

# Mediastinal Lymphoma Eroding the Right Atrium

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## ABSTRACT

Primary cardiac tumours are an uncommon cause of intra-cardiac mass. Most common intra-cardiac mass is thrombus followed by infiltrating secondary cardiac tumours. These secondary tumours are more likely to invade the cardiac chambers when they arise from close vicinity of the heart. We report an unusual case of mediastinal lymphoma in a 55 years old lady presenting as an intra-cardiac mass in the right atrium, which was detected by a transthoracic echocardiogram and later confirmed with more specific modalities.

**Key words:** *Intracardiac mass. Mediastinal lymphoma. Right atrium. Transthoracic echocardiography.*

## INTRODUCTION

Primary cardiac tumours are very rare, published incidence is 0.3 – 0.7%.<sup>1</sup> Only one-third of primary tumours are malignant and two-third are benign. Most common malignant tumours are the sarcomas, angiosarcomas being the commonest. They vary in location but commonly right atrium is the site for angiosarcoma while fibrous leiomyosarcoma commonly arise from the left atrium.<sup>2</sup>

Secondary tumours are far more common cardiac tumours and their incidence varies in literature ranging from 2.3 to 18.3%.<sup>3,4</sup> Although, not every malignant tumour has a preference to metastasize to the heart but some tumours do, for example, melanoma and mediastinal primary tumours. These tumours can spread to the heart through various methods; by direct extension, through the blood stream, through the lymphatic system, and by intra-cavitary diffusion through either the inferior vena cava or the pulmonary veins. Tumours that result into the erosion of heart chambers usually arise from nearby structures, for example lungs or mediastinal tissues. The tumours with highest metastatic rate to heart are pleural mesothelioma (48.4%), melanoma (27.8%), lung adenocarcinoma (21%), undifferentiated carcinomas (19.5%), lung squamous cell carcinoma (18.2%) and breast carcinoma (15.5%).<sup>5</sup> High rates of heart metastases have also been observed in patients affected by ovarian carcinoma (10.3%), and lymphomyeloproliferative neoplasms (9.4%).<sup>5</sup>

This case report describes a mediastinal lymphoma that eroded into the right atrium and got detected on transthoracic echocardiography.

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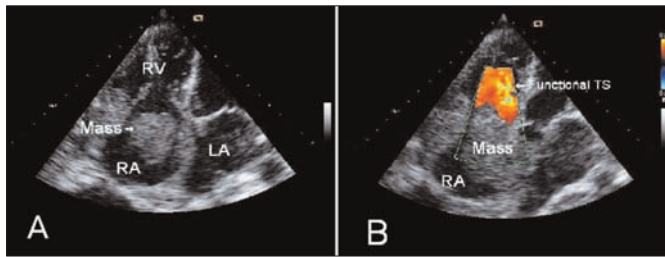
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## CASE REPORT

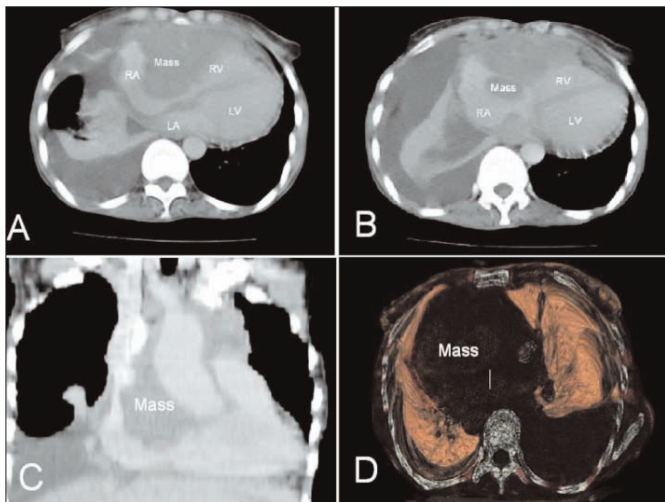
A 55-year-old female presented to the emergency department with history of weight loss for the last 6 months and symptoms suggestive of congestive heart failure (CHF) exacerbation. On physical examination, she had generalized wasting, raised jugular venous pulse, and lower extremities oedema. A chest radiography revealed wide mediastinum with normal cardiac silhouette. As a part of evaluation protocol, transthoracic echocardiography (TTE) was performed to assess the cardiac chambers. TTE showed normal left ventricular dimension and function with mildly dilated left atrium (LA). Right atrium (RA) was markedly dilated with an echogenic mass extending upto the tricuspid valve annulus (Figure 1 A). Colour Doppler evaluation of tricuspid valve showed high velocity flow with aliasing across the tricuspid valve producing a functional tricuspid valve stenosis (TS Figure 1B). Subsequently, a computed tomography scan of chest was obtained, which showed anterior mediastinal mass compressing the right atrium externally (Figure 2A) and eroding into the right atrium (Figure 2B). A histological examination confirmed diagnosis of malignant lymphoma. Patient was referred to oncology services for further management.

## DISCUSSION

Cardiac manifestation of cardiac metastases is very variable. Depending upon the cardiac tissue involvement, it may be the only manifestation of primary tumour or it may totally go unrecognized and only diagnosed after death on autopsy. Focal involvement of myocardium may result in non-specific symptoms, while extensive involvement of myocardial tissue may result with more pronounced signs and symptoms. For example, extensive shortness of breath, hypotension and distant heart sounds are due to large pericardial effusion with tamponade physiology. Secondary tumours involving myocardium may result in electrical disturbance, and patient may present with atrial arrhythmias, like



**Figure 1:** (A) Representative TTE images showing LA, right ventricle (RV) with an echogenic mass in RA; (B) a high velocity flow with aliasing at tricuspid annulus, producing a functional stenosis.



**Figure 2:** Computed tomographic images of mediastinal mass. Axial slices of the upper right atrium (A) and at tricuspid annulus level (B) showing a compressed RA and tricuspid annulus; coronal plan image (C) shows the upper and lower extension with the right atrium; axial plan image with volume rendering (D) distinguishes mediastinal mass from lung parenchyma.

atrial fibrillation, pre-mature atrial complexes, atrial flutter, and ventricular arrhythmias. Atrioventricular blocks or bundle branch blocks may present when the conduction system has been infiltrated with metastases.<sup>6</sup>

Intra-cavitary erosion of secondary tumours can become so obstructive that it fills the chamber completely and blocks valve movement, resulting in a clinical pattern similar to pericardial constriction or myocardial restrictive disease.

Transthoracic echocardiography (TTE) is the mainstay imaging technique for cardiac tumour detection. Using echocardiography Lai *et al.* reported that upto 75% of

cases among patients with mediastinal lymphoma involve the heart and its related structures.<sup>7</sup> Although generally robust, TTE carries several well-described limitations, including operator dependence, restricted field of view (especially in patients with a large body habitus), and occasional limited imaging of the right heart chambers. In a situation when the TTE is unable to provide good quality data, transesophageal echocardiography (TEE) improves image quality considerably but is more invasive and carries a restricted field of view, with limited views of the aortic arch, inferior vena cava, and left ventricular apex. Recent developments in three dimensional (3D) imaging have further enhanced its role in the evaluation of cardiac masses. It has many advantages over two dimensional (2D) in imaging cardiac tumours by allowing for the acquisition of full volumes, live 3-D images, and 3-D zoom (smaller, magnified, pyramidal data at higher resolution). Three-dimensional TTE is much better at evaluating mass volume over 2D.<sup>8</sup> Cardiac computed tomography (CT), and cardiovascular magnetic resonance (CMR) provides more robust data over echocardiography in terms of tumour size, extent and tissue characteristics.

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