



# Cardiac Surgery for Active Infective Endocarditis of Mitral Valve after Recent COVID-19 Infection

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## Abstract

Coronavirus Disease 2019 (COVID-19) pandemic resulted in a global public health crisis. Only urgent and emergent operations have been performed globally to prevent widespread transmission of COVID-19. It was difficult for clinicians to decide whether to operate on patients who had a history of recent COVID-19 infection and pneumonia, even in urgent cases. We report a case of successful urgent surgical management of active infective endocarditis for a patient who had been treated for pneumonia due to COVID-19 three weeks before cardiac surgery.

**Keywords:** COVID-19; Infective endocarditis; Cardiac surgery

## Introduction

Coronavirus Disease 2019 (COVID-19) emerged as a pandemic and resulted in a public health crisis worldwide. Almost all elective cardiac surgeries were postponed during the pandemic in order to reduce transmission and only urgent and emergent cardiac surgeries were being performed. The decision to perform emergent surgery for patients with recent COVID-19 infection is difficult, particularly because this disease remains an unknown disease entity in the setting of urgent cardiac surgery [1-3]. We present a case of a patient with active Infective Endocarditis (IE) who underwent urgent cardiac surgery in the setting of a recent COVID-19 infection.

## Case Presentation

The patient was a 67-year-old woman who had been hospitalized for 3 weeks due to COVID-19 pneumonia. She was intubated and required mechanical ventilation support for 6 days for severe pneumonia. After 3 weeks of intensive care, the patient recovered and was discharged home. Three days before discharge from the hospital, she presented with high fever, and oral antibacterial therapy was started because the blood culture grew Methicillin-Sensitive *Staphylococcus aureus* (MSSA). She was doing well after discharge from the hospital, but continued to experience occasional fever spikes. Two weeks after discharge from the hospital, she presented with high-grade fever (40°C), and blood culture was positive for MSSA. There were no obvious findings related to recurrence of pneumonia and repeat COVID-19 Polymerase Chain Reaction (PCR) test was negative. Trans-thoracic echocardiography revealed large mobile vegetation on the posterior mitral valve leaflet with trivial mitral regurgitation (Figure 1). Magnetic resonance imaging showed multiple small cerebral infarctions, although no obvious neurological deficits were observed.

Chest computed tomography revealed resolution of pneumonia and scarring after a recent COVID-19 infection (Figure 2). The patient did not require oxygen for maintaining saturation. Therefore, after two negative PCR results for COVID-19, emergent cardiac surgery was planned for active IE to decrease the risk of embolic events 3 weeks after the patient recovered from COVID-19 infection.

Under general anesthesia, thoracotomy was performed through the right 4<sup>th</sup> intercostal space. Cardiopulmonary bypass was established with right femoral arterial cannulation and bicaval drainage. The ascending aorta was cross-clamped through the right intercostal space, and cardiac arrest was achieved by antegrade cardioplegic infusion into the aortic root. The mitral valve was inspected through a right-sided left atriotomy. The appearance of active IE was obvious with vegetation on the posterior mitral leaflet without annular abscess. The vegetation was removed concomitantly with leaflet tissue, and the defect of the posterior mitral leaflet was closed with a pericardial patch (Figure 3). Mitral valve repair was performed without using the mitral annular

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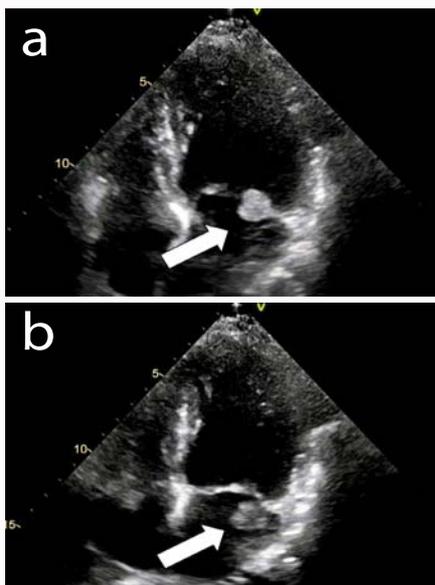
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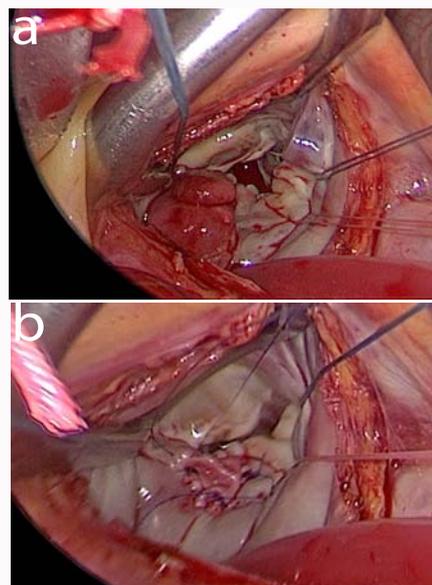
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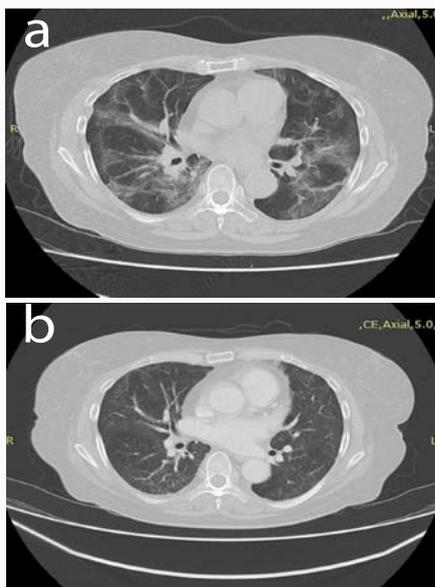
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**Figure 1:** Echocardiography demonstrated the large mobile vegetation on the posterior mitral leaflet (arrow).



**Figure 3:** Intraoperative appearance of the mitral leaflet. (a) There was large vegetation on the posterior mitral leaflet. (b) The vegetation was removed concomitantly with mitral leaflet and the defect was closed with a pericardial patch.



**Figure 2:** (a) Thoracic Computed Tomography (CT) showing bilateral extensive alveolar interstitial infiltration during pneumonia due to active COVID-19 infection. (b) Pre-operative thoracic CT scan showing no obvious findings related to recurrence of pneumonia.

ring. Weaning from cardiopulmonary bypass was uneventful, and the patient was discharged from the hospital after receiving 3 weeks of antibiotic therapy.

## Discussion

The novel coronavirus, known as severe acute respiratory syndrome coronavirus 2, has significantly impacted the global economy, politics, and health. On March 11<sup>th</sup>, 2020, the World Health Organization declared COVID-19 a pandemic, which resulted in a public health crisis worldwide. Almost all elective cardiac surgical operations were postponed with only urgent and emergency operations being performed globally. The decision to operate in emergency patients with active/recent COVID-19 infection is difficult

as COVID-19 is an unknown disease entity and predicting outcomes of emergent cardiac surgery in such cases is difficult [1-3]. Therefore, this report is unique because it showcases that urgent cardiac surgery for active IE can be successfully performed in the setting of a recent COVID-19 infection.

As the COVID-19 pandemic continues, COVID-19 occurring simultaneously with other diseases will become more common in daily practice [4,5]. At present, the literature provides limited evidence regarding the management of patients with COVID-19 and IE. The COVID-19 pandemic has also presented new challenges for the diagnosis and treatment of cardiovascular diseases [1,3-5]. Patients with COVID-19 most commonly present with fever and cough and can have an array of nonspecific complaints. There is a symptom overlap with other cardiovascular conditions such as acute coronary syndrome, decompensated heart failure, non-COVID-19 myocarditis, and IE [4-6].

These factors may further complicate the management of patients with active IE for several reasons [2,4,5]. First, both active IE and COVID-19 infection may present with similar symptoms, such as shortness of breath, fatigue, and fever, as well as nonspecific laboratory results and similar chest roentgenogram findings. Additionally, both diseases may present with relatively rapid decompensation and may affect seemingly healthy individuals. In our case, it was not immediately clear which disease process was causing the patient's symptoms: Recent COVID-19 respiratory infection that had resolved, bacterial IE with pulmonary congestion from mitral regurgitation, or some combination of the two conditions. Testing for multiple conditions from the beginning is critical for a timely diagnosis. Active IE was easily detected on echocardiography; and blood culture positive for MSSA further supported this diagnosis. However, determining the appropriate time to operate was difficult. The mobile vegetation and embolic events confirmed the need for emergent surgery when no evidence of recurrence of pneumonia was found and COVID-19 PCR results remained negative.

A previous study confirmed that large vegetation size, repeat embolic events, decompensated heart failure due to severe mitral/aortic regurgitation, and possible occurrence of early annular abscess should be considered as indications for emergent surgery for active IE, which is associated with reduced embolic events and mortality rather than non-surgical therapy [6-8]. Our patient presented with active IE with large mobile vegetation and multiple cerebral infarctions. The impact of invasive surgery under general anesthesia on a patient who has recently recovered from pneumonia is unknown. In particular, we do not know the impact of cardiac surgery using a heart-lung machine in the setting of recent COVID-19 pneumonia. Therefore, our case highlights that patient with active IE can successfully undergo cardiac surgery *via* right thoracotomy, which is less invasive compared to median sternotomy, in the setting of recent COVID-19 pneumonia.

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