CASE REPORT

Acute myocarditis with accelerated junctional rhythm and cardiogenic shock as a complication of influenza A (H1N1)

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SUMMARY

Respiratory infection is usually manifested as fever, cough, and sore throat, which are the common presentations to health care facilities. It is caused mainly by viruses such as influenza and parainfluenza viruses with seasonal epidemics. Most viral respiratory infections are mild in nature and only require supportive treatment with adequate hydration and rest. However, some may develop complications such as acute respiratory failure requiring ventilatory support and heart failure due to myocarditis and pericarditis. Acute viral myocarditis can manifest with different severity from subtle non-specific changes in the electrocardiogram to life-threatening cardiogenic shock. We report a case of influenza A infection in a young lady complicated with cardiogenic shock due to acute myocarditis with accelerated junctional rhythm and isorhythmic atrioventricular dissociation.

INTRODUCTION

Viral respiratory tract infection is one of the most common acute illnesses worldwide. It has a typical presentation of fever with respiratory symptoms such as cough, sore throat, and nasal discharge. The infection often follows a self-limiting course and can be treated outpatient with symptomatic relief such as adequate hydration and antipyretic medication. However, in some cases, the infection can be life-threatening leading to respiratory failure requiring mechanical ventilatory support as well as multiorgan failures resulting in cardiogenic shock, and severe renal and hepatic failures.

Cardiac complications in viral respiratory tract infections such as myocarditis and pericarditis are not uncommon, and may manifest as chest pain, dyspnoea, palpitation, or syncope. Apart from non-specific ST segment changes and pathological Q wave seen on an electrocardiogram in an acute myocarditis, ventricular tachyarrhythmias and conduction blocks are also commonly seen. Accelerated junctional rhythm is rare and seldomly reported in adult with acute viral myocarditis.[1-2]

CASE PRESENTATION

A 28-year-old woman presented with a 4-day duration of fever, productive cough with yellowish sputum, and diarrhoea. She has no notable past medical history, particularly no history of any cardiac disease. Her physical examination upon presentation revealed a clinically stable young woman with blood pressure of 112/68 mmHg, heart rate of 68 beats per minute, temperature of 36.8˚c, and oxygen saturation 98% on room air. Her systemic examinations were otherwise unremarkable. Her blood investigations showed a low C-reactive protein level of 0.6 mg/dL and leukopenia, lymphopenia, and mild thrombocytopenia of 2.62 $x10^9$/L, 0.79 $x10^9$/L, and 147 $x10^9$/L respectively. Other investigations including renal and liver function tests were unremarkable.

She was initially admitted to the ward for observation while waiting for further investigation. As she was living in the dengue endemic area and had probable dengue sign of fever, diarrhoea, and leukopenia, a dengue serology was tested which turned out to be negative. On the second day of admission, she developed an episode of dizziness and chest discomfort with a blood pressure of 80/52 mmHg and heart rate of 60 beats per minute. An electrocardiogram revealed an accelerated junctional rhythm with ST depressions over the lead II, III, and aVF (Figure 1). She required inotropic support with intravenous infusion of noradrenaline after a cautious fluid resuscitation. A serial high-sensitivity troponin I showed a significant rise in a three-hour-interval from 5.7 ng/L to 701.[3] ng/L. A nasopharyngeal swab later confirmed the diagnosis of influenza A viral infection with subtype H1N1/2009 complicated with acute viral myocarditis with accelerated junctional rhythm.

DISCUSSION

Influenza infection is an acute febrile illness of global importance due to its capability of causing a worldwide pandemic.[3] A seasonal influenza is able to cause up to five million infections per year, with an annual mortality rate of 300,000.[4] Its main routes of human transmission are via air droplets, aerosols, and contact transmission which often leads to upper respiratory tract infections manifested as acute febrile illness with respiratory symptoms of cough, sore throat and nasal discharge, and non-specific symptoms such as headache, myalgia, malaise, and anorexia.[5] In severe cases, influenza infections involve lower respiratory tract and manifest as pneumonia and acute bronchitis and can be complicated with extra-pulmonary manifestations such as acute renal and hepatic impairments, myocarditis, pericarditis, and other neurological disorders such as

This article was accepted: 13 November 2024
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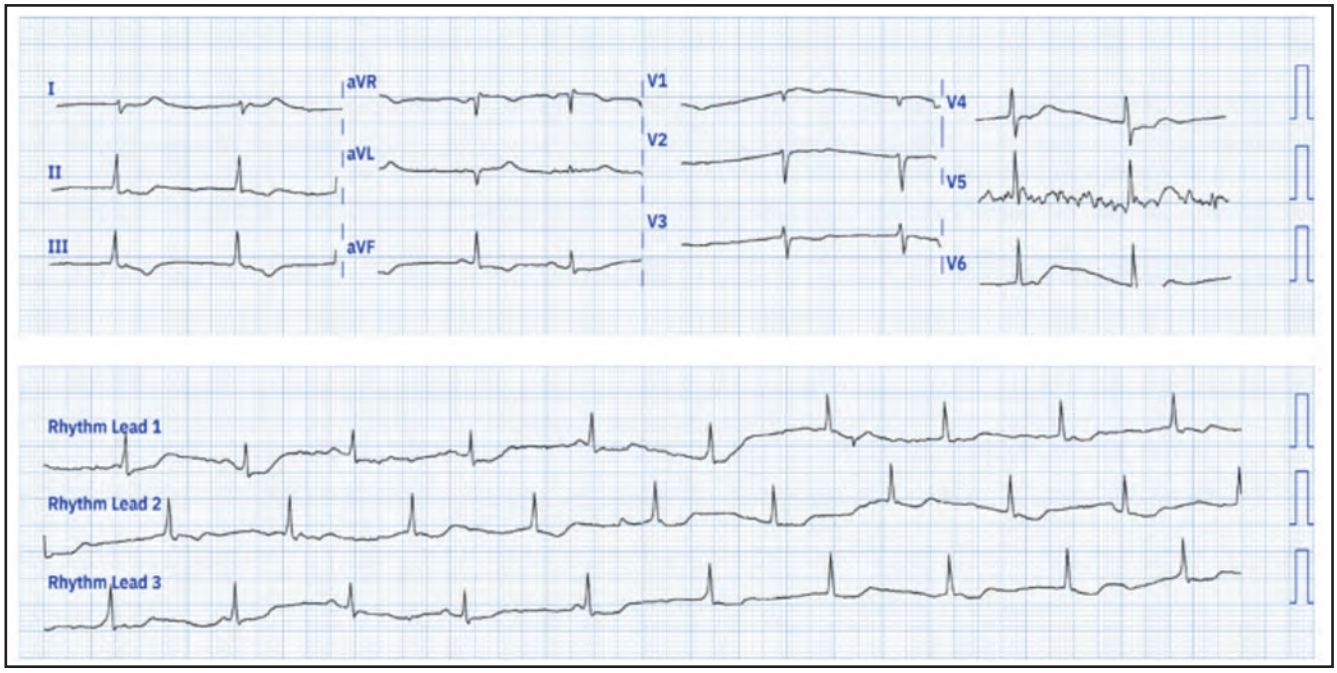

Fig. 1: Electrocardiogram showed atrioventricular dissociation with a ventricular rate of more than 60 beats per minute suggesting an accelerated junctional rhythm. There were ST segments depression in the inferior lead and T waves were flattened in most leads

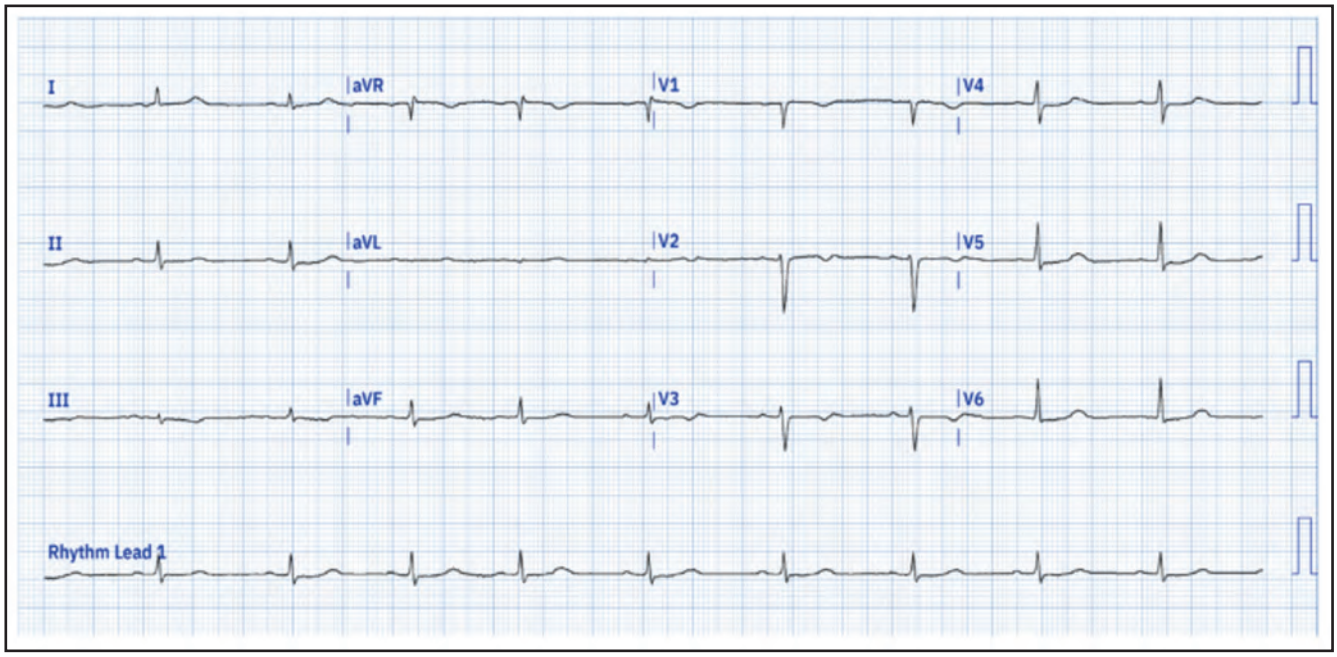

Fig. 2: Electrocardiogram showed reversion to sinus rhythm with non-specific ST segments and T waves changes

Guillain-Barre syndrome, transverse myelitis, and encephalomyelitis.[3]

Myocarditis is an inflammatory injury of the cardiac muscle, which can be caused by infections of different origins as well as non-infectious causes such as toxins, drugs, and autoimmune.6 Viral myocarditis remains the most common cause of myocarditis, predominantly due to picornaviruses such as Coxsackie A and B.[7] The exact mechanism of myocarditis due to viral infections remains uncertain but myocarditis resulted from influenza infections is postulated to be a result of immune-mediated myocardial injury.[8] Acute influenza-related myocarditis usually develops within first three days of symptoms of influenza in 51% of patients,[1] manifests with a range of severity from subtle asymptomatic non-specific changes in electrocardiogram to sudden cardiac death which accounts for approximately 10% of young patients below 35 years old.[9]

The diagnosis of myocarditis is difficult due to its heterogenous manifestations. Physical examination may reveal signs of cardiogenic shock or heart failure while electrocardiogram may show non-specific T-wave changes with elevated cardiac enzyme such as high sensitivity troponin I or T in approximately 64% of patients.[10] Accelerated junctional rhythm is reported in children and rarely reported in adults with acute myocarditis.[11] Echocardiography may reveal changes such as increased myocardial wall thickness and abnormal myocardial echogenicity. Nonetheless, left ventricular ejection fraction is preserved in approximately 75% of patients in early course of myocarditis, and may decline rapidly later.[10] The viral myocarditis in our case manifested as acute chest pain with dizziness due to accelerated junctional rhythm with cardiogenic shock, her echocardiography was normal with elevated cardiac enzyme and cardiac arrhythmia as the only positive findings in her investigations for myocarditis.

The majority of cases of acute myocarditis are mild and self-limiting, however some cases may be fulminant.[4] Treatment of myocarditis is mainly supportive, however, the association between myocarditis and viral infection suggests the potential benefits of antiviral strategies and antiviral vaccines in the treatment of viral myocarditis.[12] Antiviral medications would be effective in the early stages of viral myocarditis, despite most adult patients present in the chronic phrases of disease.[6] High-dose steroids are not recommended due to unproven benefit and potential harmful effect on the infection.[1] Our case managed to recover in terms of resolution of cardiac arrhythmia and hemodynamic stabilization after a day of manifestation with supportive treatment without long-term sequel or complication.

CONCLUSION

Viral myocarditis is not an uncommon complication of viral infections. It can lead to hemodynamic instability and increase morbidity and mortality of viral infections. Accelerated junctional rhythm is rarely reported but can be a manifestation of cardiac arrhythmia in H1N1 myocarditis. Although the mainstay treatment of myocarditis is supportive, early recognition of the condition is crucial to ensure appropriate monitoring and support before its recovery.

ACKNOWLEDGEMENT

The authors would like to thank the patient for agreeing to publish this case.

DECLARATION

The authors have no conflict of interest to disclose.

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