Primary Cardiac Lymphoma Presenting Clinically as Restrictive Cardiomyopathy

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An unusual case of primary cardiac lymphoma presenting as restrictive cardiomyopathy with arrhythmia is reported in a 72-year-old woman who was admitted for evaluation of exertional dyspnea and palpitations. Electrocardiography (ECG) showed atrioventricular dissociation and right heart cardiac catheterization revealed a typical ‘dip-and-plateau’ waveform. Restrictive cardiomyopathy was suspected because computed tomography (CT) did not reveal pericardial thickening, calcifications, or an effusion. Heart failure initially improved with diuretic therapy, but subsequently worsened, and the patient experienced a syncopal episode. ECG showed atrial fibrillation, and CT revealed a large mass in the right atrium and multiple tumors in the liver, which needle biopsy confirmed as diffuse large B-cell lymphoma. Chemotherapy induced complete remission, and her heart failure markedly improved. The ‘dip-and-plateau’ waveform was no longer detected on repeat cardiac catheterization and the ECG showed restoration of sinus rhythm. Clinically, the diagnosis was primary cardiac lymphoma. (Circ J 2005; 69: 249–252)

Key Words: Arrhythmia; Malignant lymphoma; Restrictive cardiomyopathy

Primary cardiac lymphoma (PCL) is extremely rare, accounting for only 1.3% of all primary cardiac tumors, and its prognosis is poor because of its rarity and nonspecific clinical presentation making an antemortem diagnosis difficult. However, recent reports suggest that early diagnosis and proper treatment can lead to long-term survival.

We report an unusual case of PCL in which the patient presented a clinical picture of restrictive cardiomyopathy with arrhythmias that resolved following systemic chemotherapy. Diastolic heart failure caused by PCL has rarely been described.

Case Report

A 72-year-old woman was admitted for evaluation of exertional dyspnea and palpitations. She had been well until the year before admission, during which exertional dyspnea gradually worsened. Five months prior to admission, a dry cough developed and 1 month prior, the exertional dyspnea and palpitations rapidly worsened, and she reported a 6 kg weight gain in that month.

On admission, the patient’s blood pressure was 124/61 mmHg and her heart rate was 40 beats/min. Jugular venous distension was marked. The first and second heart sounds were normal, and no murmurs were detected. Inspiratory rales were present at the base of both lungs. The liver was palpable 2 cm below the right costal margin. There was peripheral edema. No lymphadenopathy was noted.

Laboratory investigations were normal except for a slight elevation in the serum lactate dehydrogenase (LDH) concentration (566 IU/L). Chest roentgenogram showed cardiomegaly, pulmonary congestion, and distended pulmonary arteries (Fig. 1). Electrocardiography (ECG) revealed atrioventricular dissociation with a ventricular rate of 40 beats/min (Fig. 2). Transthoracic echocardiography showed mild atrial and ventricular enlargement. There were not any findings of pericardial effusion, pericardial thickness, or cardiac tumor. The ejection fraction of the left ventricle was 67%. Doppler echocardiography revealed tricuspid regurgitation with a pressure gradient of 34 mmHg. Cardiac catheterization revealed an increased right end-diastolic pressure of 17 mmHg and a left end-diastolic pressure...
Fig 2. Electrocardiogram on the first admission shows atrioventricular dissociation with a ventricular rate of 40 beats/min.

Fig 3. (A) Computed tomography (CT) does not reveal pericardial effusion, pericardial thickness, or cardiac tumor on the first admission. (B) Contrast CT on the second admission showed a large cardiac mass and multiple tumors in the liver. (C) Magnetic resonance imaging on the second admission reveals a large cardiac mass in the right atrium with a small residual lumen that extends into the superior vena cava. (D) Masses are smaller after the first cycle of chemotherapy.
sure of 23 mmHg; right cardiac catheterization showed a typical ‘dip-and-plateau’ waveform (Fig 4A). The presumptive diagnosis was restrictive cardiomyopathy because a plain computed tomography (CT) scan did not reveal pericardial thickening, calcification, or effusion (Fig 3A). Congestive heart failure improved with diuretic therapy, and the patient was discharged 16 days after admission.

Following discharge, however, the exertional dyspnea gradually worsened and the patient complained of fatigue and reported a 6 kg weight loss in 1 month. At 39 days after discharge, she was brought to the emergency room following an episode of syncope. Blood pressure was 117/60 mmHg, and her heart rate was 120 beats/min. Peripheral pitting edema was noted. ECG showed atrial fibrillation with ventricular rate of 100 beats/min. Blood test revealed a markedly elevated serum concentration of LDH (1,599 IU/L) and soluble interleukin-2 receptor (sIL2R) (1,880 U/ml). Contrast CT and magnetic resonance imaging (MRI) showed pericardial effusion and a large tumor in the right atrium, with a small residual lumen that extended into the superior vena cava. There were also multiple masses in the liver (Fig 3B,C). Histopathology of a needle biopsy of the hepatic tumor demonstrated diffuse proliferation of large lymphoid cells with a high mitotic index; the neoplastic cells were reactive for CD45, CD20, and CD79, so diffuse large B-cell lymphoma (WHO classification) was diagnosed.

Staging with whole-body CT and gallium scintigraphy failed to reveal any other tumor. Tumor cells were not found in bone marrow biopsy or spinal fluid.

After steroid pulse therapy, chemotherapy was initiated with 2 cycles of CVP (cyclophosphamide, vindesine, and prednisone) followed by 4 cycles of THP-CVP (cyclophosphamide, pirarubicin, vindesine, and prednisone). After 6 cycles of chemotherapy, CT and MRI confirmed the disappearance of the tumors in the heart and liver (Fig 3D) and ECG showed sinus rhythm. The cardiac catheterization after 4 cycles of chemotherapy revealed the disappearance of the ‘dip-and-plateau’ waveform, and the right end-diastolic pressure (5 mmHg) and left end-diastolic pressure (12 mmHg) were within normal limits (Fig 4B). The symptoms of the heart failure resolved.

Discussion

PCL is an extremely rare malignancy,1 but its frequency is increasing in immunocompromised patients.2 On the other hand, secondary cardiac lymphoma is relatively common, and is present in approximately 20% of patients with lymphoma at autopsy.5

PCL is classically defined as a non-Hodgkin lymphoma involving only the heart and/or pericardium;6 however, several cases with extensive extracardial involvement have been reported as PCL.7,8 Therefore, the currently accepted definition of PCL is a lymphoma presenting as cardiac disease, especially when the bulk of the tumor is intrapericardial.9 The present case should be considered as PCL, despite hepatic involvement, for 2 reasons: (1) the initial symptoms were cardiac, and (2) CT did not demonstrate hepatic lesions when severe heart failure initially appeared.
PCL has nonspecific symptoms, most commonly unresponsive heart failure, precordial pain, systemic symptoms, such as fever or weakness, arrhythmias, and cardiac tamponade with progressive impairment of cardiac function. The right atrium is involved in most patients and infiltration of the conductive system can produce many types of arrhythmias, such as atrial fibrillation, atrioventricular block, sick sinus syndrome, ventricular tachycardia, and ventricular fibrillation. Unusual clinical findings are related to multiple pulmonary embolism, and symptoms mimicking hypertrophic cardiomyopathy. The present case had severe diastolic dysfunction and several different arrhythmias on the first admission and the presumptive diagnosis was restrictive cardiomyopathy because cardiac catheterization showed a typical ‘dip-and-plateau’ waveform and CT did not reveal pericardial constriction or thickening. However, it seems reasonable to assume that these clinical manifestations were caused by the cardiac tumor itself, because they improved once the cardiac tumor shrank after systemic chemotherapy. Although the plain CT on the first admission did not reveal it, we guess that there was a small cardiac tumor that caused the diastolic dysfunction and the ‘dip-and-plateau’ pattern observed during cardiac catheterization. Two mechanisms can be considered: (1) a small cardiac tumor on the pericardium or the myocardium set the upper limit of cardiac volume and compression occurred in mid through late diastole or (2) infiltration of tumor cells resulted in diastolic dysfunction of the myocardium. Syncope may have resulted from a sudden reduction in cardiac output, caused by diastolic dysfunction, some arrhythmias, and obstruction to blood flow by the cardiac tumor. This is the second case of PCL to present with a clinical picture of restrictive cardiomyopathy.

The standard diagnostic work-up of PCL includes chest roentgenograms, transthoracic echocardiography, and CT. Transesophageal echocardiography and MRI will confirm any suspicious lesions. Thoracotomy is diagnostic, but less invasive procedures, such as cytology of the pericardial effusion, mediastinoscopy, transesophageal echo-guided biopsy, thoracoscopic pericardial window, and endomyocardial transvenous biopsy, have been reported. The present case suggests that contrast CT imaging is superior to plain CT and transthoracic echocardiography for detecting small lesions.

The prognosis is poor because a low index of suspicion usually precludes correct diagnosis antemortem, although recent reports suggest that early diagnosis and proper treatment can lead to long-term survival. A review of 48 patients with PCL suggests that early systemic treatment with chemotherapy containing anthracyclin is the only effective therapy. Radiation after chemotherapy improved survival in a few cases. We avoided the use of anthracyclin during the first 2 cycles of the chemotherapy in the present patient because we feared that cardiac toxicity could be fatal. The early phase of chemotherapy is critical, as suggested by reports of sudden death from pulmonary embolism and ventricular tachycardia.

References