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The Diagnostic and Therapeutic Dilemma of Multiple Left Ventricular Masses

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Abstract

Intracardiac masses are rare and potentially life-threatening entities with diverse clinical presentations. The prompt identification of cardiac masses is critical. However, even with the advancement we have in imaging modalities, diagnosing cardiac masses remains a formidable challenge. Herein, we present the case of a 62-year-old female who presented with a three-week history of dyspnea and chest pain. Further workup revealed elevated troponins, thrombocytosis, and ST-segment elevation in the anterolateral leads. Chest CT revealed a concerning lung mass, along with vertebral lesions and a large pleural effusion. The patient underwent treatment for suspected myocardial infarction. Additional imaging identified five intracardiac masses in the left ventricle suspicious for either malignancy or thrombi. High-intensity heparin drip was started, yet the patient developed neurological symptoms. Neuroimaging showed new cerebral infarcts. Based on the patient and her family's wishes, the patient transitioned to comfort care and passed away from gastrointestinal bleeding.

In our case, the patient's presentation raised questions about whether her intracardiac masses were malignant or thrombotic. The decision to initiate and maintain anticoagulation therapy constitutes a debate, emphasizing the need for an individualized approach and shared decision-making with the patient and the multidisciplinary team.

Keywords: Cardiac masses, Thrombus, Embolization, Lung cancer

1. Introduction

While intracardiac masses are rare, they can carry significant risk if not diagnosed promptly. Clinical presentation is variable, and diagnosis remains challenging despite advances in imaging modalities. Here, we present a case of a 62 year-old patient with multiple intracardiac masses and detail the complex evaluation and complications.

2. Case report

A 62-year-old woman presented to the emergency room with a three-week history of progressive dyspnea and chest pain. Her past medical history includes hypertension, hypothyroidism, tobacco use (15 pack-year), and thrombocytosis. No family history of malignancies or thromboembolic events. On

exam, she was hypertensive (150/100 mmHg), tachycardic (116 beats/minute), with normal first and second heart sounds, markedly decreased air entry in the right lung, and no lower limb edema.

Workup revealed elevated troponins with significant delta (200–273 ng/L at 2 h), and thrombocytosis ($1028 \times 10^9/L$, normal peripheral smear). ECG showed sinus tachycardia with ST elevation in the anterolateral leads. Non-contrast chest CT revealed a mass in the right upper lung with focal central necrosis concerning for malignancy (Fig. 1). She also had destructive vertebral osseous lesions and a large right-sided pleural effusion. Due to concerns for STEMI, the patient was loaded with aspirin and clopidogrel, and was started on heparin drip. She underwent heart catheterization which demonstrated moderate coronary artery disease and proximal LAD 50% stenosis with no

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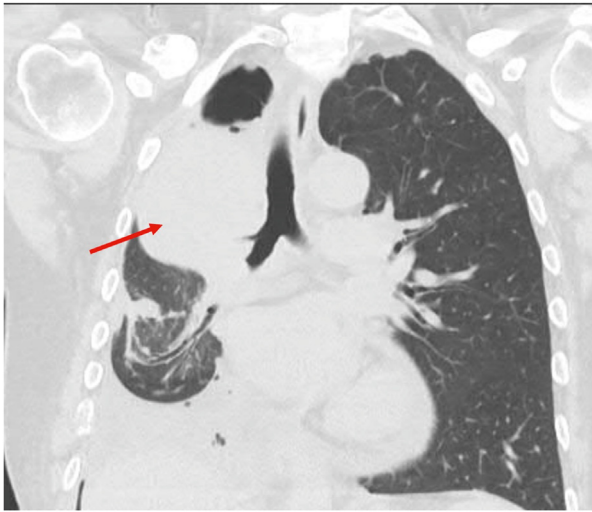


Fig. 1. CT chest (coronal plane) showing mass-like consolidation in the right upper lung (arrow).

intervention. A trans-thoracic echocardiogram (TTE) showed five intracardiac masses (1 out of 5 is mobile) in the left ventricle (LV), attached to an akinetic anteroseptum (Fig. 2). The largest measured 1.7×2.1 cm. LV size was normal with a low ejection fraction of 34%. There was also mild-to-moderate pericardial effusion. These LV masses were suspicious for either malignancy or thrombi. High intensity heparin drip was started. Over the next 24 h, the patient became incoherent with right-sided weakness. Head and neck CT, CT angiography, and brain MRI were significant for left cerebral multifocal infarcts most prominently involving the cortex in the peri-rolandic and parietooccipital regions. Based on the patient and her family's wishes, she was transitioned to comfort

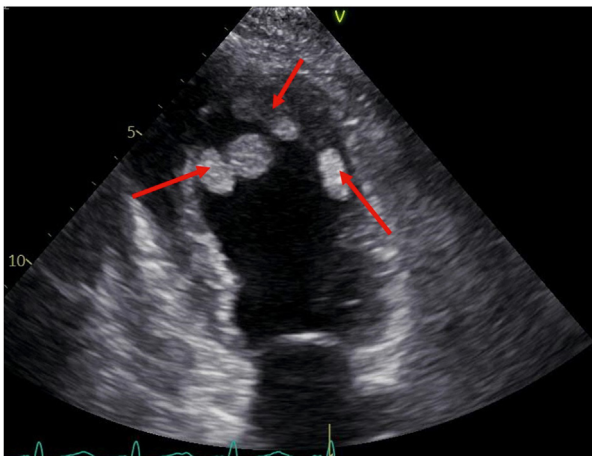


Fig. 2. Transthoracic echocardiogram (apical two chamber view) showing left ventricular masses (arrows).

cares. Soon thereafter, she developed new gastrointestinal hemorrhage and passed away.

3. Discussion

Intracardiac masses are rare entities that can be found incidentally in many cases. Nevertheless, their clinical presentation can be life-threatening, possibly leading to blood flow obstruction, arrhythmia, and systemic embolization.¹ Potential differential diagnoses include thrombi, vegetations, primary tumors (benign and malignant), metastatic diseases, among other rare conditions. Most cardiac masses are benign formations like thrombi or vegetations rather than cancerous growths.¹ Cardiac tumors are uncommon, with cardiac metastases being notably more common than primary cardiac tumors.¹

Given the diversity and location of cardiac masses, identifying and managing them represent a diagnostic dilemma in clinical practice. In the past, diagnosis was reliant on histological samples obtained during surgery or post-mortem examinations. However, advancements in imaging techniques have improved our ability to characterize these masses. TTE is frequently the initial imaging choice due to its accessibility, cost-effectiveness, and noninvasive nature. Perfusion echocardiography to assess the vascularity of these structures can be helpful as well.² Transesophageal echocardiography (TEE) surpasses TTE in its ability to precisely illustrate the correlation between the cardiac mass and the neighboring tissue, particularly in cases of atrial masses.¹ Cardiac magnetic resonance (CMR) is a frequently considered second-line imaging modality because of its high ability to characterize tissues. One study demonstrated that CMR can differentiate thrombi from tumors based on certain characteristics of the cardiac mass.³ Another study showed that CMR achieved a higher sensitivity and specificity in LV thrombi detection compared to TTE and TEE.⁴ However, CMR is expensive and not widely available, even in well-developed nations. PET can also provide an incremental value in that regard.⁵

Despite imaging advancements, numerous cases have been documented in the literature wherein distinguishing a cardiac tumor from a thrombus posed a challenge.^{6,7} Obtaining a pathological sample remains the sole dependable approach to definitive diagnosis.⁸ Our patient's presentation raised two questions to be addressed promptly. The first is whether her LV masses represent thrombi or malignancy. The second is whether anticoagulation should be urgently started.

To address the first question, our patient had some factors favoring malignancy. These include

the large necrotic lung mass and pleural effusion, pericardial effusion, and destructive vertebral osseous lesions. Several other factors however favored thrombi. These include the smaller size of LV thrombi, many being immobile on an akinetic anteroseptum in the setting of possible STEMI, and the significant thrombocytosis. In addition, malignancy would increase her thrombosis risk. There was no time to obtain CMR as she unfortunately deteriorated quickly. Hence, an individualized, multidisciplinary approach was followed after discussing this with our patient and her family.

The second question regarding anticoagulation initiation is a topic of debate in the literature. Some studies indicate that medical management with anticoagulants is ineffective in preventing recurring embolic events in scenarios involving cardiac masses like myxomas.⁹ Conversely, other studies recommend considering anticoagulation or thrombolytics when the potential for thrombosis exists, even when uncertainty surrounds the diagnosis. This again highlights the importance of an individualized approach.¹⁰ In stable patients, contrast-enhanced CMR would likely help in differentiating thrombi from tumors (i.e., lack of contrast uptake in the former).¹¹

4. Conclusion

This case highlights the complexity associated with diagnosing and managing patients with cardiac masses. A detailed analysis of the clinical presentation, and imaging modalities is essential in reaching the correct diagnosis. CMR can offer additional useful information about the nature of the mass which helps in guiding management.

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Conflict of interest

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