Journal of Cardiology Cases 16 (2017) 5–8

Contents lists available at ScienceDirect

Journal of Cardiology Cases

journal homepage: www.elsevier.com/locate/jccase

Case Report

Acute necrotizing eosinophilic myocarditis complicated by complete atrioventricular block promptly responded to glucocorticoid therapy

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ARTICLE INFO

Article history:
Received 30 November 2016
Received in revised form 7 March 2017
Accepted 12 March 2017

Keywords:
Acute necrotizing eosinophilic myocarditis
Complete atrioventricular block
Steroid therapy

ABSTRACT

Acute myocarditis is frequently accompanied with conduction disturbances. Complete atrioventricular (AV) block may occur in acute myocarditis, but rarely in eosinophilic myocarditis. Acute necrotizing eosinophilic myocarditis, the most severe form of eosinophilic myocarditis, is generally fatal, and rarely complicated by complete AV block. We report a case of a 66-year-old woman with acute necrotizing eosinophilic myocarditis who presented with general malaise and nausea. She suddenly fell into cardiogenic shock because of complete AV block and worsened heart failure. Ultrasound cardiography revealed pericardial effusion, edematous myocardium, and reduced contractility of the left ventricle. The biopsied specimens showed marked interstitial infiltration with predominant eosinophils accompanied with myocardial necrosis. Oral administration of glucocorticoid in moderate dose promptly resolved the complete AV block, her clinical symptoms, and cardiac function. We recognized that acute necrotizing eosinophilic myocarditis can be complicated by complete AV block. Steroid therapy could be effective in the treatment of conduction disturbance as well as myocardial inflammation.

<**Learning objective:** We experienced a case of acute necrotizing eosinophilic myocarditis complicated by complete atrioventricular block. This case report documents the rare complication of acute necrotizing eosinophilic myocarditis and the great benefit of early steroid therapy for the condition.>

Introduction

Acute myocarditis is frequently accompanied by conduction disturbances [1]. Complete atrioventricular (AV) block may occur in acute myocarditis as lymphocytic myocarditis or giant cell myocarditis, but rarely in eosinophilic myocarditis [2–4]. Acute necrotizing eosinophilic myocarditis is the most severe form of eosinophilic myocarditis or hypersensitivity myocarditis [5]. The disease, usually fatal, is rare and presents with acute onset and rapid progression to fulminant heart failure characterized by extensive necrosis of myocytes with predominant eosinophilic infiltration [5–7]. Although steroid therapy was previously reported to be effective for acute necrotizing eosinophilic myocarditis, the therapeutic efficacy is not established because of the rapid clinical course [4]. To the best of our knowledge, this is the first case report of acute necrotizing eosinophilic myocarditis complicated by complete AV block that was promptly resolved by steroid therapy.

Case report

A 66-year-old female patient presented to the emergency department of our hospital with complaint of increasing general malaise. She had been in her usual state of health until 3 days before presentation, when malaise and nausea developed. Her medication was rosuvastatin for hypercholesterolemia. Her electrocardiogram (ECG) result was normal at 7 months before presentation. She reported having no allergies or drug hypersensitivity. Her temperature was 35.9 °C; blood pressure, 129/83 mmHg; and pulse, 123 beats/minute. The heart was normal without the presence of a gallop rhythm or crackles. There was no

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http://dx.doi.org/10.1016/j.jccase.2017.03.002

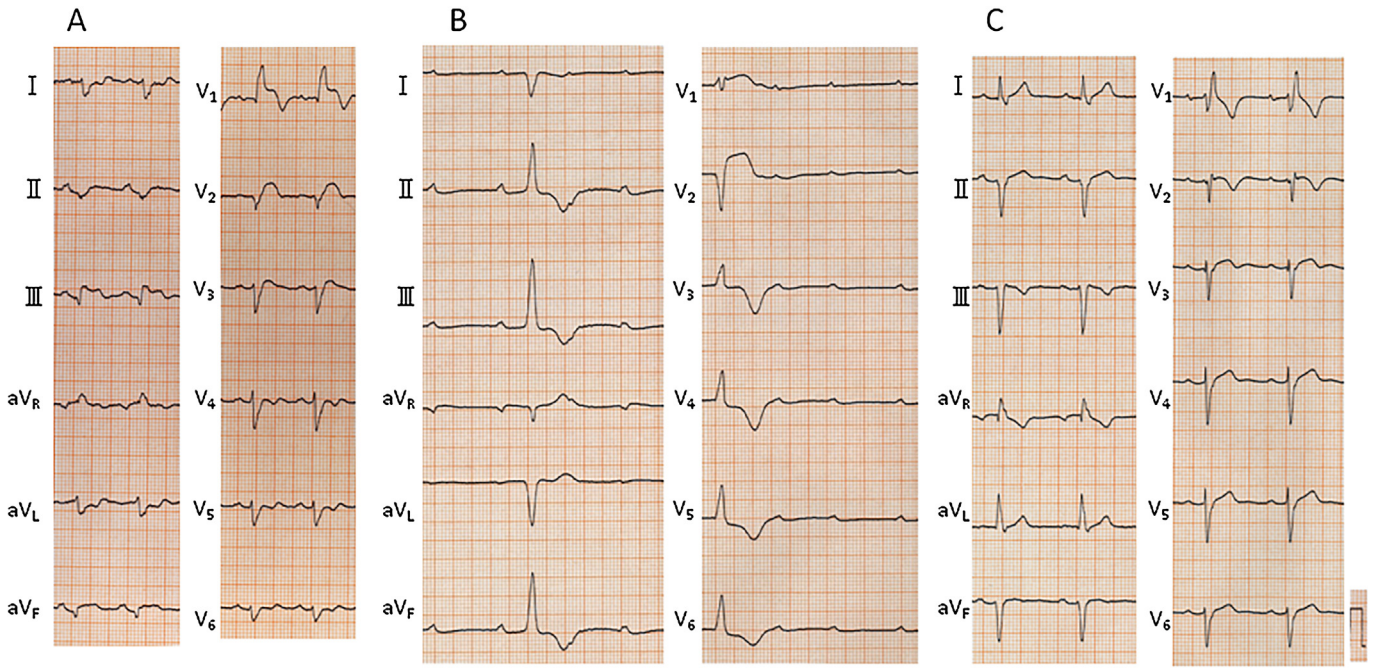

Fig. 1. Electrocardiogram. (A) On admission, sinus tachycardia with complete right bundle branch block and ST elevation in leads III, aV_F, and V1–V3 were found. (B) Seven hours after admission, complete atrioventricular blocks occurred suddenly. (C) On the 18th day, left-axis deviation and right bundle bunch block remained.

skin rash. Blood tests showed a leukocyte count of 8900 count/mm^3 (predominantly neutrophils, 6755 count/mm^3), with normal eosinophil count (213 count/mm^3), C-reactive protein (7.18 mg/dL), troponin T (3.6 μg/L), creatine phosphokinase (474 U/mL), creatine phosphokinase MB isoenzyme (47 U/mL), asparate aminotransferase (652 IU/L), alanine aminotransferase (524 IU/L), and lactic dehydrogenase (957 U/L). ECG at arrival showed sinus tachycardia with complete right bundle branch block and ST-segment elevation in leads III, aV_F, and V1–V3 (Fig. 1A). Ultrasound cardiography (UCG) revealed pericardial effusion, edematous myocardium, and reduced contractility of the left ventricle (LV) (Fig. 2A). Coronary angiogram showed normal coronary arteries, and right ventricular biopsy specimens were obtained. Seven hours after admission, complete AV block occurred with cardiogenic shock, necessitating temporary cardiac pacing (Fig. 1B). Then, congestive heart failure persisted despite administration of inotropic agent and diuretic. On the sixth day after admission, repeat blood test showed leukocytosis (16,800 count/mm^3) and eosinophilia (1176 count/mm^3). The biopsied specimens revealed pronounced interstitial infiltration of inflammatory cells predominantly composed of eosinophils, with fewer lymphocytes, accompanied with myocardial necrosis (Fig. 3). Some of the eosinophils had degranulation. Interstitial fibrosis was not observed. The pathological findings led to a diagnosis of acute necrotizing eosinophilic myocarditis, and oral prednisolone (30 mg/day) was begun. The complete AV block was promptly resolved on the first day of steroid therapy. Her clinical symptoms progressively decreased, accompanied with normalization of eosinophil count and inflammatory markers. UCG showed improved LV contractility, attenuated LV hypertrophy, and decreased pericardial effusion. The prednisolone dose was then reduced by steps of 5 mg/week.

A drug lymphocyte stimulation test for rosuvastatin was negative. The result of the screening test for specific IgG antibody to parasite was also negative. No significant increase in virus-specific IgG antibody in acute/convalescent serum pairs or presence of virus-specific IgM antibody in a single serum specimen was detected.

On the 30th hospital day, she was discharged from the hospital, with the prednisolone dose tapered to 10 mg/day. At discharge, UCG showed normalization of the wall thickness and contraction of LV with slight pericardial effusion (Fig. 2B). ECG showed left-axis deviation and complete right bundle blocks sustained (Fig. 1C). Follow-up at 6 months showed that the patient has been doing well and has no signs of disease recurrence.

Discussion

Eosinophilic myocarditis, a rare disease characterized by myocardial inflammation with eosinophils, has various etiologies [7]. Hypersensitivity reaction induced by drugs, infections, and allergic reactions; autoimmune systemic diseases; malignancies; and hypereosinophilic syndrome are the major causes [7]. Acute necrotizing eosinophilic myocarditis is the most severe form of acute eosinophilic myocarditis. Although it is a fatal disease, a standard treatment has not been established due to its rarity. The present case raises important clinical issues in terms of treatment of the disease. Firstly, AV block complications can arise in the clinical course of acute necrotizing eosinophilic myocarditis. Although complete AV block may appear in acute myocarditis such as lymphocytic myocarditis or giant cell myocarditis, it rarely occurs in eosinophilic myocarditis [2–4]. Because conduction systems contain rich interstitial tissues, interstitial inflammation can likely lead to their damage [1]. The present case showed pronounced interstitial infiltration of the inflammatory cells composed of predominantly eosinophils in the myocardium. This finding indicates that if complete AV block occurs in acute myocarditis, not only lymphocytic myocarditis or giant cell myocarditis should be considered, but also eosinophilic myocarditis. A case of acute eosinophilic myocarditis in a toddler with complete AV block and wide complex tachycardia was reported previously [3]. In that patient, a hypersensitivity reaction was considered as a possible etiology, and the