Case Report

Mediastinal diffuse large B-cell lymphoma invading the left atrium mimicking coronary artery disease with a mural thrombus

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Received November 29, 2010; accepted September 16, 2011

Abstract

A left atrial mass associated with coronary artery disease is often diagnosed as a mural thrombus rather than other possible etiologies such as benign primary cardiac tumor (myxoma, lipoma), a malignant primary cardiac tumor (sarcoma, lymphoma), or secondary involvement for extracardiac tumors. Malignant lymphoma initially presenting as intracardiac masses is very rare. Chest computed tomography with contrast enhancement and cardiac magnetic resonance may be the best methods for distinguishing primary cardiac tumors from direct extension from adjacent mediastinal structures. We report the case of a 59-year-old man with incidentally found mediastinal diffuse large B-cell lymphoma invading the left atrium, which presented with coronary artery disease and a left atrial mass. Improvement in cardiac ventricular function heart after coronary artery bypass grafting may provide the patient with a better chance of receiving an adequate dose of chemotherapy.

Keywords: coronary artery disease; diffuse large B-cell lymphoma; intracavitary tumor; left atrial mass; mural thrombus

1. Introduction

Differential diagnosis of a clinically observed left atrial mass includes mural thrombus, benign primary cardiac tumor (myxoma, lipoma), malignant primary cardiac tumor (sarcoma, lymphoma), and secondary involvement from extracardiac tumors. Malignant lymphoma initially presenting as intracardiac masses is very rare.1 We report a case of a patient with mediastinal diffuse large B-cell lymphoma invading the left atrium, which was diagnosed incidentally from intra-operative frozen sections taken during coronary artery bypass grafting (CABG).

2. Case report

A 59-year-old man initially presented with intermittent chest tightness, nausea, and vomiting for several days. Coronary angiography demonstrated total occlusion of the right coronary artery and the left circumflex branch, and severe stenosis of the left anterior descending branch (LAD). Primary percutaneous coronary intervention stenting was tried but failed. The patient was then admitted for surgical intervention. He had a past history of nasopharyngeal carcinoma treated with surgical resection and adjuvant radiotherapy 28 years previously. He also had type II diabetes being treated with insulin for 5 years and hypertension for 10 years.

Physical examination revealed a normally developed middle-aged man with blood pressure of 106/72 mmHg. He had a grade III/VI systolic murmur heard over the left heart border and apex. Laboratory examinations including cell counts, serum electrolytes, and other biochemistry tests were unremarkable. Chest radiography revealed a calcified aortic arch with mild cardiomegaly and slight pulmonary congestion. An electrocardiogram (ECG) demonstrated sinus tachycardia with a complete left bundle branch block. An echocardiogram revealed general hypokinesia of the left ventricle with impaired systolic function and moderate to severe mitral valve regurgitation, with an estimated left ventricular ejection fraction (LVEF) of 16%. In addition, a mass measuring...
approximately $2.63 \times 1.67$ cm was noted on the posterior wall of the left atrium (Fig. 1), highly suspected of being a left atrial thrombus. Hence, CABG combined with mitral valve repair and removal of the left atrial thrombus was suggested.

The patient underwent conventional on-pump open heart surgery on June 7, 2010. The radial artery was anastomosed onto the LAD, and the reverse great saphenous vein was anastomosed onto the posterior descending branch and obtuse marginal branch 2 sequentially. A solid intracardiac tumor measuring $3 \times 1.5$ cm occupying the posterior wall of the left atrium was noted, and the left superior pulmonary veins were partially obstructed. Frozen sections of the tumor revealed high-grade malignant cells. An undersized annuloplasty of the mitral valve was performed with a 28-mm Carpentier—McCarthy—Adams IMR ETlogix annuloplasty ring (Edward Lifesciences LLC Irvine, CA 92614-5686, USA). The total time for bypass and aortic clamping was 242 minutes and 162 minutes, respectively. The procedures and postoperative course were smooth and uneventful.

The pathological diagnosis was diffuse large B-cell lymphoma. Microscopic sections revealed necrosis and a sheet-like pattern in the tumor. There were irregular large nuclei, an irregular nuclear membrane, prominent nucleoli, and a moderate amount of cytoplasm in the large cells (Fig. 2). Immunohistochemical staining showed strong positivity for CD20 (Fig. 3) but negativity for CD3, CD30, and cytokeratin (CK).

Multidetector computed tomography on June 15, 2010 revealed infiltrative soft tissue of $\sim 36$ mm in size over the mediastinum, obstructing the left lower pulmonary vein with protrusion to the left atrium and left upper pulmonary vein. Adjacent mediastinal lymphadenopathy was also noted (Fig. 4).

A whole-body positron emission tomography scan revealed increased fluorodeoxyglucose uptake at the mediastinum and left pulmonary hilum, consistent with tumor involvement. Bone marrow aspiration revealed normal cellular marrow with mild infiltration of small lymphocytes and serous degeneration without definite evidence of lymphoma involvement. The tentative diagnosis was primary mediastinal diffuse large B-cell lymphoma with intracardiac invasion, stage IIE.

Chemotherapy with regimen R-CVP (Endoxan 1200 mg, vincristine 2 mg, rituximab 600 mg) was started on June 23, 2010. An echocardiogram performed on July 19, 2010 showed that the patient’s LVEF improved from 16% to 21%.

3. Discussion

On clinical observation of an intracavitary cardiac mass, the differential diagnosis may include mural thrombus, benign primary cardiac tumor (myxoma, lipoma), malignant primary cardiac tumor (sarcoma, lymphoma), or secondary involvement from extracardiac tumors. Left atrial thrombi are most often associated with atrial fibrillation and/or rheumatic mitral stenosis, which accounts for over 45% of cardiogenic thromboemboli. Cardiac myxoma, usually involving the left atrium, is another possible diagnosis. The differentiation is frequently challenging.3

Fig. 1. A solid mass measuring $2.63 \times 1.67$ cm occupying the posterior wall of the left atrium (white arrow).

Fig. 2. Tumors with necrosis and a sheet-like pattern. The tumor cells have large nuclei and an irregular nuclear membrane.

Fig. 3. Immunohistochemical staining shows strong positivity for CD20.
A normal cardiac history and normal ECG findings may help in distinguishing an intracardiac tumor from a mural thrombus. Several non-specific systemic symptoms such as fever, chills, fatigue, malaise and weight loss were not seen in our patient; instead, he presented with intermittent chest tightness, which is typical for his confirmed ischemic heart disease. The clinical situations of coronary artery disease, congestive heart failure, mitral regurgitation, and chamber dilation of the left atrium also made the suspicion of mural thrombus logical. Transesophageal echocardiography is believed to be a better method for initial assessment of cardiac lesions in comparison to transthoracic echocardiography. If a mass obstructing a pulmonary vein is noted, a tumor is more likely than an intra-atrial thrombus. However, histological evaluation is necessary for a definitive diagnosis.

Primary cardiac lymphomas are rare neoplasms that account for 1.3–2% of all primary cardiac tumors. Secondary involvement from extracardiac tumors is 20–40 times more common than primary cardiac tumors. Primary mediastinal B-cell lymphoma, a less common subtype of diffuse large B-cell lymphoma that arises in the thymus and mainly affects young adults, is more common in women than men. Common symptoms include dyspnea, cough, chest pain, fatigue, loss of appetite, enlarged lymph nodes, night sweats, and fever. Malignant lymphoma initially presenting as an intracardiac mass is very rare. Most patients remain clinically undetected and are diagnosed from autopsy findings. When the heart is involved, patients often present with impaired ventricular function caused by ventricular invasion, and the prognosis is poor. Differentiation between primary cardiac lymphoma and secondary heart invasion by lymphoma is challenging. The two conditions share similar and non-specific symptoms (fever, chills, night sweats, weight loss, fatigue, and occasionally chest discomfort due to pleural or pericardial effusion or external compression). Primary cardiac lymphoma mainly involves the right side of the heart in 69–72% of cases, with rare extracardiac involvement. Chest computed tomography with contrast enhancement and cardiac magnetic resonance may offer the best methods to distinguish primary cardiac tumor from direct extension from adjacent mediastinal structures.

Ban-Hoefen et al reported a case of diffuse large B-cell lymphoma with left atrial and esophageal invasion, which presented with a left atrial mass and dysphagia. The patient died on the 15th day of chemotherapy. Acute myocardial infarction caused by direct compression of lymphoma or as a late complication of radiation and chemotherapy has also been reported. To the best of our knowledge, this is the first case of primary mediastinal diffuse large B-cell lymphoma with left atrial invasion.

During follow-up, echocardiography revealed an improvement in LVEF, indicating that CABG and mitral valve annuloplasty improved the patient’s heart function. Against the cardiotoxicity of the chemotherapeutic agent rituximab, the surgical procedures carried out may have provided our patient with a better chance of receiving an adequate dose of chemotherapy.

References