Rare case of cardiac metastasis from a giant cell-rich primary bone sarcoma.

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Introduction

While primary cardiac tumors are rare, cardiac metastases were found in 9% of autopsies with a primary tumor.[1] The most common primary cancers to metastasize to the heart are lung, breast, and hematologic malignancies.[2] We present an extremely rare case of a recurrent giant cell-rich primary bone sarcoma metastasizing to the interventricular septum, discovered on 18F-FDG PET/CT and confirmed by MRI and echocardiogram.

Disclosure/Disclaimer

The authors have no disclosures relevant to this research.

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Case Presentation

A 24-year-old male presented with right lower extremity pain after a fall. Imaging demonstrated an expansile lytic lesion of the right distal femoral diaphysis. 18F-FDG PET/CT-guided biopsy of the lesion revealed a giant cell-rich tumor (GCT), without high-grade features **(Figure 1**). Orthopedic surgery then performed a wide local excision of the lesion with bone grafting and internal fixation. The patient subsequently had recurrences locally and in a pulmonary nodule. Definitive pathology of the metastatic and recurrent lesions came back as giant cell-rich primary bone sarcoma.

Over the next 4 years, right lower extremity above the knee amputation, wedge lung resection, radiation therapy, and multiple different chemotherapy regimens treated the primary disease site and growing mediastinal lymph node, pulmonary nodule, and cervical vertebral metastases. During radiation therapy to the cervical metastasis, 18F-FDG PET/CT revealed a growing hypermetabolic cardiac metastasis in the interventricular septum that encroached on the right ventricular outflow tract and spread to the right ventricular apex (**Figure 2**). Cardiac MRI and echocardiogram helped to confirm and delineate the cardiac metastasis (**Figure 3**). The patient also developed recurrent pericardial effusions despite drainage.

Figure 1. PET-guided biopsy

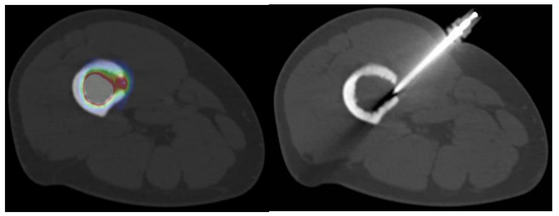

Figure 1. Fused 18F-FDG PET/CT (left) and CT (right) images demonstrate the hypermetabolic primary GCT in the right femur, which was biopsied under PET/CT guidance.

Figure 2. Cardiac metastasis on PET

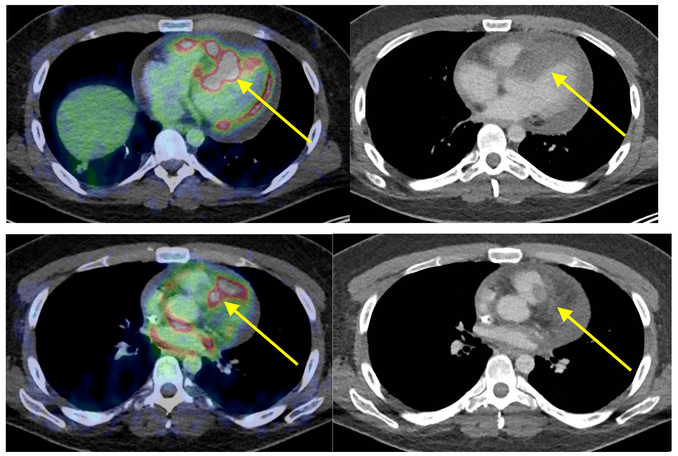

Figure 2A. Fused 18F-FDG PET/CT (left) and CT (right) images demonstrate an hypermetabolic lesion in the thickened septum (arrows).
Figure 2B. The hypermetabolic lesion extends from the septum to the right ventricular outflow tract (arrows).

Discussion

In this case, we demonstrate a rare occurrence of giant cell-rich primary bone sarcoma metastasis to the heart through correlative imaging. 18F-FDG PET/CT played a critical role in the management of this patient's disease from the initial PET/CT-guided biopsy to the discovery of the cardiac metastasis.

Figure 3. MRI and echocardiography

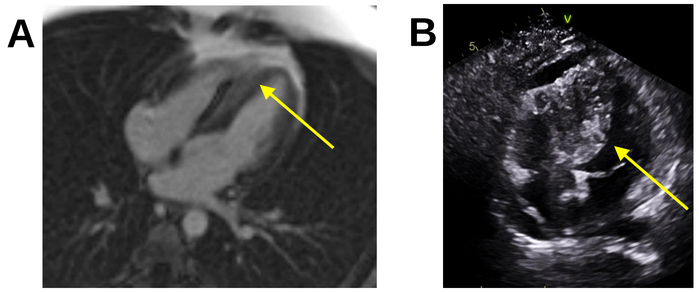

Figure 3A. Early cardiac MRI after the initial PET/CT diagnosis of cardiac metastasis demonstrates thickening of the distal septum and mild delayed enhancement (arrow).
Figure 3B. Later echocardiogram demonstrates interval enlargement of the septal metastasis with marked septal thickening (arrow) and right ventricular outflow tract involvement (not shown).

Discussion

GCTs compromise 5-6% of primary bone tumors. Malignant GCT transformation to high grade sarcoma is very rare (~4.0%), with secondary malignancy (due to therapy) more likely than primary malignancy.[3] Secondary malignancies are reported to develop years after therapy; however, in this case it seemed to occur after only a few months, suggesting a possible primary malignancy.

GCTs commonly metastasize to lung, as in this case, but only one case report of a "benign" GCT metastasizing to the heart was found.[4] This is the only literature case of sarcomatous transformation of a GCT, with metastasis to the heart.

The case stresses the importance of 18F-FDG PET/CT in multiple aspects of cancer diagnosis and management.

References

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