



LETTER / Cardiac imaging

Imaging features of primary cardiac lymphoma

Keywords Primary cardiac lymphoma; Cardiac lymphoma; Cardiac imaging; Cardiac CT; Large B-cell lymphoma

Dear Editor,

Primary cardiac lymphoma (PCL) represents only 1.3% of all cardiac tumors and 0.5% of all extranodal lymphomas [1–3]. PCL is really an oncologic emergency being fatal within few months unless diagnosed and treated in time [4]. We report herein the imaging features of PCL.

A 78-year-old woman with a history of chronic increasing chest pain presented to the emergency department with acute chest pain and feeling of imminent death. She had dyspnea on exertion. Computed tomography (CT) angiography of the thorax (Figs. 1 and 2) was first performed to exclude pulmonary embolism. Cardiac views revealed an

heterogeneously enhancing infiltrating mass developing on the roof, anterior wall and apex of the heart with infiltration of the interventricular groove, interventricular septum and partially of the right outflow tract. Epicardial effusion was associated. The anterior interventricular coronary artery was found traversing the tumor without any invasion or compression. These findings were confirmed by transoesophageal echocardiography. ¹⁸fluorodeoxyglucose (FDG) positron emission tomography (PET) CT revealed intense ¹⁸FDG uptake of the mass with no other areas of hypermetabolism. Paroxysmic, complete, atrioventricular block was associated and the patient underwent pacemaker placement. The final diagnosis was obtained through transcatheter endomyocardial biopsy, which confirmed diffuse large B-cell lymphoma (Fig. 3) and R-CHOP chemotherapy was initiated.

PCL occurs in patients with a median age of 63 years. The male to female ratio is 2(3):1. Most cases are diffuse large B-cell lymphoma [1,2]. PLC is much more common in immunosuppressed patients. Nevertheless, a considerable

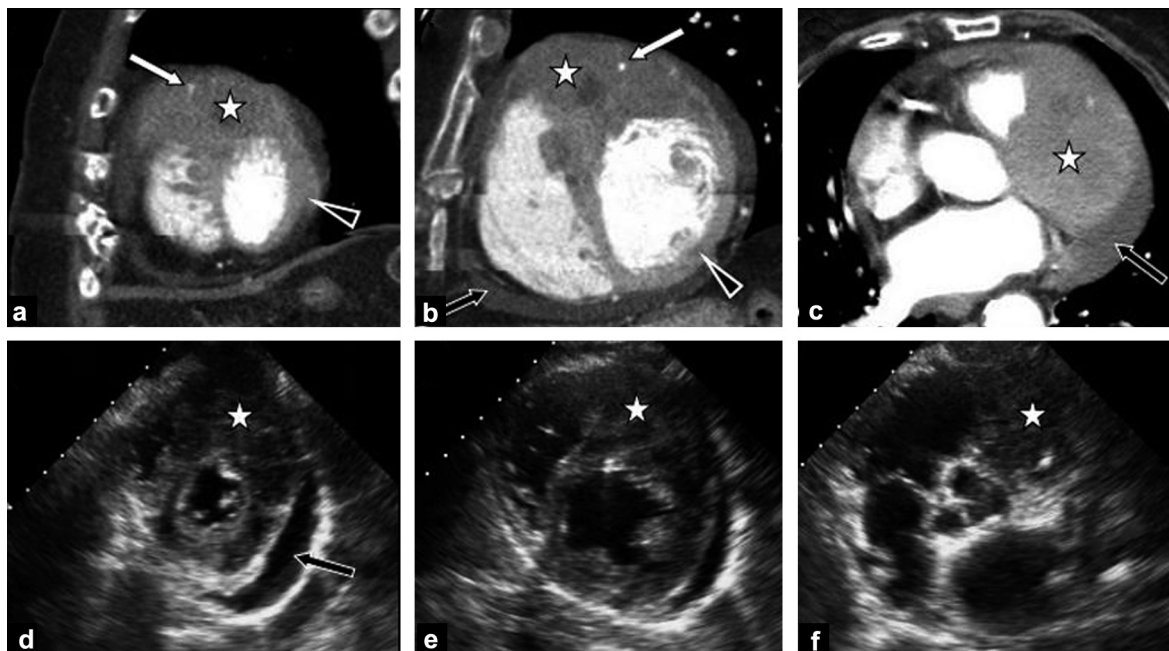


Figure 1. Cardiac computed tomography images in short axis (a and b) and long axis view (c) show infiltration of the roof, interventricular groove and cardiac septum by an heterogeneously enhancing infiltrating mass (white star) whose attenuation appears slightly lower than that of the adjacent myocardium (arrowhead). The interventricular coronary artery passes through the tumor without any direct invasion or compression (white arrow). Corresponding short axis (d and e) and long axis (f) echocardiographic views show infiltration of the cardiac muscle by a heterogenous, hypoechoic mass (white star). Pericardial effusion is present (black arrow on b and d).

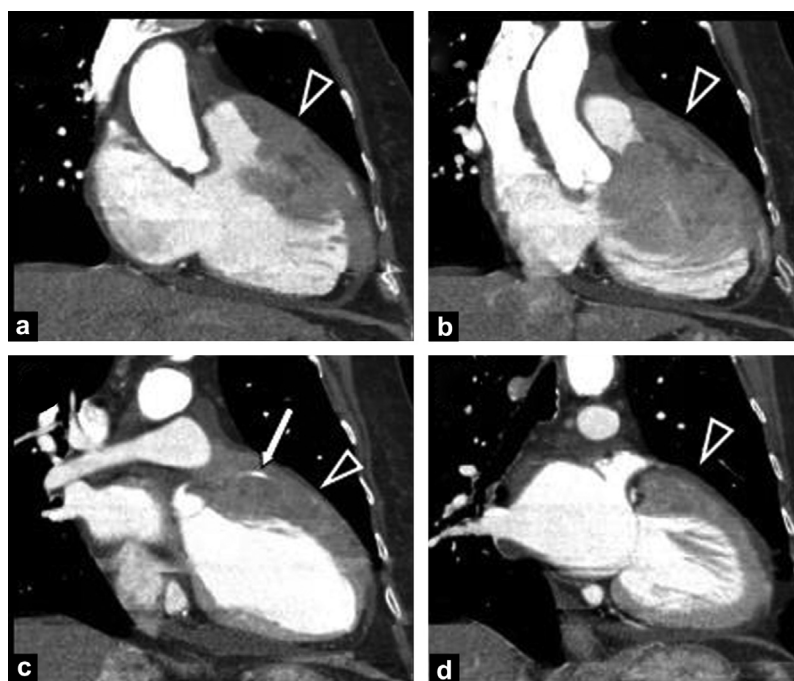


Figure 2. Cardiac computed tomography images in coronal oblique long axis (a to d) show infiltration of the roof, interventricular groove and septum by a heterogeneously enhancing infiltrating mass (arrowheads). The interventricular coronary artery passes through the tumor without any direct invasion or compression (white arrow).

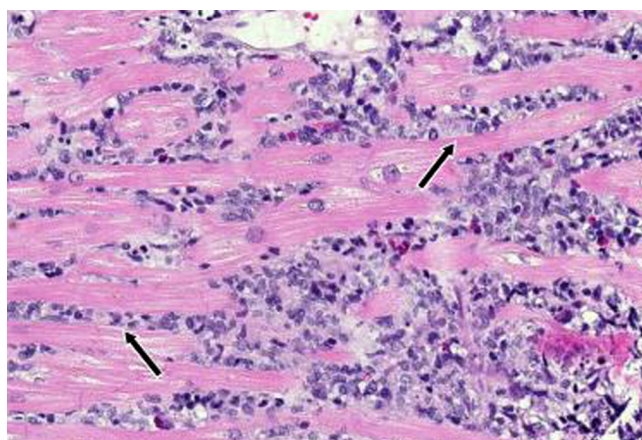


Figure 3. Hematoxylin-Eosin staining ($\times 400$) show diffuse large B-cell type cells diffusely infiltrating myocardial cells (arrows).

proportion still predominantly occurs in immunocompetent patients [2,3]. Patients with PCL may present with dyspnea (64%), congestive heart failure (47%), pericardial or pleural effusion, chest pain (24%), aspecific constitutional complaints (fever, chills, sweats and weight loss) (26%), cardiac tamponade due to extensive pericardial effusion, superior vena cava syndrome, cardiac infarction, pulmonary embolism. Moreover, 56% of patients manifest heart rhythm disturbances dominated by atrial arrhythmias (23%) and atrio-ventricular blocks (22%). PLC most commonly manifests as an ill-defined, infiltrative mass in the myocardium, with pericardial effusion and/or masses [2,3]. The right side of the heart is preferentially affected [2,5]. Other commonly invaded structures are the septum and the superior vena cava. Ultrasound demonstrates a hypoechoic mass

infiltrating most frequently the right heart often associated with pericardial effusion. Transesophageal ultrasound is twice much effective for the diagnosis [5]. Cardiac CT reveals an infiltrating epicardial or myocardial mass whose attenuation values may be similar or lower than those of the normal myocardium [3,5]. In our patient, the mass displayed heterogeneous enhancement. PCL tends to extend along the epicardial surfaces of the heart, primarily encasing adjacent structures including coronary arteries and the aortic root [3]. The absence of direct invasion or compression of the coronary arteries traversing the tumor is typical [5,6], assumably due to the softness of the tumor. There is also a frequent extension along the atrioventricular groove. Pericardial effusion or only pericardial thickening may be the only finding [7]. Magnetic resonance imaging best depicts the extent of myocardial and pericardial infiltration. PCL can be relatively hypointense on T1-weighted images and hyperintense on T2-weighted images, although PCL can be isointense relative to the myocardium. Contrast enhancement is frequent and may be homogeneous or heterogeneous [3]. ^{18}F FDG PET-CT may be useful in evaluating the response to chemotherapy [3]. Cytology is diagnostic in only two-thirds of cases. Liquid cytology of the cardiac or pleural effusion is very useful. If cytology is not available, the diagnosis can be assisted by cardiac tissue biopsy [4]. Chemotherapy is the most effective treatment for PCL. Sixty-one percent of patients may have remission with chemotherapy alone. Radiation therapy alone, does not improve the prognosis of PCL. Surgical excision is often difficult and incomplete but may be necessary before chemotherapy especially when hemodynamics is already compromised for example by partial or full occlusion of the outflow tract [1,4]. Differential diagnosis includes metastatic lung carcinoma and cardiac sarcomas [5].

Disclosure of interest

The authors declare that they have no competing interest.

References

- [1] Jovanicius K, Salcius K, Meskauskas R, Valeviciene N, Tarutis V, Sirvydis V. Primary cardiac lymphoma: two cases and a review of literature. *J Cardiothorac Surg* 2015;10:138.
- [2] Petrich A, Cho SI, Billett H. Primary cardiac lymphoma: an analysis of presentation, treatment, and outcome patterns. *Cancer* 2011;117:581–9.
- [3] Jeudy J, Kirsch J, Tavora F, Burke AP, Franks TJ, Mohammed TL, et al. From the radiologic pathology archives: cardiac lymphoma: radiologic–pathologic correlation. *Radiographics* 2012;32:1369–80.
- [4] Wang TL, Lai CH, Liou JY, Lo HM, Shyu KG. Complete AV block and torsades de pointes in a case of primary cardiac T-cell lymphoma. *Acta Cardiol Sin* 2015;31:245–8.
- [5] Colin GC, Symons R, Dymarkowski S, Bogaert J. Value of CMR to differentiate cardiac angiosarcoma from cardiac lymphoma. *JACC Cardiovasc Imaging* 2015;8:744–6.
- [6] Nose N, So T, Sekimura A, Miyata T, Yoshimatsu T, Matsuno Y. The diagnosis of primary cardiac lymphoma was facilitated by computed tomographic coronary angiography. *J Surg Case Rep* 2014;12:1–3.
- [7] Araoz PA, Eklund HE, Welch TJ, Breen JF. CT and MR imaging of primary cardiac malignancies. *Radiographics* 1999;19:1421–34.

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