

Delayed presentation of acute coronary syndrome with mechanical complication during COVID-19 pandemic: a case report

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Background

The World Health Organization declared coronavirus disease 2019 (COVID-19) a global pandemic on 11 March 2020. We report a patient with acute myocardial infarction (AMI) who presented late due to fears of contracting COVID-19.

Case summary

A 65-year-old man with a history of hypertension presented late to the emergency department (ED) with AMI. He gave a 2-month history of exertional angina but avoided seeking medical consult due to fears of contracting COVID-19. On the day of admission, he had 4 h of severe chest pain before presenting to the ED. He was hypotensive and tachycardic on arrival. Electrocardiogram showed inferolateral ST-elevation myocardial infarction. Chest radiograph revealed widened superior mediastinum and bedside echocardiogram revealed inferoseptal and inferolateral hypokinesia with features of cardiac tamponade. An urgent computed tomography aortogram showed possible left ventricular (LV) wall perforation with resulting haemopericardium and cardiac tamponade. Subsequent coronary angiogram showed 100% occlusion of mid left circumflex artery and a contained LV wall rupture was confirmed with LV ventriculogram. He was transferred to a tertiary centre and underwent successful emergency surgical repair.

Discussion

Our index case demonstrates the impact of the COVID-19 pandemic on health seeking behaviour due to fears of contracting COVID-19 and the ensuing impact of delayed medical intervention. Cardiologists worldwide are seeing an alarming rate of rare complications of AMI in patients who present late. Physicians need to be aware of this phenomenon and have an active role to play in public education.

Keywords

Acute coronary syndrome • Case report • COVID-19 • Mechanical complication

Learning points

Physicians should:

- Have an awareness of the impact of coronavirus disease 2019 on patients' health seeking behaviour.
- Adopt a low threshold of clinical suspicion for rare mechanical complications of acute myocardial infarction as a result of delayed presentation.

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Introduction

Viral pneumonia outbreaks caused by severe acute respiratory syndrome coronavirus 2 which originated from Wuhan, China in December 2019 has escalated to become a global pandemic. As of 18 October 2020, there have been more than 39 million confirmed cases of coronavirus disease 2019 (COVID-19) and more than 1 million deaths reported.¹

The COVID-19 pandemic has impacted healthcare delivery worldwide. Many countries have reported a significant decline, of up to 40%, in acute myocardial infarction (AMI)-related hospitalizations during this pandemic with an alarming pattern of delayed myocardial infarction (MI) presentations and their associated cardiac complications.^{2,3} Another recent study⁴ has shown that patients were more likely to die from AMI when compared with pre-pandemic times.

It is postulated that hospital admissions³ for acute coronary syndrome (ACS) have reduced significantly during the pandemic due to the perception that the hospital is a high-risk place to contract COVID-19 infection.

Diagnosis and treatment of ACS, especially ST-elevation myocardial infarction (STEMI) start from the point of first medical contact. Ischaemic time duration is a major determinant of infarct size and survival in patients with STEMI. Hence, prompt activation of emergency medical services leading to early recognition and treatment is crucial to reduce the mortality and morbidity related to ACS.⁵ We report a patient with ACS who presented late during the COVID-19 pandemic due to medical care avoidance behaviour. He did not have any signs and symptoms of COVID-19 and was diagnosed to have left ventricular (LV) posterolateral wall contained rupture and underwent a successful emergency surgical repair.

Timeline

Timeline	Event
2 months before admission	<ul style="list-style-type: none"> Developed angina on exertion but avoid medical consult due to fears of contracting coronavirus disease 2019 (COVID-19) infection from hospital visit
3 days before admission	<ul style="list-style-type: none"> Developed angina at rest but did not seek medical attention
On admission	<ul style="list-style-type: none"> Presented with severe resting chest pain for 4 h prior to admission Brought in by the ambulance to the emergency room hypotensive and tachycardic
0.5 h after admission	<ul style="list-style-type: none"> Electrocardiogram showed features of inferolateral ST-elevation myocardial infarction Bedside transthoracic echocardiogram (TTE) showed inferoseptal and inferolateral

Continued

Continued

Timeline	Event
1 h after admission	<ul style="list-style-type: none"> hypokinesia with echocardiographic features of cardiac tamponade An urgent computed tomography aortogram showed possible perforation of the left ventricular (LV) wall resulting in haemopericardium and cardiac tamponade
1–2 h after admission	<ul style="list-style-type: none"> Coronary angiogram revealed 100% occlusion of mid left circumflex artery Left ventriculogram showed small LV pseudoaneurysm, likely from a contained LV wall rupture Transferred to tertiary centre for urgent surgical repair
4 h after admission	<ul style="list-style-type: none"> Successful LV free wall rupture repair with a bovine pericardial patch and cardiac tamponade drainage
Day 12	<ul style="list-style-type: none"> Post-operative TTE showed LV ejection fraction of 50% with wall motion abnormalities in the septum and lateral wall and mild pericardial effusion
Day 20	<ul style="list-style-type: none"> Patient medically fit and discharged
4 months after (follow-up)	<ul style="list-style-type: none"> Patient is well and asymptomatic with regular follow-up scheduled

Case presentation

A 65-year-old man with a known history of hypertension presented to the emergency department (ED) with a 3-day history of chest pain with the worst onset of chest pain occurring just few hours before admission. On further questioning, patient had experienced exertional angina for 2 months prior to ED visit. He had deliberately avoided medical consultation due to fear of contracting COVID-19 from hospital visit.

On arrival at the ED, his blood pressure was 93/72 mmHg with heart rate of 120 beats per minute. He had a low grade fever of 37.9°C. On examination, there were reduced air entry in bilateral lung bases. Heart sounds were dual with no audible murmurs. There were no radio-radial or radio-femoral delays. Electrocardiogram showed ST-elevation in the inferolateral leads (*Figure 1*) and high-sensitivity troponin level was elevated at 13 852 ng/L (normal value 18 ng/L). Chest X-ray showed widened superior mediastinum (*Figure 2*). Transthoracic echocardiogram revealed hypokinesia in the inferoseptal and inferolateral walls with moderately depressed LV ejection fraction of 40%. A moderate size global pericardial effusion was seen with right atrial collapse (*Video 1*) and plethoric inferior vena cava. He remained hypotensive in the ED despite intravenous

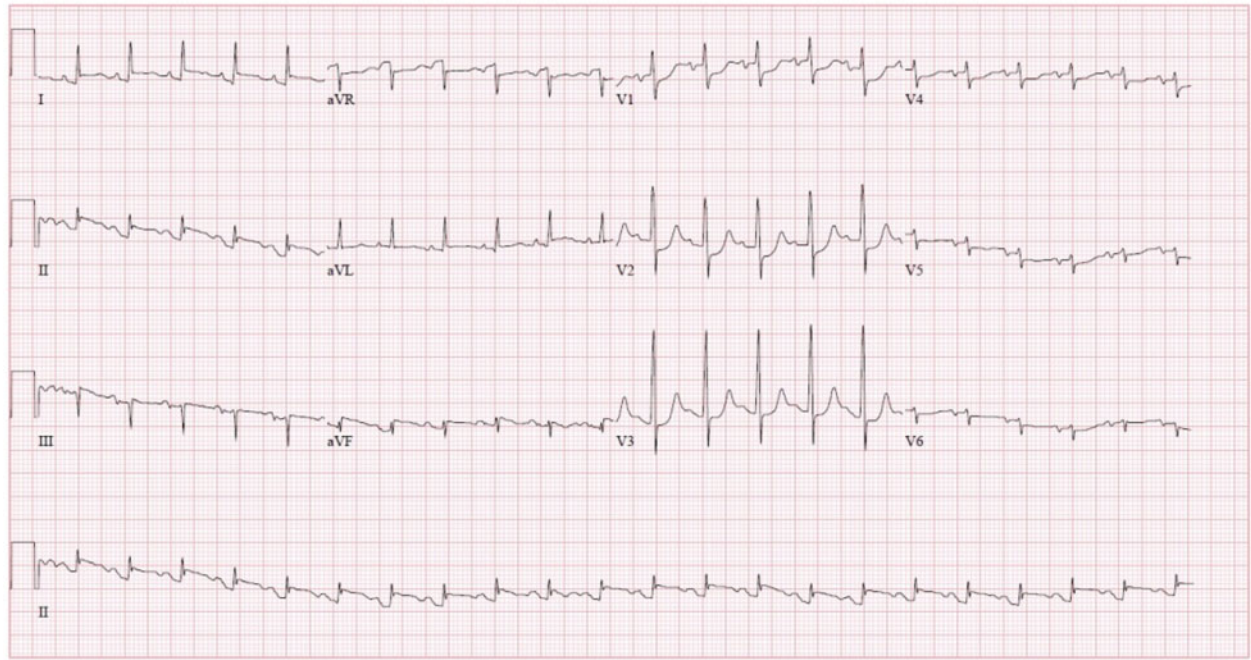


Figure 1 Electrocardiogram showing inferolateral ST-elevation myocardial infarction.



Figure 2 Chest radiograph showing widened superior mediastinum.



Video 1 Transthoracic echocardiogram demonstrating a moderate size global pericardial effusion with features of cardiac tamponade in subcostal view.

fluid challenge and was started on intravenous noradrenaline. Urgent computed tomography aortogram was performed to rule out aortic dissection. This showed contrast leakage at posterolateral LV free wall suggesting possible perforation of the LV wall resulting in haemopericardium and cardiac tamponade (Figure 3A and B).

The working diagnosis was a delayed presentation of inferoposterior MI with LV wall rupture and cardiac tamponade. Coronary angiogram showed 100% occlusion of the mid left circumflex artery (Video 2). Left ventriculogram (LVgram) showed a small LV pseudoaneurysm (LVP) likely from a contained LV wall rupture (Video 3). An intra-aortic balloon pump was inserted for haemodynamic support. He was immediately transferred to a tertiary centre with cardiothoracic surgery services for emergency surgical repair and drainage of the cardiac tamponade. Operative findings revealed extensive posterolateral infarct of LV wall and a ruptured

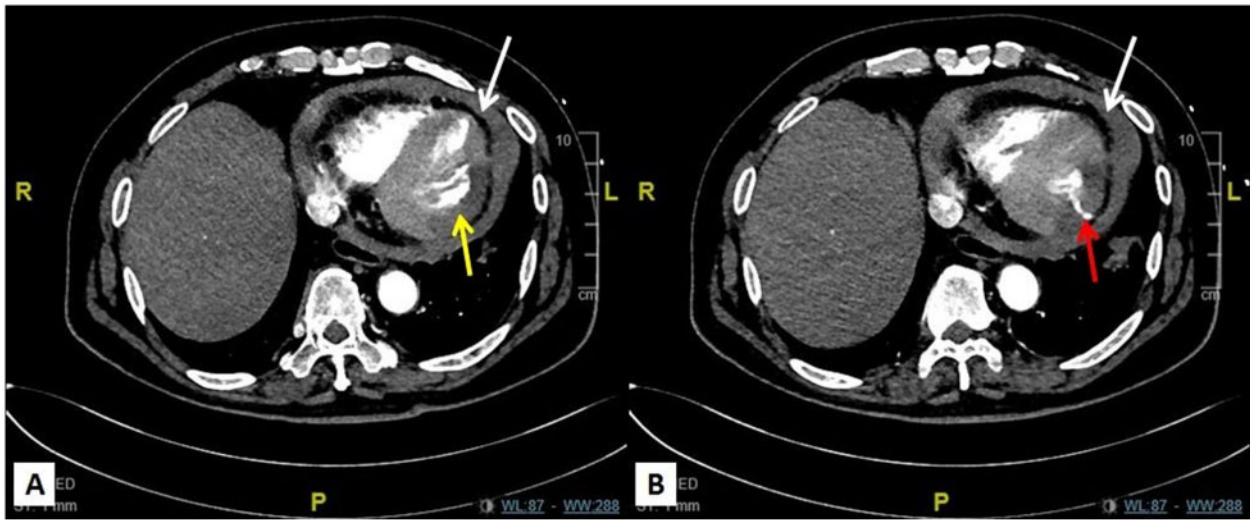


Figure 3 Computed tomography aortogram showing hypoenhancement of the posteroinferior wall of the left ventricle suggesting possible myocardial infarction (A, yellow arrow). There was a transmural linear track of contrast seen extending from the lumen to the left ventricular wall raising concern for possible perforation of left ventricular wall (B, red arrow). Moderate haemopericardium seen with mild compression of right ventricle in keeping with cardiac tamponade (white arrow).



Video 2 Coronary angiogram showing acute thrombotic occlusion of mid left circumflex artery.



Video 3 Left ventriculogram showing left ventricular pseudoaneurysm.

site covered in fibrin and clots with minimal oozing. This was repaired successfully with a bovine pericardial patch (Figure 4). His condition stabilised post-operatively and he was discharged from hospital on Day 20. He remained clinically well and asymptomatic at 4 months of follow-up.

Discussion

We described a patient with STEMI who presented late with mechanical complication of MI. LVP⁶⁻⁸ forms when there is a contained rupture of the left ventricle by adherent pericardium, thrombus or scar tissue. LVP can be clinically silent in 12% of patients and the most

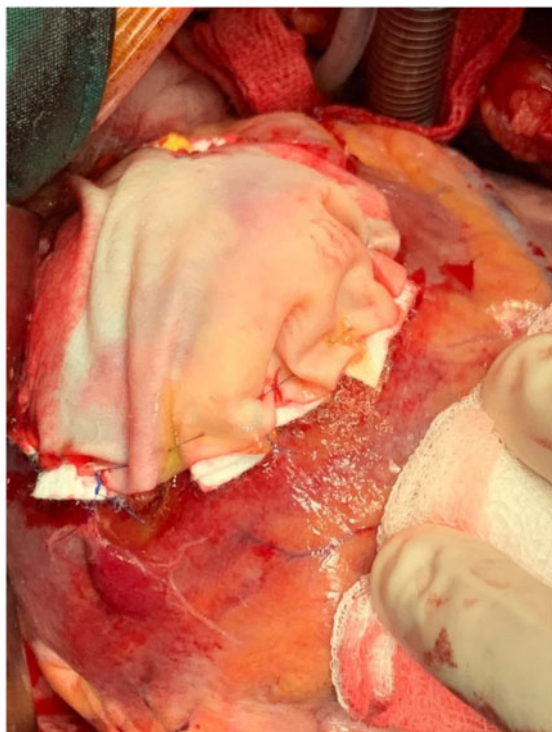


Figure 4 Intraoperative picture of posterolateral left ventricular wall ruptured site covered with bovine pericardial patch.

common symptoms at presentation⁹ include dyspnoea, chest pain, and congestive heart failure.

The most common aetiology of LVPs is MI. It is however a rare complication of MI, with a reported incidence of 0.2–0.3%. Inferior MI accounts for twice as many cases of LVPs compared to anterior MI. This finding is consistent with the most common reported location of LVPs which are the posterior, lateral, apical or inferior surface of LV wall. LVPs are best diagnosed with LVgram during coronary angiography, which is crucial for planning of subsequent surgical intervention. Untreated LVPs are prone to rupture with the reported risk as high as 30–45%. The mortality rate for conservative management of LVPs is 50%. Therefore, early surgical intervention¹⁰ is highly recommended.

COVID-19 was declared a pandemic by the World Health Organization on 11 March 2020 and has imposed an enormous strain on healthcare systems worldwide.¹¹ Decreased utilization of healthcare services for acute conditions by non-COVID-19 patients have also been reported and attributed to the public's concerns about contracting the virus.

Our index case demonstrates the psychological impact of COVID-19 pandemic on health seeking behaviour in our local population. Access to healthcare requires both the availability of services as well as the patient's ability to recognize their need for medical attention. Patient's unconfirmed beliefs about the mode of transmission of disease, perceived severity and susceptibility of illness have contributed to medical avoidance behaviour.¹² In this particular case, the patient's

preconceived fear of acquiring COVID-19 resulted in significant delay in seeking medical attention for his life-threatening condition.

This is consistent with a recent paper from Hong Kong¹³ which reported significant delay in time from symptom onset to first medical contact (median time of 318 min) during the COVID-19 pandemic compared to the time before pandemic (median time of 82.5 min during office hour and 91.5 min during non-office hours). Although some patients with ACS presented late as demonstrated by our index case, there is a greater concern for those do not seek medical help at all.

These patients will likely suffer unnecessary morbidity and mortality without proper ACS management. Cardiologists worldwide are seeing an alarming increase in rare complications¹⁴ of untreated ACS which include ventricular septal defects from transmural infarcts, papillary muscle rupture, LV aneurysm, and thrombus. A recent publication¹⁵ from Lombardy, Italy reported 58% increase in the number of out-of-hospital cardiac arrests in the first 40 days of the COVID-19 pandemic compared to 2019. It may not be possible to differentiate between the cardiac arrests caused by complications of COVID-19 and those that are a result of hospital avoidance but the authors estimate that COVID-19 accounts for 77.4% of the increase.

Hence, proper public education by healthcare providers worldwide through traditional media channels/social media is extremely crucial in ensuring individuals with symptoms suggestive of ACS seek prompt medical evaluation and timely medical intervention.

In conclusion, our index case demonstrates the impact of COVID-19 pandemic on health seeking behaviour of patients and the ensuing collateral damage. Physicians worldwide need to be aware of this phenomenon and be more vigilant. A high index of clinical suspicion is needed to look for mechanical complications of AMI especially for those who presented late and haemodynamically unstable.

Lead author biography



Dr Joo Hor Tan graduated from University of Edinburgh in 2013. He obtained her Masters of Medicine and MRCP (UK) in 2016. He completed his internal medicine residency training in 2019 and is currently a second year senior resident in Department of Cardiology, Tan Tock Seng Hospital.

Supplementary material

Supplementary material is available at *European Heart Journal - Case Reports* online.

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Slide sets: A fully edited slide set detailing this case and suitable for local presentation is available online as [Supplementary data](#).

Consent: The authors confirm that written consent for submission and publication of this case report including images and associated text has been obtained from the patient in line with COPE guidance.

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