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## Case Report

# Fungal endocarditis resembling primary cardiac malignancy in a patient with B-cell ALL with culture confirmation

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## ABSTRACT

Fungal endocarditis is a rare subtype of infective endocarditis that often presents with nonspecific symptoms in patients with complex medical histories, making diagnosis challenging. Patients with a history of ALL may present with congestive heart failure, chemo-induced cardiomyopathy, acute coronary syndrome, cardiac lymphomatous metastasis, or infections. We present the case of a patient with a history of ALL who presented with acute coronary syndrome and imaging concerning for primary cardiac lymphoma, when in fact the patient ended up suffering from culture proven fungal endocarditis.

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## Introduction

Infective endocarditis is a condition that carries high mortality and is becoming more common in the United States with an estimated incidence of 15 per 100,000 in 2011 [1]. Fungal endocarditis (FE) is a rare subtype with an incidence of 2 per 1,000,000 [1,2]. Additionally, FE is associated with a high mortality of approximately 50%, necessitating expedient diagnosis and treatment [3]. FE can mimic many diseases and

often presents as a fever of unknown origin with nonspecific B-symptoms, making diagnosis even more challenging in patients with lymphoma. FE can also mimic heart failure or even primary cardiac malignancies as illustrated in this case [4].

## Case presentation

We present the case of a 64 year-old male with a history of B-cell ALL who presented to the emergency department with bruising and chest pain 17 days following initial diagnosis of

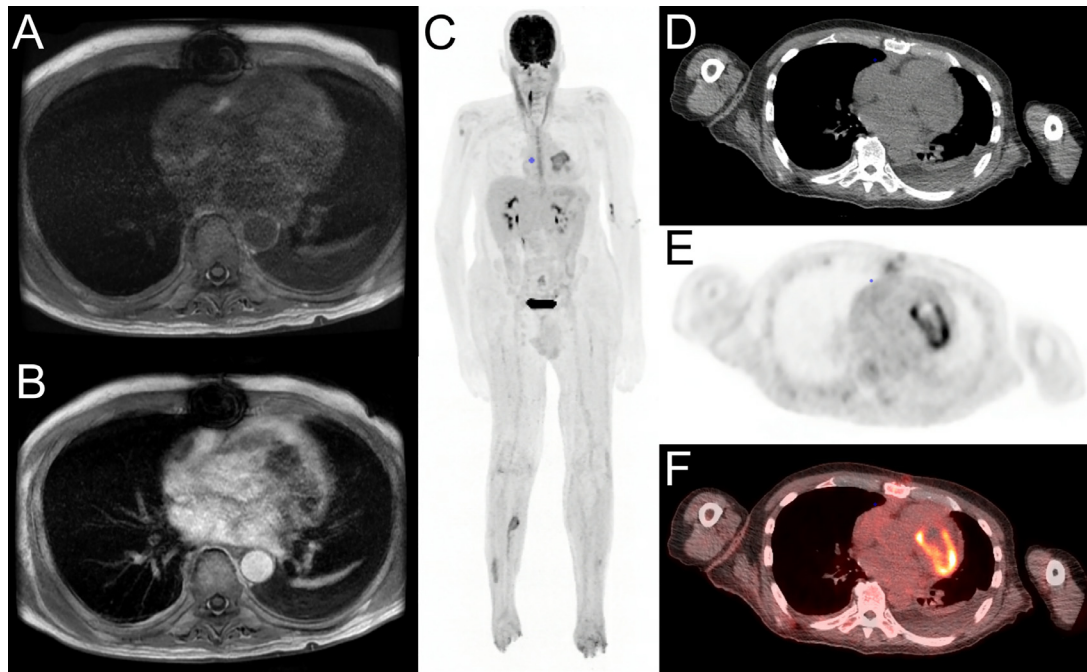
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**Fig. 1 – Cardiac MRI, CT and FDG-PET imaging of fungal endocarditis in a patient who presented with acute coronary syndrome. Cardiac MR was used to assess lesions suspicious for cardiac malignancy after CT imaging. Fig. 1 A and B show an area of the left ventricle primarily T1 isointense to muscle, with heterogeneous areas of T2 hyperintensity. There is contrast rim-enhancement of this lesion with a nonenhancing core. FDG-PET/CT demonstrates a hypermetabolic rim lesion overlying the pericardium and anterior wall of the left ventricle concerning for a metabolically active process such as infection vs malignancy**

his leukemia. The patient was started on cyclophosphamide, vincristine, doxorubicin, dexamethasone and dasatinib C1D1 therapy for acute ALL but developed severe chest pain with troponins of >40, at the time thought to have acute coronary syndrome. The patient was then sent for coronary catheterization considering elevated troponins, however, angiography demonstrated clear coronary arteries, while serial echocardiography revealed pericardial effusion with wall motion abnormalities consistent with myopericarditis. At that time, the patient's therapy was changed to dexamethasone/prednisone, colchicine, and NSAIDs. His one-month hospital course was complicated by gram-positive bacteremia and delirium. Prior to discharge echocardiography demonstrated a moderate to large, organized pericardial effusion and a new small mobile mass in the right ventricular outflow tract thought to be a thrombus. The patient was sent home on apixaban and was discharged home on hospital day 28.

Five days later the patient re-presented to the emergency department with progressive weakness and hypotension. At that time cardiac MRI demonstrated a moderate to large effusive pericarditis and a pericardiectomy was performed. Surgical biopsy demonstrated some necrotic tissue with acute inflammatory components and fibrinoid debris consistent with fibrinous pericarditis. The patient's 2 week hospital course was complicated by cardiogenic shock with multiorgan failure requiring inotropic drugs. He was resuscitated and discharged to a skilled nursing facility on digoxin and apixaban.

One month later the patient presented for cardiology follow-up where echocardiography redemonstrated a right

ventricular outflow tract mass that was significantly larger and the patient was readmitted to the cardiac unit. A new cardiac MRI demonstrated 3 large cardiac masses (right atrium, right ventricular outflow tract, and left ventricle) (fig. 1A,B). To evaluate for malignancy, 18-fluorodeoxyglucose (18F-FDG) positron emission tomography (PET)/computed tomography was performed showing a band-like hypermetabolic rim lesion over the pericardium/LV anterior wall, concerning for infection vs malignancy (fig. 1 C-F). Subsequent biopsy of the left ventricle was negative for malignancy and histopathological abnormality, however, blood cultures grew *Candida pelliculosa* confirming fungal endocarditis.

## Discussion

FE represents less than 2% of all IE, the majority of which are caused by *Candida* and *Aspergillus* species [5,6]. FE often presents as a fever of unknown origin in the immunosuppressed, injection drug users, and those with intravascular devices. While our patient had a central line, he did not have any of these other risk factors. Other manifestations for FE include new onset murmur, embolization to the brain, extremities, gastrointestinal tract and lungs, cutaneous nodules, petechiae, and sepsis [4].

Initial evaluation is typically echocardiography to determine cardiac function and evaluate valvular pathology. Additionally, CT is used to evaluate for a source of infection. While

FDG PET is less commonly used for FE than these modalities, it can play an important role in identifying malignancy, infection, embolic complications and other extracardiac disease. FDG-PET can also visualize intracardiac disease if the patient is prepared with the appropriate protocol [7]. Cardiac MRI can further characterize valvular vegetations and endothelial inflammation making it critical for diagnosis and treatment planning [8,9].

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## Conclusion

Fungal endocarditis is a serious disease that can be difficult to diagnose, especially in patients with a recent diagnosis of lymphoma, however, PET/CT can be helpful in identifying intra- and extracardiac lesions. Cardiac MR can provide further characterization and facilitate clinical decision making once the diagnosis is confirmed by biopsy.

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