Primary Lymphoma of the Heart, Diagnosed Antemortem

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Primary cardiac lymphomas diagnosed antemortem are extremely rare. We present a case of primary cardiac lymphoma initially diagnosed antemortem by cytologic examination of pericardial effusion fluid. Echocardiography suggested the presence of a tumor localized at the right ventricular free wall. The cytologic examination of pericardial effusion was effective in establishing the correct antemortem diagnosis.

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Introduction

Cardiac involvement of malignant lymphoma is common, but only 21 of the 62 reported cases meet the criteria of primary cardiac lymphoma “a lymphoma involving only the heart and pericardium”, as defined by McAllister and Fenoglio, of the Armed Forces Institute of Pathology (AFIP) in 1978 (1, 2). In most cases, definitive diagnosis is only obtained at autopsy.

Case Report

A 71-year-old man was hospitalized for evaluation of facial edema, dry cough and wheezing. On admission, physical examination revealed an elderly man in mild distress, weighing 56 kg and measuring 155 cm in height, with respirations of 16/min, a regular pulse rate of 90 beats per minute, and a blood pressure of 128/70 mmHg. He was afebrile. Jugular venous distension, pulsus paradoxus and facial edema were noted. There was a bibasilar wheeze; no heart murmurs, extra cardiac sounds, or pericardial friction rubs were heard. Abdominal examination was unremarkable. No peripheral lymphadenopathy was detected. Laboratory investigations showed a leukocyte count of 10,900/mm³ with 69% neutrophils, 16% lymphocytes, 8% monocytes, and 6% eosinophils, but no atypical cells. The erythrocyte sedimentation rate was 66 mm/h. Liver function tests were abnormal with aspartate aminotransferase 66 IU/l, alanine aminotransferase 85 IU/l, lactate dehydrogenase (LDH) 704 IU/l, alkaline phosphatase 407 IU/l, and \( \gamma \)-glutamyltranspeptidase 94 IU/l. Serum copper level was 133 \( \mu \)g/dl. A human immune deficiency virus antibody test was negative.

Chest radiography showed cardiomegaly and blunting of the right costophrenic angle. An electrocardiogram (ECG) showed low voltage tracings on all leads. An echocardiogram showed a large pericardial effusion, confirming the diagnosis of heart failure due to cardiac tamponade. Swan-Gantz catheterization data showed pulmonary arterial pressure of 20/7, \( \overline{P} \text{ mmHg} \), mean pulmonary artery occlusive pressure of 8 mmHg, right atrial pressure of 14/8, \( \overline{P} \text{ mmHg} \), cardiac output of 4.36 //min, and a cardiac index of 2.87 //min/m². Therapeutic pericardial drainage produced 580 ml of bloody fluid. Examination of the fluid revealed: total protein 6.1 g/dl, LDH 21,780 IU/l. Bacterial culture and Gaffky smear were negative. Cytologic examination of the pericardial effusion revealed a monotonous proliferation of round and relatively large-sized tumor cells. The N/C ratio of the tumor cells was high, with fine and increased nuclear chromatin, and one or two nucleoli. Most of the cell membrane of the tumor cells were ill-defined. No nuclear cleavage could be seen (Fig. 1). Malignant lymphoma of the large cell type was suggested by these results. Oncologic workup included echocardiogram, computed tomography (CT), and magnetic resonance imaging (MRI), which were performed following pericardiocentesis. They confirmed the presence of the mass on the anterior wall of the right ventricle (RV), which was enhanced by intravenous gadolinium-diethylene-triaminepentaacetic acid (Gd-DTPA) injection on MRI (Figs. 2, 3). Chest CT showed no hilar or mediastinal lymphadenopathy. The CT scans of the abdomen, pelvis, and head were negative. Gallium scintigraphy showed a mild positive uptake in the middle lower chest on anterior image. Thallium (\( ^{201} \text{TI} \)) myocardial scan was negative. Right ventriculography showed a mass in the RV anterior wall, but endomyocardial biopsy was not performed. Coronary angiography was normal and did not show a feeding artery. Bone marrow aspirates did not indicate lymphomatous involvement. Because there was no
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Figure 1. Pericardial fluid showing monotonous proliferation of large cell-type lymphoma cells (Papanicolaou test, ×1,000).

Figure 2. Two-dimensional echocardiogram. Apical 4-chamber view shows a mass-like thickening of the anterior free wall of RV (arrows) and a small residual pericardial effusion. LA: left atrium, LV: left ventricle, RA: right atrium, RV: right ventricle.

Figure 3. Axial image from gadolinium-enhanced MRI showing a mass (arrows) of anterior free wall of RV, which was enhanced by intravenous gadolinium injection.

Figure 4. Histology of a biopsy specimen taken from the cervical lymph node; diffuse and monotonous proliferation of lymphoid cells is seen (HE stain, ×400).

increase in the size of the RV mass or the amount of pericardial effusion without specific therapy, he was discharged and he remained free from symptoms until the next admission.

He was readmitted with shortness of breath and dyspnea on exertion, 6 months after the first admission. On readmission, physical examination revealed an immobile right cervical lymphadenopathy, 2 cm in diameter. ECG revealed an atrial flutter at a ventricular rate of 108, and the patient was placed on digitalis and warfarin. A chest radiograph showed massive left pleural effusion and a widened mediastinal shadow.Thoracentesis was performed, draining 1,100 ml of straw-colored fluid. Cytologic study of the pleural effusion showed lymphoma cells.

Echocardiogram showed reaccumulation of pericardial effusion and hypoechoic mass around the RV. Enhanced CT revealed a prominent mass from the anterior RV wall to the RV cavity. Biopsy specimen from the right cervical lymph node showed diffuse and monotonous proliferation of atypical lymphoid cells without nuclear cleavage (Fig. 4). Immunohistochemical investigations on formalin-fixed, paraffin-embedded specimens revealed positive reactivity with anti-LCA (leukocyte common antigen, DAKO, Copenhagen) and anti-SL-26 (pan B-cell, DAKO, Copenhagen) antibodies, but negative reactivity with UCHL-1 (anti-CD45RO, DAKO, Copenhagen) antibody. Malignant lymphoma of diffuse large B-cell type was sug-
Figure 5. Cut section of the heart, showing multiple small polypoid lesions (arrowheads) in the endocardium of the right ventricle.

Suggested by these results. Lumbar puncture was normal. On the twelfth day of hospitalization, the patient was placed on the chemotherapy program with vincristine, cyclophosphamide, predonine, adriamycin, bleomycin, etoposide, and vindesin. Although the size of the cardiac mass on the RV free wall, pericardial effusion, and widened mediastinum were reduced, his general condition progressively deteriorated and he died approximately 10 months after his initial consultation.

Autopsy findings

The heart weighed 460 g, with thickening and adhesion of the parietal and visceral pericardium. Small polypoid lesions, measuring less than 5mm in diameter and consisting of packed infiltration of non-neoplastic foamy histiocytes, were observed in the endocardium of the RA and RV (Fig. 5). Foamy histiocytes were also observed in the pericardium. In addition, no cardiac chamber dilation, no lymph node swelling, and no viable lymphoma cells were noted on the autopsy specimens.

Discussion

Cardiac involvement of malignant lymphoma is relatively common, and its incidence has been reported in 8.7% to 20% of several large autopsy studies (3). However, primary malignant lymphoma of the heart is extremely rare. In 1978, the AFIP defined a primary malignant lymphoma of the heart as that involving only the heart and pericardium (1). Although 62 reports of primary cardiac lymphomas have been published, most reports describe the presence of metastasis outside the heart and pericardium. Only 21 of 62 reported cases met the AFIP criteria (2–4). These tumors exhibit non-specific signs and symptoms and are rarely detected before death. Only 5 cases with antemortem diagnosis have been reported (4). The clinical presentation depends on the location of the tumor in relation to various heart structures. Chest pain, arrhythmias, congestive heart failure, cardiac tamponade, and sudden death were all described (5). In all these cases, the clinical course showed a remarkably acute onset and a rapid progression with fatal consequence. In the cases where antemortem diagnosis was made, most did not survive beyond 3 weeks, despite therapy. The longest surviving case of primary cardiac lymphoma was 18 months reported by Nand et al (6). Recently primary lymphomas of the heart have been reported in patients with acquired immune deficiency (7), although these were discovered only at autopsy. The present patient was negative for the human immune deficiency virus antibody test and his condition was not associated with any immunocompromised state.

In the present case, the initial manifestation was pericardial tamponade. And routine cytologic examination of pericardial effusion revealed lymphoma cells. Radiographic examination including echocardiogram, Gd-DTPA enhanced MRI, and gallium scintigraphy demonstrated the mass on the RV anterior wall. Tumor was not detected anywhere other than the heart and pericardium. Several studies have shown that Gd-DTPA can produce differential enhancement of tumor from normal myocardium and therefore demonstrate intramural masses. Also in this case, Gd-DTPA enhanced MRI was helpful in supporting the antemortem diagnosis of primary cardiac lymphoma. The clinical course of our patient was quite unique in that the pericardial effusion had completely disappeared after the initial pericardial drainage and no reaccumulation was detected without therapy, and then prior acute deterioration occurred 8 months later.

Although rare, the possibility of lymphoma should be included in the differential diagnosis of patients demonstrating cardiac signs and symptoms.

References