Myocarditis with Brugada Pattern: An Unusual Early Manifestation of Leptospirosis

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ABSTRACT

Leptospirosis is a zoonotic disease caused by Leptospira spirochaetes. Cardiac involvement in leptospirosis is frequent yet underdiagnosed. We describe a myocarditis case showing Brugada pattern Type 1, a rare leptospirosis cardiac complication. As myocarditis is an atypical cardiac manifestation of leptospirosis, it is important to investigate anything sign related to cardiac involvement in managing leptospirosis.

INTRODUCTION

Leptospirosis is an infectious disease caused by pathogenic spirochetes of the genus Leptospira1. It can affect both animals and humans. It is the world’s most common zoonosis and is resurfacing globally 2. Leptospirosis is primarily found in tropical areas. Banten had the highest case fatality rate (CFR) for leptospirosis cases in 2016, at 60 percent, followed by DI Yogyakarta at 35.29 percent, and Central Java at 18.29 percent 3.

There are two classifications of leptospirosis clinical manifestations. They are (i) classic icteric leptospirosis, combined with renal and liver failure known as Weil’s disease, and (ii) anicteric leptospirosis with various unspecific presentations in many organs1. In cases of cardiac manifestations, leptospirosis can cause arrhythmias, pulmonary edema, refractory shock, chest pain in patient with severe disease4. Physician should consider a cardiac involvement if the patient complaints shortness of breath, chest pain, palpitations, with physical examination showed tachycardia, basal crackles, or hypotension5. In addition of ECG abnormalities such as arrhythmias, ST/T changes, conduction abnormalities, wall motion abnormalities on echocardiography6. Autopsy studies have revealed significant cardiac involvement in fatal leptospirosis6. Data shows that these patients have severe cardiac dysfunction, even though myocarditis with Brugada pattern is uncommon7.

CASE PRESENTATION

A 46-year-old Indonesian man was admitted to our hospital after experiencing syncope, chest pain, fever, arthralgia, and severe myalgia in the previous day. There is no history of sudden death <45 years-old in his family, or similar symptoms before. Physical examination revealed anicteric sclera, tenderness of the abdominal, thigh and calf muscles. Thorax and lungs were normal vesicular without crackles. The cardiovascular examination showed regular, rhythmic heart sounds, tachycardia, no murmurs. Blood biochemistry was initially shown as Table 1. The electrocardiogram (ECG) revealed sinus tachycardia, with “coved” with the ST-segment elevation that concaves down and inverted T waves suggestive Brugada Type-1 pattern in V1-V3 (Figure 1). Cardiac biomarkers were increased. We used a rapid chromatographic immunoassay for the qualitative detection of IgG and IgM antibodies to Leptospira interrogans in human’s whole blood. Positive Leptospira IgM confirmed the diagnosis of leptospirosis.
Based on sign and symptoms, physical examination, and diagnostic testing we concluded the patient has acute leptospirosis, myocarditis related to leptospirosis, and acute kidney injury. Treatment was started with doxycycline 2 x 100 mg orally, supportive care of ceftriaxone 2 x 1 g intravenously. In support of evaluation the myocarditis, patient had daily routine electrocardiography and trans thoracal echocardiography. The ECG showed no malignant arrhythmia during hospitalization. The echocardiography showed normal left ventricular function with no regional wall motion abnormalities.

Significant improvements were seen after 13 days of treatment, showed by normal sinus rhythm and better kidney function biochemistry result. On the 14th day of hospitalization, the patient was discharged.

DISCUSSION

Early phase is leptospiremia or septicemic phase when non-specific acute febrile illness occurring for three to nine days. The following phase is immune phase, where IgM antibodies detected in the blood. It’s settled in higher concentrations in the organs, therefore serious manifestations occur during this phase. We assumed our patient was in immune phase leptospirosis, shown by the presents of kidney injury, IgM reactive antibody, and myocarditis. Chest pain, tachycardia, “coved” shaped ST segment elevation followed by T

Figure 1. ECG on the admission in emergency room: sinus tachycardia, “coved” shaped ST elevation followed by T inversion in V1-V3 suggestive Brugada Type 1 Pattern

Figure 2. ECG on the 13th day of hospitalization: normal sinus rhythm without ST elevation
infiltration, and petechial hemorrhage especially in acute myocarditis.

Infiltration of lymphocytes and plasma cells, mononuclear (Toll Like Receptor) may be involved in the mechanism of myocarditis or cardiac hypoxemia. The hallmarks of acute myocarditis are sign of injury and death of cardiomyocytes and immune cells infiltration in the tissue. It is not described clearly yet, however TLR (Toll Like Receptor) maybe involved in the mechanism. Infiltration of lymphocytes and plasma cells, mononuclear infiltration, and petechial hemorrhage especially in epicardium, or coronary arteritis was presented in leptospirosis.

Electrolyte abnormalities are likely to contribute to electrocardiographic changes. Renal tubular electrolyte transport mechanisms were disturbed during leptospirosis infection. Data suggest that an outer membrane protein of Leptospira inhibits the Na+ - K+ -Clcotransporter activity in the thick ascending limb of Henle, resulting hypokalemia and sodium wasting.

CONCLUSION

We describe a rare and unusual early leptospirosis complication. The ECG abnormalities are possibly caused by the direct effect of leptospirosis or non-specific result of a febrile infection or metabolic and electrolyte abnormalities. Cardiac manifestation such as myocarditis should be investigated in treating patient with leptospirosis. As shown in this case, it is important to bear in mind that transient Brugada pattern ECG changes during fever could trigger syncope.

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REFERENCES