CASE REPORT

An Unusual Presentation of Acute Pericarditis in a Young COVID-19 Patient: a Case Report.

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Abstract

COVID-19 is a worldwide pandemic, even in the year 2022. Extrapulmonary manifestations are rare, especially cardiovascular involvement. Our case report described a teenage boy with positive COVID-19 who presented with symptoms suggestive of acute pericarditis. An echocardiogram revealed mild loculated pericardial effusion. He was treated with oral colchicine 0.5mg BD for two weeks, and repeated ECG showed resolution of the ECG changes. He remained asymptomatic throughout the admission and during follow-up. More studies are needed to understand the cardiac involvement in COVID-19 to provide better treatment in the future.

Keywords: *COVID-19, pericarditis, colchicine, pericardial effusion.*

Introduction

Severe Acute Respiratory Syndrome Coronavirus (SARS-CoV-2), better known as COVID-19, has become a pandemic worldwide for the past two years. The World Health Organization (WHO) has reported 265,706,115 new cases of COVID-19, with an alarming rate of 5,232,562 death so far (1). In addition, Malaysia has confirmed as many as 2,654,474 new cases with 30,574 deaths (2). The clinical presentation is broad, but the patient usually presents with pulmonary symptoms like coryza, dyspnea, and cough. There are also extrapulmonary manifestations of COVID-19 involving gastrointestinal, renal, hematological, and cardiovascular systems (3). Cardiac involvement of COVID-19 may vary from acute coronary syndrome to pericarditis. Additionally, acute pericarditis as the main presentation of COVID-19 in adolescents is rare, and only a few cases have been reported previously (4, 5) .

Therefore, we report an unusual presentation of an adolescent who is positive for COVID-19 with acute pericarditis without pulmonary symptoms.

Case presentation

MS is a 16-year-old Malay schoolboy with no known comorbid. He was initially admitted with complaints of runny nose, cough, and fever for one day. Otherwise, there was no chest pain, dyspnea, or gastrointestinal symptoms. Upon admission, the patient's blood pressure (BP) was 139/74 mmHg , tachycardia with a heart rate (HR) of 125 beats per minute, and afebrile. Other clinical examinations were unremarkable. Both his COVID-19 saliva test and polymerase chain reaction (PCR) tests were positive . An initial electrocardiogram (ECG) revealed sinus tachycardia [Figure 1], no acute ischemic changes, and his high-sensitivity cardiac troponin (hs-cTn) was 5.04 ng/L (normal less than 14ng/L).

Initial laboratory investigations revealed an average white cell count of 8.0×10^9/L (normal value 4.5 to 11.0 $\times$ 10^9/L) with absolute lymphocyte count (ALC) of 0.9 $\times$ 10^3 cells/µL (normal $\geq$ 1.0 $\times$ 10^3 cells/µL), normal haemoglobin level of 14.9 g/dL (normal $\geq$ 14 g/dL for men) and platelet level of 235 $\times$ 10^9/L (normal 150 to 400 $\times$ 10^9/L). His c-reactive protein (CRP) was less than 4 mg/L (Normal: Less than 10 mg/L) and his chest x-ray revealed no ground glass opacity. Subsequently, the patient was admitted for COVID-19 category two.

However, given persistent tachycardia, serial ECGs were repeated and revealed widespread concave ST elevation at lead II, III, AVF, V4-V6 [Figure 2]. Furthermore, repeated hs-cTn was normal. 2D echocardiogram revealed left ventricular ejection fraction (LVEF) of 60%, loculated effusion at the right atrium of 0.8cm, with no evidence of cardiac tamponade, dilated left atrium, and mild mitral regurgitation (MR) and tricuspid regurgitation (TR).

Based on these findings, the patient was diagnosed with acute pericarditis. He was started on oral colchicine 0.5mg twice daily for two weeks. Throughout admission, the patient remained asymptomatic, and the vital signs remained stable. He was discharged after 14 days. During follow up two weeks after discharge, he remained asymptomatic, and a repeated echocardiogram showed complete resolution of pericardial effusion, with preserved EF of 60% and mild MR and TR. Repeated ECG noted mild resolution of widespread ST elevation at inferolateral leads [Figure 3] compared to previous ECG. Serial blood investigation (Table 1) for common causes of acute pericarditis such as human immunodeficiency virus (HIV), hepatitis B, hepatitis C, Epstein-Barr Virus (EBV), Cytomegalovirus (CMV) and Herpes SimplexVirus (HSV) all came out negative. His autoimmune screening (i.e., antinuclear antibody (ANA), C3C4, rheumatoid factor (RF)) also were negative, while patient was still admitted in the ward. He was again reviewed one-month post-COVID, in which he remained asymptomatic,

and his ECG returned to sinus rhythm. Thus, he was subsequently discharged.

Discussion

According to the European Society of Cardiology (ESC) 2015, acute pericarditis is defined as an inflammatory pericardial syndrome with at least two criteria: i. pericarditic chest pain, ii. pericardial rub, iii. new widespread ST elevation, or iv. PR depression on ECG or pericardial effusion (new or worsening)(6). This patient had a characteristic ECG pattern with the presence of pericardial effusion.

Acute pericarditis in adolescence, even before COVID-19 is a rare entity. It was estimated that the incidence of acute pericarditis, pre-COVID-19 era was around 0.7 per 1000 in-patients between 2010 to 2019 in Korea, as described by Park *et.al* (7). Hence, it is not uncommon that the data on clinical spectrum of COVID-19, especially in adolescence, remains scarce. To our knowledge, only one paper described this previously. Dimitra *et.al* described two cases of acute pericarditis in a 15 and 16 year-old teenager whom were diagnosed with COVID-19, presenting mainly with chest pain (4). Most of adolescence with acute pericarditis presented with chest pain, only 30% had no chest pain, as portrayed in our case (5). The exact pathophysiological mechanism involving the pericardium in COVID-19 infection is not fully understood. The possible mechanisms behind this could be the direct replication of the virus itself or the inflammatory response to the cytokine release in COVID-19. (8) Cardiomyocytes, cardiac fibroblasts, vascular endothelium, and vascular smooth muscle cells all express angiotensin-converting enzyme 2 (ACE2) receptors. When SARS-CoV2 enters the host cells by binding to ACE 2 receptors, it triggers a cytokine storm that causes pericarditis. (8) Viral infection, such as HIV, HSV, EBV and many more, is the commonest aetiology for acute pericarditis; however, in as much as 40-80% of cases, the aetiology is undetermined, mainly due to the difficulty in obtaining the sample, especially in mild cases, as demonstrated in our case (9). Furthermore, our patient did not have any signs or symptoms, nor any laboratory evidence suggesting autoimmune as the aetiology for the acute pericarditis.

The non-steroidal anti-inflammatory (NSAIDs) and colchicine remain the mainstay of treatment for acute pericarditis, even though there is no guideline to support its use in COVID-19 (6, 8, 10). Colchicine is an anti-inflammatory drug, which targets white blood cells (WBC) by inhibiting phagocytosis, motility and degranulations of WBCs, leading to reduced inflammation (11). Even though there is no strong association between NSAIDs in COVID-19 and the worsening of symptoms, we decided to use colchicine only as it is the widely-used treatment in managing such patients (8, 10, 12, 13).

Conclusion

To our knowledge, this is the first paper that described acute pericarditis as the main presentation of COVID-19 in a healthy teenager in Malaysia. This is maybe due to under-reporting. Hence, more studies are needed to investigate this to develop a better understanding and better treatment in the future.

Table 1. Laboratory investigations

Investigations	Results	Normal Value
Thyroid function test (TFT)	TSH 0.453 mIU/L	0.55 – 4.78 mIU/L
	T4 18.07 pmol/L	11.5 – 22.7 pmol/L
Antinuclear antibody (ANA)	Negative	
C3	0.97 g/L	0.82 – 1.85 g/L
C4	0.34 g/L	0.15 – 0.44 g/L
Erythrocyte sedimentation rate (ESR)	7 mm/hr	0 – 20 mm/hr
Rheumatoid Factor (RF)	Negative	
HIV serology	Non reactive	
Hepatitis B surface antigen (HBsAg)	Non reactive	
Hepatitis C antibody	Non reactive	
Epstein Barr Virus IgG	Reactive	
Cytomegalovirus Genome Detection Blood	Not detected	
HSV serology 1	IgG positive, IgM negative	
HSV serology 2	IgG and IgM negative	

HIV: Human immunodeficiency virus, HSV: Herpes Simplex Virus

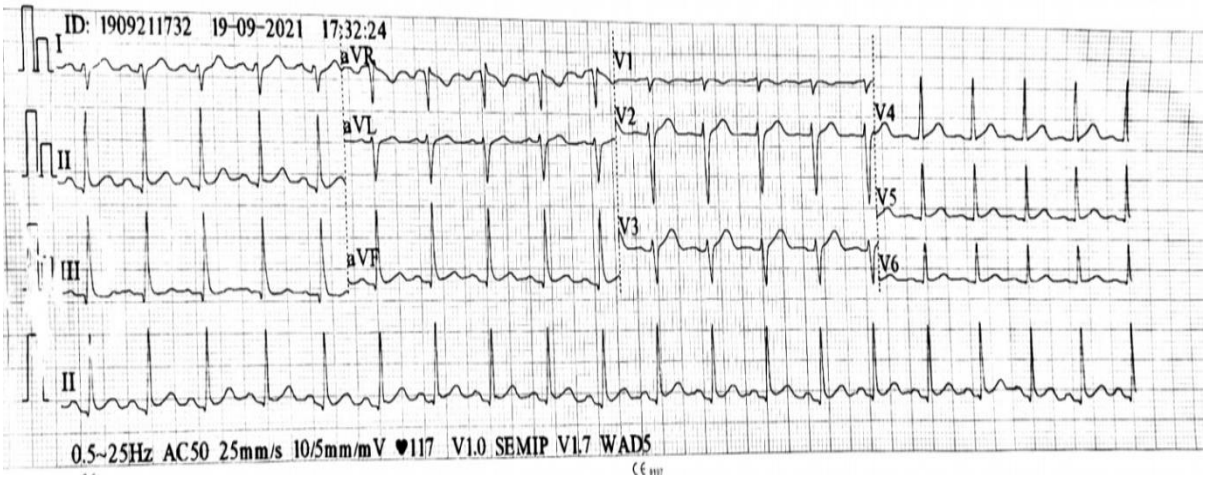

Figure 1. Initial ECG

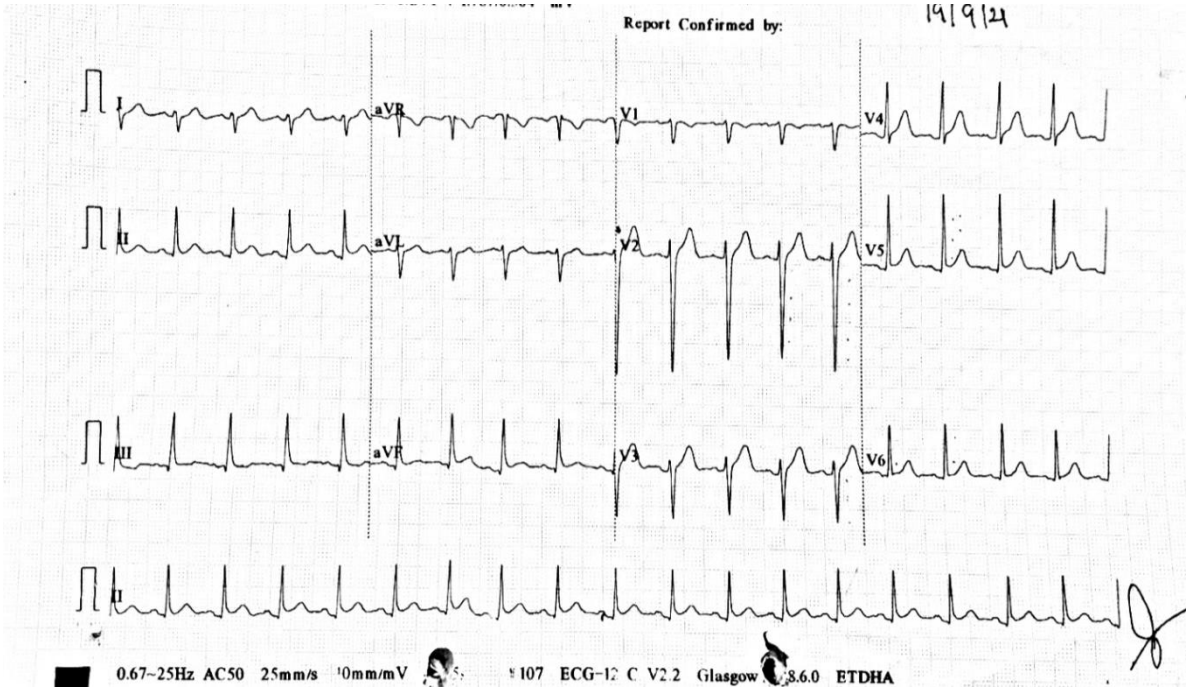

Figure 2. Repeated ECG in the ward which showed ST elevation at inferolateral leads

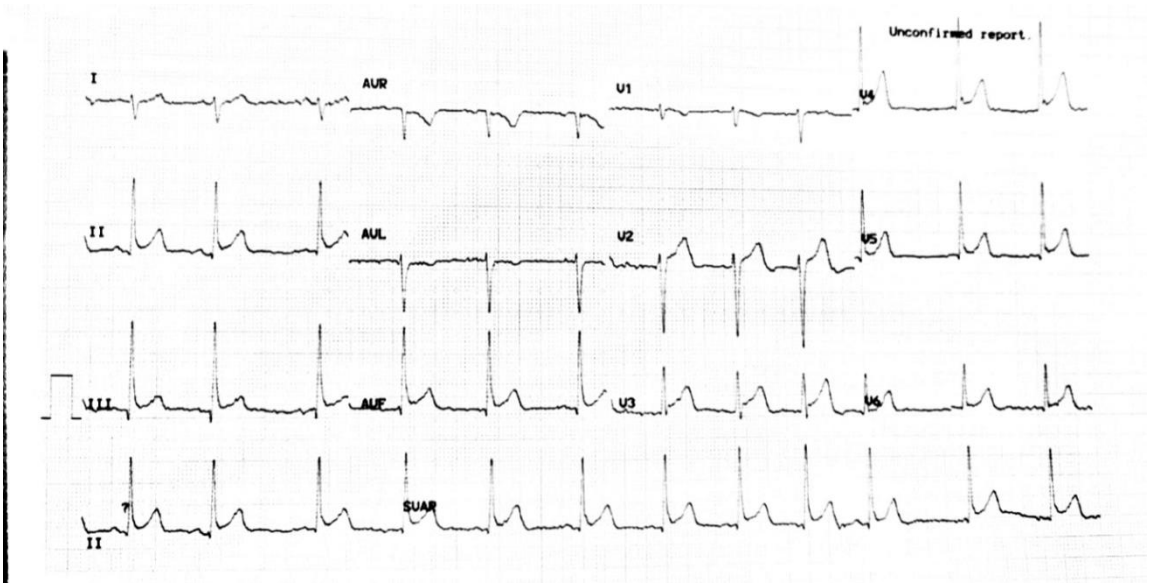

Figure 3. Repeated ECG in the clinic after 1week completion of treatment with colchicine

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