

INTRASOSEOUS SARCOIDOSIS MIMICKING AS BONE METASTASES ON ¹⁸F- FDG PET/CT

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Abstract

A 62-year-old male with known prostate cancer underwent ¹⁸F-fluorodeoxyglucose positron emission tomography/computed tomography (¹⁸F-FDG PET/CT) scan for suspected osseous metastases after a magnetic resonance imaging of the pelvis, done for chronic low back pain and demonstrated a number of suspicious T1 hypointense/T2 hyperintense lesions in the sacrum, iliac bones and right proximal femur. ¹⁸F-FDG PET/CT showed abnormal foci of increased tracer uptake in the sacrum, iliac bones and right proximal femur. Core biopsies from the sacrum were performed, showing intertrabecular non-caseating granulomata with surrounding small lymphocytes. Acid-fast bacilli and Gomori methenamine silver stains were negative, consistent with intraosseous sarcoidosis.

Key words: ¹⁸F-fluorodeoxyglucose positron emission tomography/computed tomography, non-caseating granulomata, sarcoidosis

Introduction

Sarcoidosis is a chronic granulomatous multisystem disease, of unknown aetiology, which can affect any organ. In >90% of patients, clinical sarcoidosis manifests as intrathoracic lymph node enlargement, pulmonary involvement and skin or ocular signs and symptoms.^[1] The natural course and history of sarcoidosis is unpredictable. Due to a variety of organ involvement, sarcoidosis often mimics other diseases.^[2] Malignancy may develop in patients with sarcoidosis and patients with sarcoidosis may also develop cancer.^[3]

Case Report

We report a case of a 62-year-old male with known locally advanced prostate cancer diagnosed approximately 7 years ago. It was initially treated with radiation therapy and androgen ablation.

The patient presented to us with a complaint of low back pain for the past 3 months. An magnetic resonance

imaging (MRI) of the lumbar spine and pelvis was performed, which demonstrated a number of suspicious T1 hypointense and T2 hyperintense lesions in the iliac bones, sacrum and right proximal femur, suggestive of metastatic disease [Figure 1].

The patient was then referred to the Division of Nuclear Medicine at the University of Wisconsin for an ¹⁸F-fluorodeoxyglucose positron emission tomography/computed tomography (¹⁸F-FDG PET/CT) scan, for suspected osseous metastases. A bone scan acquired 6 months prior had shown no evidence of osseous metastatic disease. ¹⁸F-FDG PET/CT showed abnormal foci of increased

FDG uptake in the sacrum, iliac bones and right proximal femur [Figure 2] corresponding to the abnormal marrow signals seen in the pelvis and right proximal femur on MRI.

The scan also showed hypermetabolic bilateral mediastinal and hilar lymphadenopathy [Figure 2]. Core biopsies from the sacrum were performed and showed intertrabecular, non-caseating granulomata, with surrounding small lymphocytes. Acid-fast bacilli and Gomori methenamine

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silver stains were negative, consistent with sarcoidosis [Figure 3].

Discussion

Sarcoidosis is a multisystem disease characterised by the formation of non-caseating granulomata, affecting different organs of the body, including lungs, skin, hilar lymph nodes, eyes and bone.^[4,5] Osseous sarcoidosis is exceedingly rare and is difficult to establish since it may simulate metastatic disease.^[6] Routine MRI studies also cannot reliably distinguish osseous sarcoidosis lesions from metastatic lesions as the MRI appearance closely

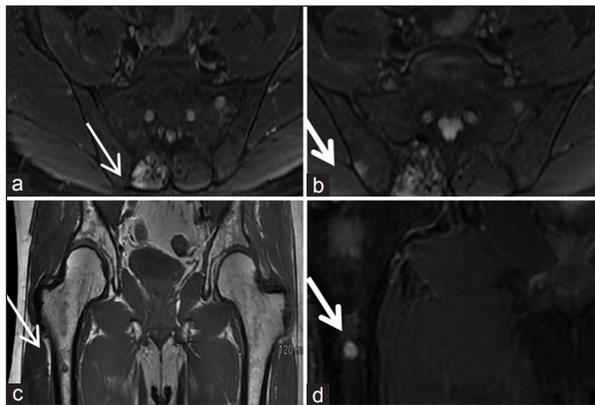


Figure 1: Unenhanced magnetic resonance imaging pelvis and femur showed T1 hypointense (a and c) and T2 hyperintense signal (b and d) in the iliac bone and right femur (arrows)

resembles that of osseous metastases.^[2,7] Histology, showing non-caseating granulomata remains the gold standard for diagnosis.^[8] The bones are affected by sarcoidosis in 1–13% of patients, as osteolytic, osteoporotic or cystic lesions.^[7,9] Bone sarcoidosis is most frequently found in the peripheral skeleton, for example, in the bones of the hands and feet.^[7,9] The development of sarcoidosis and sarcoid-like reactions has been noted in cancer patients after antineoplastic therapy and even after surgery for cancer, without chemotherapy.^[10,11] ¹⁸F-FDG PET/CT is commonly used today for staging, to assess response, to therapy and to diagnose the recurrence of malignancy. However, infectious or inflammatory processes also accumulate FDG and this can sometimes lead to diagnostic inaccuracy.^[12] Increased FDG uptake is seen in sarcoidosis due to accumulation of inflammatory cells including neutrophils, activated macrophages and lymphocytes.^[3] Serial ¹⁸F-FDG PET/CT scans can be used for the assessment of the activity of sarcoidosis and to assess the response to therapy.^[1,13] Patients with diverse malignant neoplasms have been seen to develop new onset of previously undiagnosed sarcoidosis or the development of sarcoid-like reactions. This has been noted in patients with haematological malignancies as well as in patients with solid tumours.^[14,15] Tumour-related sarcoid-like reactions are considered to be caused by soluble antigens derived from tumour cells.^[16] Regarding the differential diagnosis of disseminated malignancies from sarcoidosis or sarcoid-like reactions, symmetrical hilar FDG uptake

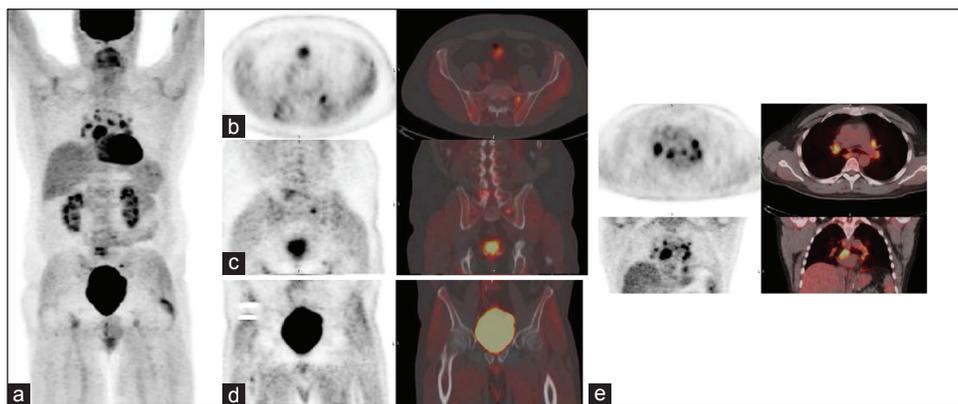


Figure 2: Fluorodeoxyglucose (FDG) positron emission tomography (PET)/computed tomography (CT) scan was performed 55 min after the administration of 9.3 mCi of F-18 FDG. Maximum intensity projection PET image (a) showed multiple foci of increased uptake including mediastinum and pelvis. The axial and coronal PET and fusion images (b-d) showed hypermetabolic lesions in the iliac bones, sacrum and right proximal femur (SUVmax up to 4.9) corresponding to signal abnormalities seen on the magnetic resonance imaging examination. In addition, FDG-avid mediastinal lymphadenopathy was also identified on FDG PET/CT scan (a and e)

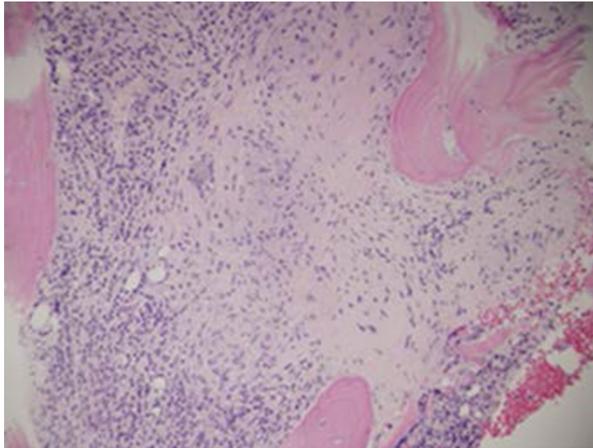


Figure 3: Core biopsies from the sacrum showed intertrabecular non-caseating granulomata with surrounding small lymphocytes. Acid-fast bacilli and Gomori methenamine silver stains were negative, consistent with sarcoidosis

may be related to a benign cause as was seen in our patient. However, the caveat is that the characteristic hilar FDG uptake in patients with granulomatous disease can be similar to that in patients with metastatic disease. FDG-PET/CT is helpful in highlighting organs that are candidates for diagnostic biopsy.^[17]

Conclusion

Osseous sarcoidosis is relatively rare and is a difficult diagnosis to establish due to its similarity to metastatic disease in oncologic patients. Histological diagnosis of non-caseating granulomata remains the gold standard for the diagnosis of sarcoidosis. Symmetric FDG uptake in hilar and/or mediastinal nodes is a typical finding in sarcoidosis and can help in making the correct diagnosis.¹⁸F-FDG PET/CT can be helpful in demonstrating FDG-avid lesions for biopsy.

Conflict of Interest

The authors declare that they have no conflict of interest.

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