Case Report
Primary cardiac lymphoma mimicking atrial myxoma in an HIV and EBV-positive patient: a case report

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Abstract: Primary cardiac lymphoma (PCL) is an extremely rare neoplasm arising from the heart (and/or pericardium) and should be distinguished from the secondary involvement of lymphomas from other parts of the body or other malignant tumors originating from the heart. In the present report, we present the case of a 40-year-old male infected with HIV (human immunodeficiency virus) and EBV (Epstein-Barr virus) suffering from palpitation, dyspnea for a month, and in whom echocardiography showed a mass in the right atrium suggesting atrial myxoma. A surgical excision of the lesion was performed, but, unexpectedly, a diagnosis of diffuse large B-cell lymphoma was made according to the microscopic features and immunohistochemical studies.

Keywords: Primary cardiac lymphoma, HIV, EBV, atrial myxoma

Introduction
Primary cardiac lymphoma (PCL) is an extremely rare but lethal neoplasm arising from the heart (and/or pericardium) [1]. PCL makes up only 1.5% of primary cardiac tumors and 0.5% of extranodal lymphomas. It is difficult to recognize because it lacks characteristic signs, and the overall survival is often very short. According to Rolla, 66 patients had a median survival time of only 7 months [2]. The clinical manifestations include dyspnea, arrhythmias, pericardial effusion, atrioventricular block, and heart failure [3]. For this disease, only several cases has been reported with HIV infection [4], and even fewer have been reported with EBV infection [5].

Case presentation
A 41-year-old man presented to a Xiangya hospital with palpitation, dyspnea after labor and one instance of syncope, with no medication taken, and his symptoms progressed to dyspnea at rest, and all his symptoms had lasted for the previous month. The patient was a civil servant and owned no pets. He lived in the south of Hunan Province and had not traveled outside China. He was divorced and reported no children, no recent sexual contacts, and he drank alcohol occasionally and was a light smoker. He reported no headache, chest pain, abdominal pain or cough, and reported no history of coronary heart disease, hypertension, hepatitis, tuberculosis, Schistosoma exposure, exposure to toxic or radioactive substances, operation, trauma, transfusion or allergy, and he lost about 5 kilograms in the previous month.

On physical examination, the patient showed no fever, his heart rate was 109 beats per minute, his blood pressure was 84/64 mm Hg, and his respiratory rate was 20 breaths per minute. He was sober and not experiencing any pain. The lungs were clear, and no heart murmur or abnormal vascular pulse was heard.

An electrocardiogram (ECG) revealed sinus tachycardia, and an echocardiography suggested
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a right atrial myxoma with a mass size of 56 × 45 mm (Figure 1A), the right atrium was enlarged with a tricuspid obstruction (accompanied by a speeding blood flow of about 2.053 m/s) (Figure 1B, 1C). The erythrocyte sedimentation rate (ESR) was raised to 50 mm/h (refer-

Figure 1. A. Transthoracic 2D echocardiograph showing a 56 × 45 mm mass in the right atrium; B, C. The right atrium enlarged with tricuspid obstruction (accompanied by a speeding blood flow about 2.053 m/s).

Figure 2. Pre-surgery Chest X ray was negative for metastasis (A. Anteroposterior film; B. Lateral film).
ence range 0-21 mm/h), the pro-brain Natriuretic Peptide (proBNP) was elevated to 2776 pg/ml (reference range 0-125 pg/ml), his C-reaction protein (CRP) ascended to 19 mg/L (reference range 0-8 mg/L). His thyroid hormone test showed normal function and the pre-surgery chest X-ray was negative for metastasis (Figure 2A, 2B).

Considering that surgical excision of the mass was the best treatment, an operation was scheduled, and a pre-transfusion examination was performed, which showed the patient was HIV positive, and the HIV test was repeated. Treatment options and findings were discussed with the patient, and the decision was made to perform the surgery under general anesthesia with extracorporeal circulation. The mass was removed with a pedicle 2 cm in length, along with an additional 5 mm clinical margin. The gross specimen revealed a yellow, solid, slightly soft mass in the cut section, and a small area of hemorrhage was noted with no necrosis.

No signs of a myxoma component in the specimen were found. Tumor cells compressing and invading the myocardium (Figure 3A) with CD3-positive T cells surrounding them (Figure 3B) were apparent in a low-power microscopic examination. A diffuse proliferation pattern of large atypical lymphoid cells that varied in nuclear shape were shown in a high-power field.

![Figure 3. A. Hematoxylin and eosin stains shows the tumor compressing and invading the myocardium (magnification × 10). B. Immunohistochemical staining for CD3 showed T cells around the mass while the tumor cells are negative (magnification × 10). C. Hematoxylin and eosin stains show a diffuse proliferation pattern of large atypical lymphoid cells in various nuclear shapes (magnification × 400). D. Immunohistochemical staining for CD20 is positive (magnification × 400). E. In situ hybridization for EBER is positive (magnification × 400). F. Immunohistochemical staining for Ki67 is positive (about 85%, magnification × 400).]
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(Figure 3C), and the cells were stained strongly positive for CD20 (Figure 3D), EBER (in situ hybridization, Figure 3E), PAX5, MUM1, Bcl6 and were negative for CD5, CD10, ALK, CD30, CD31, CD34, myogenin and CD68. The proliferation rate of ki67 was about 85% (Figure 3F). Diffuse large B-cell lymphoma, non-GCB (germinal center B cell-like) was diagnosed according to the WHO classification.

The patient was discharged just when he got the pathology results, and we suggested that he look for further chemotherapy and antivirus treatment in the department of hematology and the local HIV/AIDS care center. The follow-up is now in progress.

Discussion

There are two definitions of PCL: 1, an extranodal non-Hodgkin’s lymphoma involving only the heart and/or pericardium [6], and 2, an extranodal non-Hodgkin’s lymphoma involving mostly the heart and/or the pericardium [7]. Most PCLs reported are of B-cell origin, especially the diffuse large B-cell lymphomas, and T-cell lymphomas are extremely rare [8]. PCL has been reported with increasing frequency in patients with immunodeficiency, and they are associated with HIV or EBV infection, congenital immunodeficiency, and organ transplantation [9].

HIV has long been recognized as being closely associated with lymphomas, but even in AIDS patients, the heart is a rare location for lymphomas to grow, which may be blamed on compromised immunologic surveillance [10]. There are also some PCL cases reported in immunocompetent patients [11].

EBV has long been studied with lymphomas, especially with diffuse large B-cell lymphoma, and there are cases of composite tumors of myxoma and diffuse large B-cell lymphoma with a positive EBER stain, suggesting that the formation of diffuse large B-cell lymphoma arising within the atrial myxoma is driven by EBV which promotes lymphatic cell proliferation [9], but in our case, no signs of any myxoma component were found, and some believe that EBV is not the etiology of PCLs [12].

There are many reports of the co-infection of HIV and EBV in lymphomas [13], but no cases arising in the heart has been reported as far as we know, and the whether HIV, EBV or the combination of the two caused this case of lymphoma remains unclear.

Echocardiography is the most common noninvasive technique that is used when a cardiac tumor is suspected, but lymphomas are too rare to be noted [2, 14], and this case reminds us to distinguish between PCL and other tumors originating from the heart (when secondary involvement is excluded), and that the most common tumor to be seen is myxoma, which usually occurs in the left atrium, while lymphoma is more often seen in the right atrium [15]. The phenomenon of the lymphoma favoring the right atrium may be explained by the fact that the thoracic duct drains lymph into the superior vena cava and then into the right atrium [16]. This kind of location favoring is also helpful in distinguishing lymphoma from primary cardiac sarcomas, which may occur in any part of the heart [17]. Similar to our case, there is a report of lymphoma mimicking the right atrial thrombus [18].

The treatment for PCL consists of surgical resection, chemical therapy, and radiotherapy. Surgical resection can ease the symptoms and help in getting the pathological diagnosis, but it won’t benefit the patient’s prognosis [19]. Chemotherapy is the standard approach for treating PCL with a CHOP/R-CHOP scheme, because most PCLs are large B-cell lymphomas that are sensitive to chemotherapy with a possible high CR (complete response) rate of 71% [19]. Radiotherapy may serve as a supplementary treatment when the volume reduction of the tumor is achieved by chemotherapy, but Petrich’s research showed this supplementary therapy didn’t help the patients survive longer compared to a single chemotherapy treatment [19].

In conclusion, we report a patient with primary cardiac lymphoma, which was localized in the right atrium. The patient did not present with signs of a malignant tumor except for weight loss preoperatively. Laboratory data from earlier clinical visits, including both positive results for HIV and EBV, were unavailable. A surgical excision was performed, and a pathologic examination with immunohistochemical studies of the mass led to the diagnosis of diffuse large B-cell lymphoma, non-GCB.
Disclosure of conflict of interest

None.

Abbreviations

PCL, primary cardiac lymphoma; HIV, human immunodeficiency virus; EBV, Epstein-Barr virus; ECG, electrocardiogram; ESR, erythrocyte sedimentation rate; proBNP, Pro-brain Natriuretic Peptide; CRP, C-reactive protein; GCB, germinal center B cell-like; CR, complete response.

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References