

Eosinophilic Myocarditis due to Churg-Strauss Syndrome With Markedly Elevated Eosinophil Cationic Protein

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SUMMARY

A 67-year-old woman with asthma visited our hospital with increasing dyspnea and new-onset paresthesia and purpura in her legs. Physical examination showed a wheeze, pretibial edema, and surrounding purpura. Chest X-rays showed cardiac decompensation and an electrocardiogram revealed a new ST-T change. Laboratory data showed leukocytosis, hypereosinophilia (10,450/ μ L), troponin T(+), elevated BNP, and markedly elevated eosinophil cationic protein (ECP) (> 150 ng/mL). Echocardiography revealed diffuse left ventricular hypokinesis (ejection fraction 30%) with increased wall thickness. Coronary angiography was normal. Cardiac magnetic resonance imaging implied diffuse myocardial edema and subendocardial late gadolinium enhancement. Skin biopsy of purpura showed superficial perivascular dermatitis with remarkable eosinophilic infiltrations. No evidence of drug allergies, parasitic infection, or myeloproliferative disorder was detected. Based on these findings, a diagnosis of eosinophilic myocarditis due to Churg-Strauss syndrome was considered. She was administered prednisolone at a dose of 1 mg/kg, cyclophosphamide, and diuretics. Several markers of eosinophilic myocarditis and heart failure gradually improved, including ECP. She was discharged 30 days later with no cardiac event. Eosinophilic myocarditis is characterized by predominantly eosinophilic infiltration. Eosinophilic granule proteins, such as ECP and major basic protein, play important roles in the pathogenesis of eosinophilic myocarditis. We experienced a rare case of eosinophilic myocarditis due to Churg-Strauss syndrome. Markedly elevated ECP played an important role in the early diagnosis and subsequent reduction in ECP served as a marker of monitoring. In an asthmatic patient with dyspnea, hypereosinophilia, and vasculitis, Churg-Strauss syndrome with eosinophilic myocarditis should be considered. (Int Heart J 2013; 54: 51-53)

Key words: Heart failure, Inflammation

Eosinophilic myocarditis is characterized by predominantly eosinophilic infiltration. Eosinophilic granule proteins, such as eosinophil cationic protein (ECP) and major basic protein (MBP), play important roles in the pathogenesis of eosinophilic myocarditis. It may occur in a variety of settings; allergic disease (eg, allergic rhinoconjunctivitis and asthma), drug reactions, parasitic infection, malignancies (eg, lymphoma), and systemic disorders (eg, idiopathic hypereosinophilic syndromes and vasculitis). Here we report a rare case of eosinophilic myocarditis due to Churg-Strauss syndrome with markedly elevated ECP.

CASE REPORT

A 67-year-old woman with asthma presented to our hospital with increasing dyspnea and new-onset paresthesia and purpura in her legs (Figure 1A). She had no history of hypertension or heart disease. Her arterial blood pressure was 120/84

mmHg, pulse rate 108 bpm, body temperature 37.1°C, and arterial saturation 97% (pernasal, 2L). A wheeze was present in the bilateral lung fields and gallop rhythm was audible. Bilateral pretibial edema and surrounding purpura were observed.

Chest X-rays showed cardiac enlargement, remarkable pulmonary congestion, and bilateral pleural effusions. A 12-lead electrocardiogram (ECG) revealed a new-onset biphasic T wave in V2-3 over previous studies. Laboratory data showed leukocytosis (15,300/ μ L), hypereosinophilia (68.3%, 10,450/ μ L), troponin T(+), elevated C-reactive protein (1.58 mg/dL), and elevated BNP (611 pg/mL).

Echocardiography revealed diffuse left ventricular (LV) hypokinesis (ejection fraction 30%) with increased wall thickness. Coronary angiography was normal. Cardiac biopsy was not performed because LV end-diastolic pressure was high (28 mmHg). We performed cardiac magnetic resonance imaging (Figure 2). The quality of the imaging was poor because of inadequate breath hold due to heart failure. A T2-weighted image showed diffuse high intensity in the myocardium. A T1-

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Figure 1. A: Purpura are present on the lower legs. B: High power photomicrograph of purpura on the legs shows remarkable eosinophil-dominant perivascular infiltrates (arrows indicate eosinophils). (Hematoxylin and eosin)

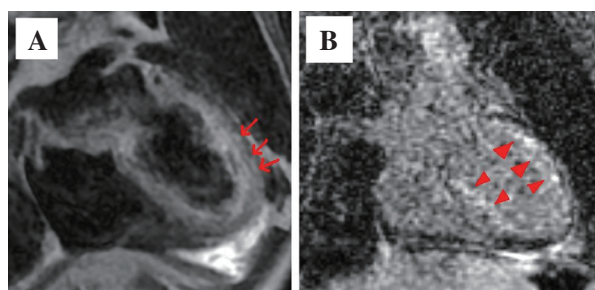


Figure 2. Cardiac magnetic resonance imaging on admission. A: T2-weighted image showing diffuse edema (arrows). B: Late enhancement image with subendocardial high intensity areas (arrow heads).

weighted image after application of gadolinium left the impression that late enhancement was positive with predominantly subendocardial involvement.

Additional investigations revealed elevated ECP (> 150 ng/mL). Skin biopsy of purpura showed superficial perivascular dermatitis with remarkable eosinophilic infiltrations (Figure 1B). No evidence of drug allergies, parasitic infection, or myeloproliferative disorder was detected.

Based on these findings, a diagnosis of eosinophilic myocarditis due to Churg-Strauss syndrome was considered.^{1,2)} She was administered prednisolone (PSL) at a dose of 40 mg (1 mg/kg), cyclophosphamide (50 mg), and diuretics. Several markers of eosinophilic myocarditis and heart failure, including ECP, gradually improved (Figure 3A). The left ventricular ejection fraction (LVEF), wall thickening, and enlarged left ventricular diastolic diameter (LVDd) improved about one month later (Figure 3B). She was discharged 30 days later with no cardiac event.

DISCUSSION

Hypereosinophilia and eosinophilic myocarditis may occur in a variety of settings; allergic disease (eg, allergic rhino-

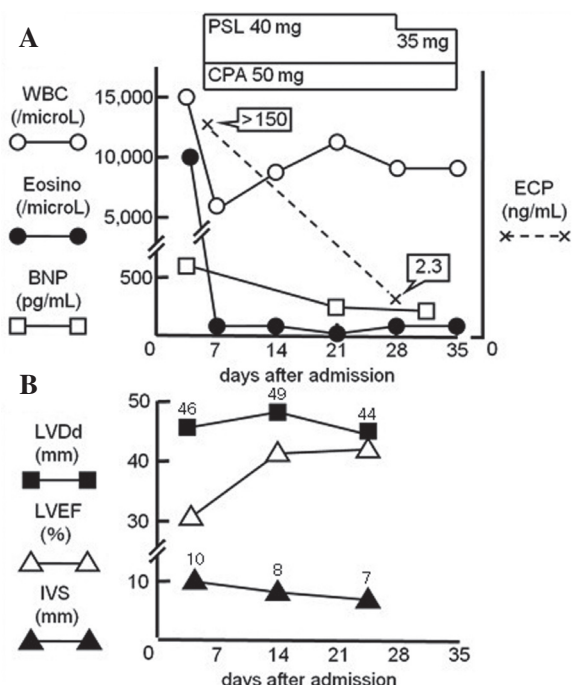


Figure 3. Clinical course after admission. A: Combination therapy with prednisolone (40 mg for initial dose, p.o.) and cyclophosphamide (50 mg) effectively decreased the eosinophil count and serum ECP levels. B: LVEF, wall thickening, and enlarged LVDd improved at the time of discharge. BNP indicates brain natriuretic peptide; CPA, cyclophosphamide; ECP, eosinophilic cationic protein; Eosino, eosinophil; IVS, interventricular septal wall thickness; LVDd, left ventricular diastolic diameter; LVEF, left ventricular ejection fraction; and PSL, prednisolone.

conjunctivitis and asthma), drug reactions, parasitic infection, malignancies (eg, lymphoma), and systemic disorders (eg, idiopathic hypereosinophilic syndromes and vasculitis).³⁾ According to a recent review of eosinophilic myocarditis,⁴⁾ etiologies of the limited available literature were idiopathic (42.1%), chronic eosinophilic leukemia (34.5%), and parasitic infection (15.8%). However, as with the present case, documented cases of eosinophilic myocarditis due to Churg-Strauss syndrome are relatively rare.^{4,5)} Our patient had remarkable hypereosinophilia ($> 10,000/\mu\text{L}$), which is an uncommon feature in Churg-Strauss syndrome with or without cardiac involvement.^{4,6)} This uncommon feature may explain the markedly elevated ECP in this case.

Eosinophilic myocarditis is characterized by predominantly eosinophilic infiltration. Eosinophilic granule proteins, such as ECP and MBP, play important roles in the pathogenesis of eosinophilic myocarditis.⁷⁾ As with our patient, elevated ECP during active disease and subsequent reductions in ECP with immunosuppressive therapy suggest that ECP may be responsible for the degranulation of eosinophils. Therefore, monitoring of serum ECP levels, which are derived from degranulation of eosinophils, is one of the valuable parameters with which to make a diagnosis of eosinophilic myocarditis.^{4,8)}

In acute lymphocytic (presumably viral) myocarditis, immunosuppressive therapy has not been predictably effective, perhaps due in part to a relatively high rate of recovery with heart failure therapy. In contrast, eosinophilic myocarditis

ranges in severity from asymptomatic to fatal due to severe heart failure. Treatment usually consists of high doses of steroids and removal of underlying disorders.^{9,10)} However, no standard treatment for eosinophilic myocarditis has been established yet because of its scarcity and the majority of previously reported eosinophilic myocarditis patients were initially treated with PSL at a dose of 1 mg/kg/day.⁴⁾ Furthermore, additional treatment of an underlying disease should be considered. In our patient, hypereosinophilia and several associated symptoms such as asthma, paresthesia, and purpura served as a trigger for the diagnosis of eosinophilic myocarditis due to Churg-Strauss syndrome. In Churg-Strauss syndrome, cardiac involvement is one of the prognostic factors and cyclophosphamides given in addition to systemic glucocorticoids have been recommended.⁶⁾ In consideration of these findings, in our case, PSL at a dose of 1.0 mg/kg per day and additional cyclophosphamide (50 mg) were effective.

Conclusion: We experienced a rare case of eosinophilic myocarditis due to Churg-Strauss syndrome. Markedly elevated ECP played an important role in the early diagnosis and subsequent reduction in ECP served as a marker of monitoring. In an asthmatic patient with dyspnea, hypereosinophilia, and vasculitis, Churg-Strauss syndrome with eosinophilic myocarditis should be considered.

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