threatening complication in COVID-19 patients. [5] Size of thrombus at the time of diagnosis correlates strongly with increased risk of thromboembolism and sudden death [6].

## Case Report:

44-year-old male patient was admitted to the Infective Clinic with a severe form of pneumonia COVID-19. The disease is complicated, with

sub-segmental embolization of the lungs and pneumothorax, which are confirmed with laboratory and computed tomography (CT) lung with angiography. On the third day of hospitalization, an echocardiogram is performed, which shows global hypocontractility of the left ventricular walls with a reduced ejection fraction EF 45%. The right ventricle was borderline. After the applied therapy, the patient's condition improves and he is discharged home with anticoagulant therapy. An echocardiography (Figure 1) performed as part of a cardiology examination one month after discharge from the hospital diagnosed a mass in the right atrium (35x27mm), which could correspond to a thrombus. Calcifications were visualized in the mass. The patient is readmitted to the Cardiology Clinic and intravenous heparin is indicated. Perform transesophageal echocardiography TEE (Figure 2) and confirm the presence of a mass consistent with thrombus.



**Figure 1:** Two-dimensional echocardiogram apical 4-chamber view showing a mass in the right atrium.



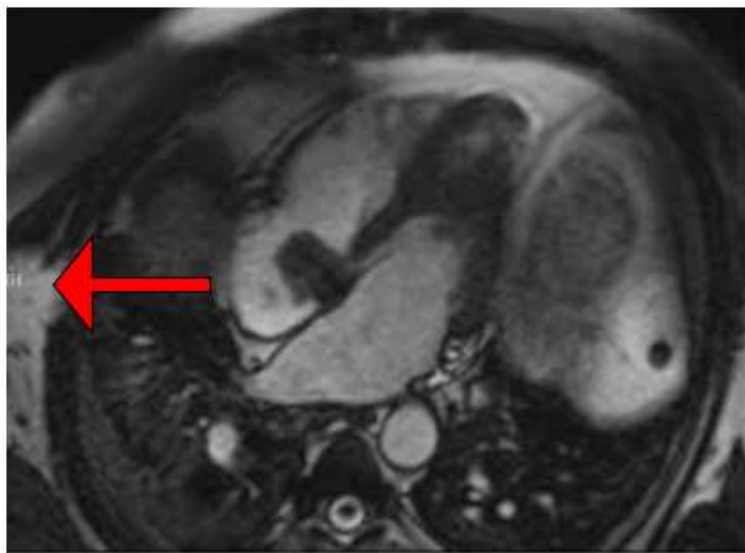
**Figure 2:** Transesophageal echocardiography showing a mass in the right atrium.

Cardiac CT (Figure 3) shows mass in right atrium extending into the inferior vena cava, and CT of the abdomen shows thrombosis of the inferior vena cava. Cardiac magnetic resonance (CMR) (Figure 4) showed a mass in the right atrium, which, corresponds to a thrombus adherent to the interatrial septum. After application of contrast, focal zones of higher

intensity are visualized, zones of fibrosis on interventricular septum, anterior and inferior and lateral wall of subepicardial and intramyocardial localization, which correspond to the sequelae of the inflammatory process, with ejection fraction 45%. The right ventricle has normal dimensions. After unsuccessful therapy with unfractionated heparin, the thrombus was successfully surgically extracted.



**Figure 3:** Cardiac computed tomography confirmed mass (thrombus) in the right atrium extending into the inferior vena cava.



**Figure 4:** Cardiac magnetic resonance showed a mass in the right atrium, which corresponded to a thrombus adherent to the interatrial septum.

## Discussion

Despite the use of anticoagulant therapy, our patient developed a thrombus in the right atrium.

This can be explained by the fact that severe cases of SARS COVID 19 are often associated with endothelial dysfunction and activation of the coagulation cascade.[7]

Stasis, endothelial injury, and coagulation abnormalities such as elevated D-dimer, fibrinogen, von Willebrand factor (VWF) antigen, and factor VIII activity are pathogenetic mechanisms of the development of hypercoagulopathy in COVID-19 disease. [8]

Transthoracic echocardiography provided us with the basic information needed for most patients, but there are specific conditions in which TEE is the modality of choice. TEE provides the information needed to provide

the best and safest care possible for critically ill patients.[9] In our patient, we indicated cardiac CT and MR to evaluate the mass in the right atrium. CT is useful for the evaluation of tumors and thrombotic masses, at the expense of radiation exposure [10], while CMR has an excellent contrast resolution that allows superior soft tissue characterization.[11]

**Conclusions:** Cardiac imaging modalities, including transthoracic or transesophageal echocardiography, cardiac magnetic resonance, cardiac computed tomography, and 18 Ffluorodeoxyglucose positron emission tomography have a complementary and reinforcing role for the evaluation of cardiac masses.[12]

## Conflicts of Interest

There are no conflicts of interest.

## Abbreviations

**COVID 19:** Coronavirus disease 19

**CT:** computed tomography

**CMR:** Cardiac magnetic resonance

**TEE:** transesophageal echocardiography

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