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Calcific Tendinosis: A Potential Mimicker of Malignancy on PET.

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We report a case of a 53 year old female with breast cancer and elevated glucose activity at the left greater trochanter on PET imaging. Further imaging with CT and MRI showed that this focus of increased FDG activity on PET was calcific tendinosis of the gluteus medius tendon, which mimicked metastatic disease in this patient.

Introduction

Little is known about the glucose metabolism and positron emission tomography (PET) evaluation of tendon pathology [1, 2]. Specifically, the PET appearance of calcific tendinosis has not been described in the literature. In this case report we present a breast cancer patient, in whom calcific tendinosis of the gluteus medius tendon insertion mimicked metastatic disease in the greater trochanter on PET imaging.

Case Report

A 53 year old female patient with newly diagnosed breast cancer and positive axillary lymph node presented to the nuclear medicine department for tumor staging. She was otherwise in good health without any other complaints. A technetium-99m methylene diphosphonate (Tc-99m MDP) total body bone scan was interpreted as negative for metabolically active metastatic bone disease (Figure 1). However, a subsequent 18F fluorodeoxyglucose positron emission tomography (18F-FDG PET) scan demonstrated a focus of increased glucose activity in the region of the left greater trochanter (maximum body weight corrected standardized uptake value [SUV] 1.4, Figure 2). Therefore metastatic disease could not be entirely excluded at this site. Revisiting the total body bone scan there was a focus of minimally increased radiotracer activity in the region of the anterior left greater trochanter (Figure 1). Computed Tomography (CT) showed an unremarkable left femur without any evidence of metastatic lesion or cortical bone erosion. There was a 5 mm oval amorphous calcification anterior to the left greater trochanter (Figure 3). No definite soft tissue mass was identified on CT. Magnetic resonance (MR) imaging of the left hip was performed to determine the cause for this focus of increased glucose activity. The T1 weighted images showed subtle thickening of the left gluteus medius tendon anterior to the left greater trochanter (Figure 4). Post contrast fat suppressed T1-weighted images showed intense enhancement at the left gluteus medius tendon insertion surrounding a low signal focus corresponding to the calcification identified on CT, representing calcific tendinosis of the gluteus medius tendon insertion with active inflammation (Figure 5). Normal marrow signal was observed within the left greater trochanter without any evidence of focal lesions or bone marrow edema.

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Abbreviations: PET, positron emission tomography, MDP, methylene diphosphonate, FDG, fluorodeoxyglucose, SUV, standardized uptake value, CT, computed tomography, MRI, magnetic resonance imaging

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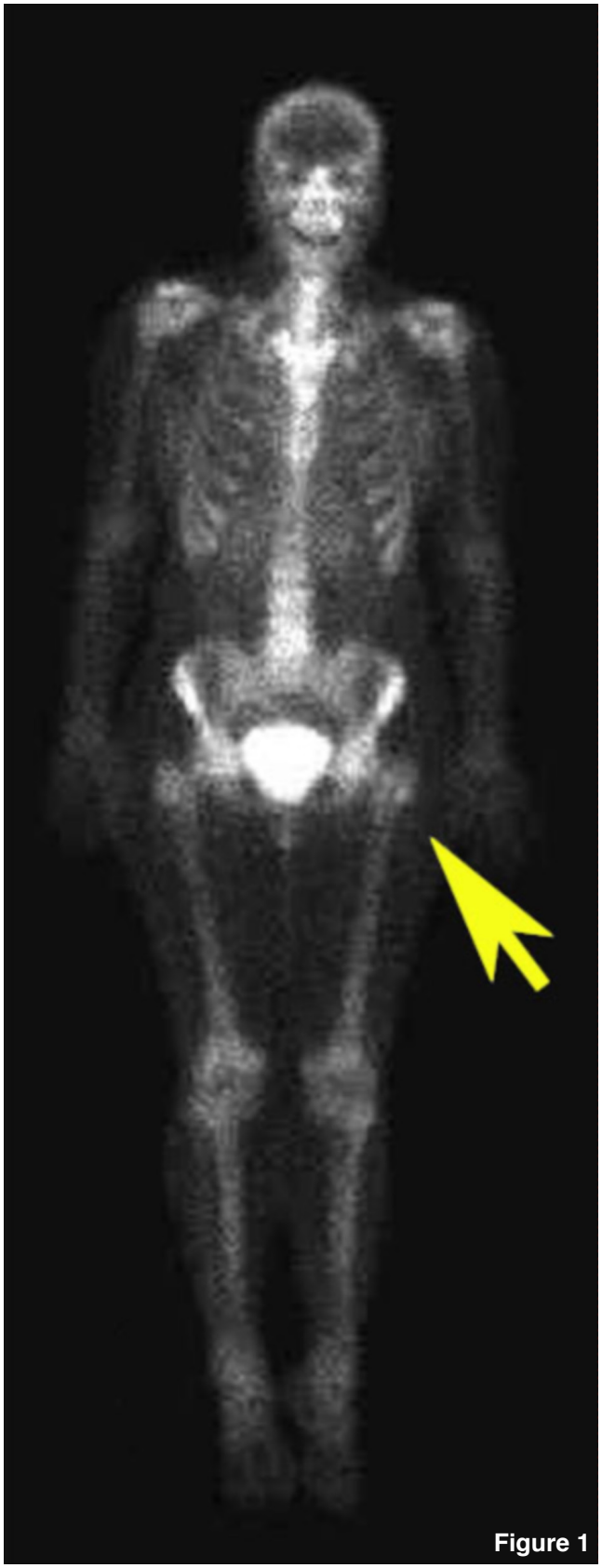


Figure 1

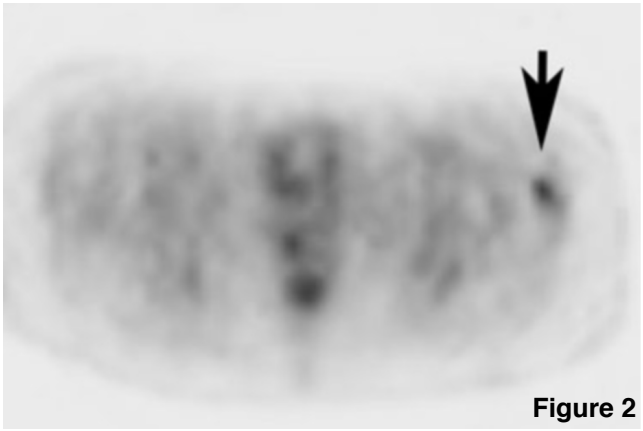
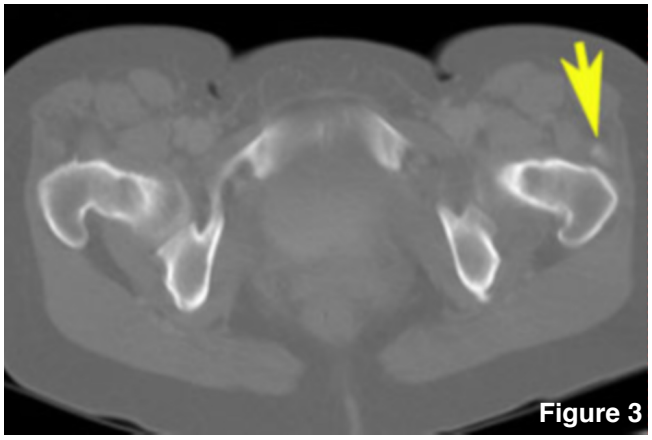
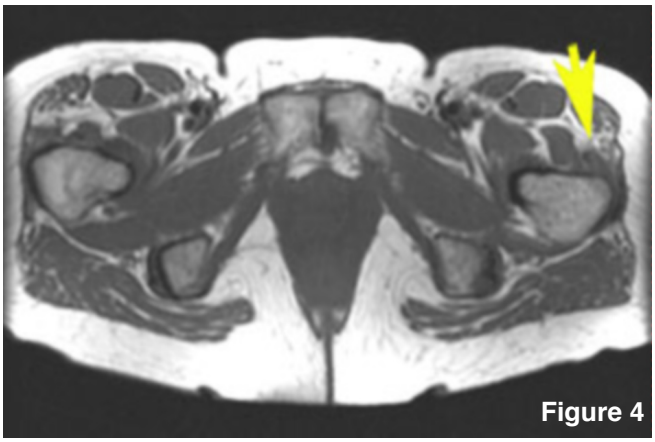


Figure 2

Figure 1. Anterior view of total body Tc99 MDP bone scan shows focus of minimally increased focal radiotracer activity at anterior-lateral portion of left greater trochanter (arrow).

Figure 2. Axial image of 18F fluorodeoxyglucose positron emission tomography (18F-FDG PET) scan at level of bilateral hips shows focus of increased glucose uptake (arrow) near anterior-lateral portion of left greater trochanter, which was suspicious for metastatic disease.





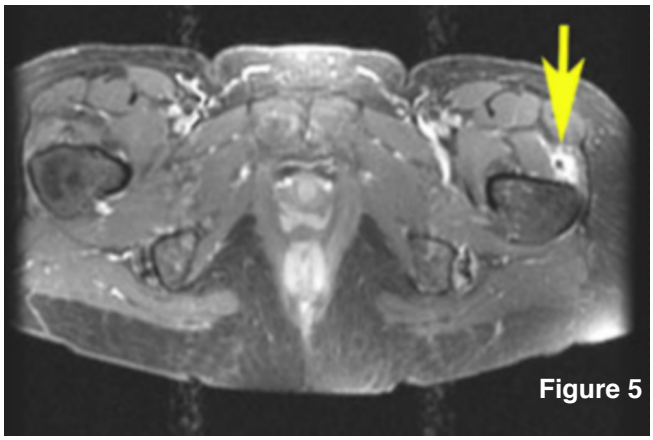


Figure 3. Axial CT image at the level of the greater trochanter shows amorphous calcification (arrow) anterior to left greater trochanter.

Figure 4. Axial T1-weighted spin echo MR image (TR/TE= 550/8 ms) at the level of greater trochanter shows thickening at left gluteus medius tendon insertion (arrow).

Figure 5. Axial T1-weighted fat suppressed spin echo MR image (TR/TE= 500/8 ms) following i.v. gadolinium contrast administration shows intense enhancement at left gluteus medius tendon insertion (arrow). Note central low signal focus corresponding to calcific deposit.

Discussion

While commonly seen in the shoulder at the supraspinatus tendon insertion, calcific tendinosis of the gluteus medius tendon insertion is relatively uncommon [3]. It has been described to mimic metastatic disease on Tc-99m MDP bone scan with underlying subcortical edema of the greater trochanter [4]. This is the first case report that shows elevated glucose activity reflecting calcific tendinosis on PET imaging. The appearance mimicked metastatic disease in this patient with known breast cancer. In contrast to the aforementioned case there was no bone marrow edema in the greater trochanter on MR imaging. Although the SUV value in our case was not very high, a small focus with mild FDG activity on PET may still indicate a breast cancer metastasis, because FDG uptake can be variable [5]. The decision calling or not calling a single bone metastasis on PET in a patient with breast cancer and no other distant metastasis is clinically very important because it substantially affects patient management. Therefore it is critical to confirm or rule out metastatic disease with a biopsy or additional imaging modalities such as MRI and CT. This case is a classic example of calcific tendinosis with the described CT and MR imaging findings. It should not be confused with metastatic malignancy, and does not require follow-up or biopsy.

Calcific tendinosis of the gluteus medius can be acute or chronic and may be associated with significant hip pain and elevated white blood cell count. At pathology, the crystals are predominantly comprised of hydroxyapatite. Crystal deposition can be seen in the gluteus medius tendon, in the bursa in between the gluteus medius tendon and the greater trochanter or on the undersurface of the gluteus medius tendon [4]. The latter two may reflect rupture of crystals from the tendon resulting in symptomatic presentation. The pathophysiology of calcific tendinosis is controversial. Uhthoff and Loehr have proposed the following stages 1) formative phase, 2) resting and 3) resorptive phases [6].

In a case of intraosseous gout of the patella Sato et al. reported focal mildly increased FDG activity [7]. Hannukainen et al. evaluated the glucose uptake in the Achilles tendon during exercise using PET. They reported a significantly smaller glucose uptake in the Achilles tendon compared to skeletal muscle, which did not increase with increasing workload [1]. Kalliokoski et al. reported increased glucose uptake in the patellar tendon and quadriceps tendon during exercise. However, the increase of tendon glucose uptake was less pronounced than in the quadriceps muscle [8]. The increased glucose uptake in calcific tendinosis is most likely due to local inflammation caused by the deposition of hydroxyapatite crystals.

In summary, although the appearance on PET was worrisome for metastatic disease in this woman with breast cancer the correct diagnosis was made using multiple imaging modalities. The possibility of gluteus medius calcific tendinosis should be included in the differential diagnosis if amorphous calcification combined with increased glucose activity is seen at the anterior-lateral greater trochanter on PET-CT. Further research is necessary to determine whether the amount of glucose uptake on PET is related to patient symptoms or can reliably monitor treatment.

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