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## Brief Communication

# Dilemmas in managing acute myocardial infarction during Covid-19 pandemic



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## ABSTRACT

A 38-year-old man presented to emergency department with dizziness, dyspnea and diarrhea for 5 days. Serum lab data revealed lymphopenia and computed tomography imaging of the chest exhibited multiple ground-glass patches in bilateral lung fields. COVID-19 was suspected and further examination was done. But patient's dyspnea progressed while waiting for the result of COVID-19 examination and respiratory failure with cardiac arrest occurred eventually, acute myocardial infarction was diagnosed then. This article is aimed to discuss the dilemmas in managing acute myocardial infarction during COVID-19 pandemic.

The outbreak of the novel coronavirus (coronavirus disease 2019, COVID-19), which began in the Hubei Province of China, in late 2019, has spread globally. On 11 March 2020, the World Health Organization declared a pandemic, with now more than 1.5 million infections and 90,000 deaths reported worldwide [1]. The ongoing COVID-19 pandemic has already overwhelmed the health care systems of several countries. Consequently, under extreme stress to cope with COVID-19, frontline healthcare workers would possibly misdiagnosis and delay the treatment of other serious diseases which can be life threatening. The patients with COVID-19 infection could manifest with initial presentation from asymptomatic to pneumonia, conjunctivitis, enteritis, or myocarditis [2–6]. However, several diseases could also mimic COVID-19 infection with multiple ground-glass opacities or consolidation in the computed tomography of chest such as decompensated

heart failure with acute pulmonary edema or interstitial lung disease, etc [7,8]. Herein, we described a patient with acute myocardial infarction was presumed to have been infected with COVID-19 while hospitalized.

## Case discussion

A 38-year-old man presented to emergency department with 1-day history of dizziness and dyspnea. The patient also reported 5-day history of diarrhea prior to presentation. He denied chest pain, orthopnea, cough, sore throat, expectoration, fevers or chills. His medical history was unremarkable. He had smoked 8–10 cigarettes per day for the past 10 years and did not consume alcohol or use illicit drugs. He had no recent overseas travel history, and no known sick contacts. Family

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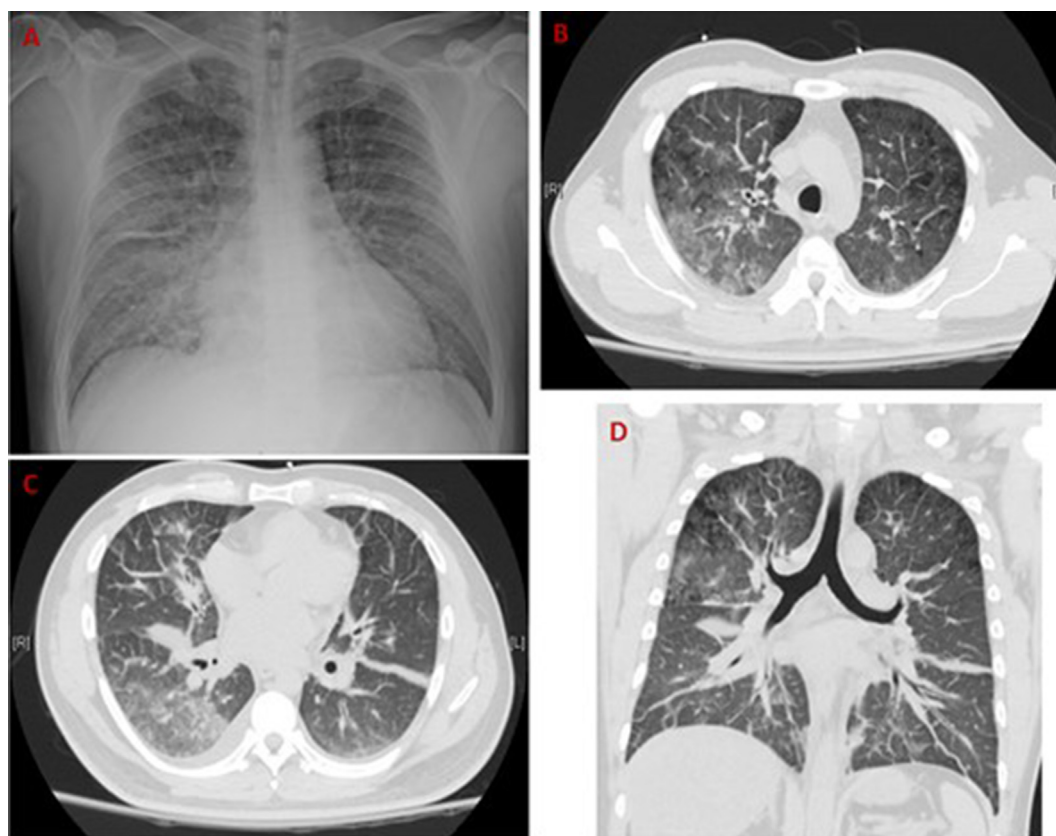


Fig. 1 Chest Radiographs and Computer Tomography (CT) Images of a 38-Year-Old Man who Presented with Dyspnea. An anteroposterior view of the chest (Panel A) shows hazy opacities in both lungs. Horizontal (Panels B and C) and vertical (Panel D) CT images show multiple ground-glass patches in bilateral lung fields.

history was remarkable for coronary artery disease. Physical examination was otherwise unremarkable, including breath sounds on chest auscultation. Blood workup revealed white blood cells (WBC) count of  $18.3 \times 10^9/L$ , Lymphocyte 12.4% (normal range 20–56%), Creatinine 1.4 mg/dL (eGFR 58 mL/min), C-reactive protein (CRP) of 1.4 mg/L (normal range <5.0 mg/L) and troponin-I 0.373 ng/mL (normal range <0.3 ng/dL). Chest radiography revealed cardiomegaly with pulmonary congestion [Fig. 1A], but electrocardiography revealed no evidence of acute myocardial infarction [Fig. 2A] and echocardiography did not reveal evidence of abnormal wall motion, thus type 2 myocardial infarction was suspected and further evaluation was suggested.

Computed tomography (CT) imaging of the chest exhibited multiple ground-glass patches in bilateral lung fields [Fig. 1B–D]. SARS-CoV-2 infection was suspected. A nasopharyngeal swab specimen was obtained and sent for detection of Covid-19 Ribonucleic Acid. The patient received conservative care, including venturi mask with 50% fraction of inspired oxygen and aspirin.

During the next seven hours, the patient's dyspnea progressed and the oxygen saturation dropped to <90% despite the patient was receiving supplemental oxygen. Endotracheal intubation was performed. Cardiac arrest occurred during intubation, while achieved return of spontaneous circulation after 4-min cardiopulmonary resuscitation. Profound shock and hypoxemia despite invasive mechanical ventilation and

vasopressors were used. Veno-arterial extracorporeal membrane oxygenation (ECMO) was implanted for cardiopulmonary support. Electrocardiography followed revealed suspicion of posterior wall myocardial infarction [Fig. 2B] and the troponin-I level increased to 8.2 ng/mL. Transthoracic echocardiography, performed after ECMO implantation, revealed abnormal left ventricular posterior wall motion. Fifteen hours after presentation, coronary angiography was performed, revealed three-vessel coronary artery disease with total occlusion of left circumflex coronary artery. Primary angioplasty and thrombectomy of left circumflex coronary artery was successfully performed. Acute posterior wall ST-elevation myocardial infarction, Killip IV complicated by cardiogenic shock was diagnosed eventually. The patient was then admitted to cardiac intensive care unit (CCU) for management. The nasopharyngeal swab tested negative for COVID-19 by real-time reverse-transcription–polymerase-chain-reaction assays. At the writing of this article on April 12, 2020, the patient was still in CCU but had successfully weaned from ECMO after revascularization.

The most commonly reported CT findings in COVID-19 were single or multi-lobe ground-glass opacification and/or patchy consolidative opacities. As the number of COVID-19 cases is continuously rising, healthcare staffs are extremely stressed when managing those suspected cases. The dilemma is for the patient who is awaiting COVID-19 test results that may delay the treatment from a potentially reversible cause of life-



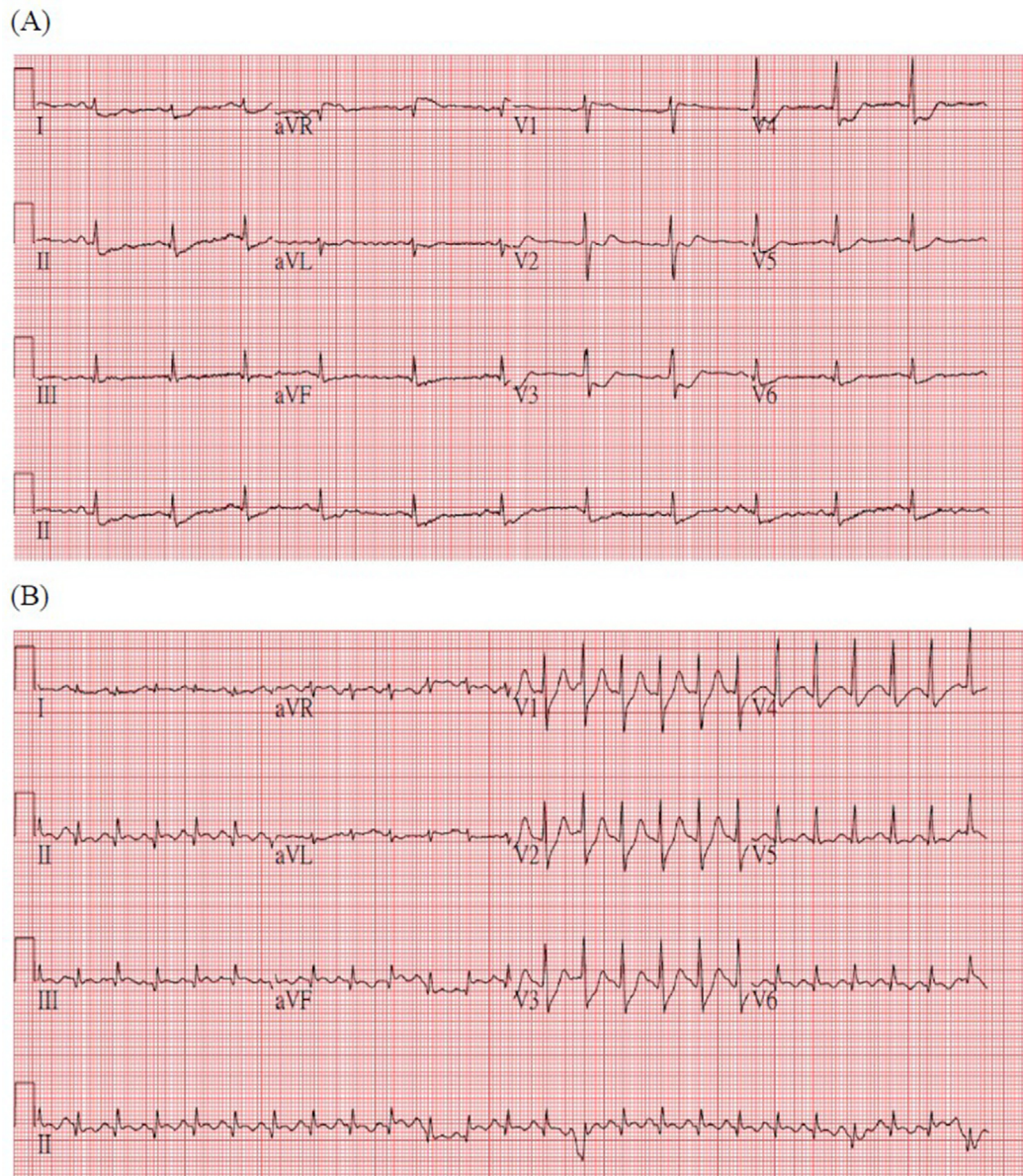


Fig. 2 Serial change of electrocardiography. Panel A revealed no evidence of acute myocardial infarction and panel B revealed ST-segment depression over V1–V3, with the suspicion of posterior wall myocardial infarction.

threatening disease. In these circumstances, the decision will always be difficult. While consider the safety of not only the patient but also the clinician, the medical staffs should wear full personal protective equipment during the care or specific interventions for suspected case in the COVID-19 era.

## Conclusion

During COVID-19 pandemic, there is a dilemma that patient may delay the diagnosis or treatment from a reversible critical ill condition, and medical staff who manage those patients should be equipped with a proper personal protective equipment.

## Conflict of interest

There is no conflict of interest.

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