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CASE REPORT

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Calcific tendinitis of the gluteus medius tendon with bone marrow edema mimicking metastatic disease

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Abstract A case of calcific tendinitis of the gluteus medius is presented. This report describes a patient with a history of breast cancer who had the combination of amorphous calcifications in the gluteus medius tendon and the MR finding of conspicuous bone marrow edema in the adjacent greater trochanter, prompting concern for metastatic disease. We present images from radiography, bone scanning, CT, and MR imaging. The unusual combination of findings in these studies should be considered conclusive for calcific tendinitis, and should not be confused with malignancy.

Keywords Calcific tendinitis, gluteus medius · Radiograph · CT · MRI

Introduction

Hydroxyapatite deposition disease (HADD), or calcific tendinitis, has been reported at numerous anatomic locations, by far most commonly around the shoulder. Involvement of the gluteus medius tendon is uncommon [1, 2, 3, 4]. We have recently observed calcific tendinitis of the gluteus medius tendon in a woman with a history of breast cancer. Of particular interest in this case was the occurrence of pronounced bone marrow edema in the adjacent greater trochanter, resulting in concern for metastatic disease.

Case report

A 56-year-old woman with a past medical history significant for breast cancer (stage II) diagnosed 2 years previously, complained of moderate left hip and thigh pain for 8 weeks. She described the pain as a burning ache centered at the left hip with occasional radiation on the lateral left thigh to the knee. The pain worsened with activity, sitting, standing, and walking, and she was unable to lie on that hip.

On physical examination, she had full hip range of motion; deep palpation over the left greater trochanter reproduced her pain symptoms. There were no other contributory findings, and no laboratory abnormalities.

Multiple imaging studies were performed. A digital computed tomograhy (CT) scout image (Fig. 1A) showed a small ovoid amorphous calcification present just lateral to the greater trochanter, but no definitive bone abnormality. A radionuclide bone scan (Fig. 1B) demonstrated a focal area of moderate increased activity in the left greater trochanter. CT (Fig. 1C) again demonstrated a small focus of amorphous calcification immediately adjacent to the lateral aspect of the left greater trochanter, located either within or immediately adjacent to the gluteus medius tendon near its insertion on the greater trochanter. The adjacent bone showed no evidence of lytic or blastic lesions. A magnetic resonance (MR) imaging examination (Fig. 2) performed 2 months later showed several abnormalities. There was signal abnormality consistent

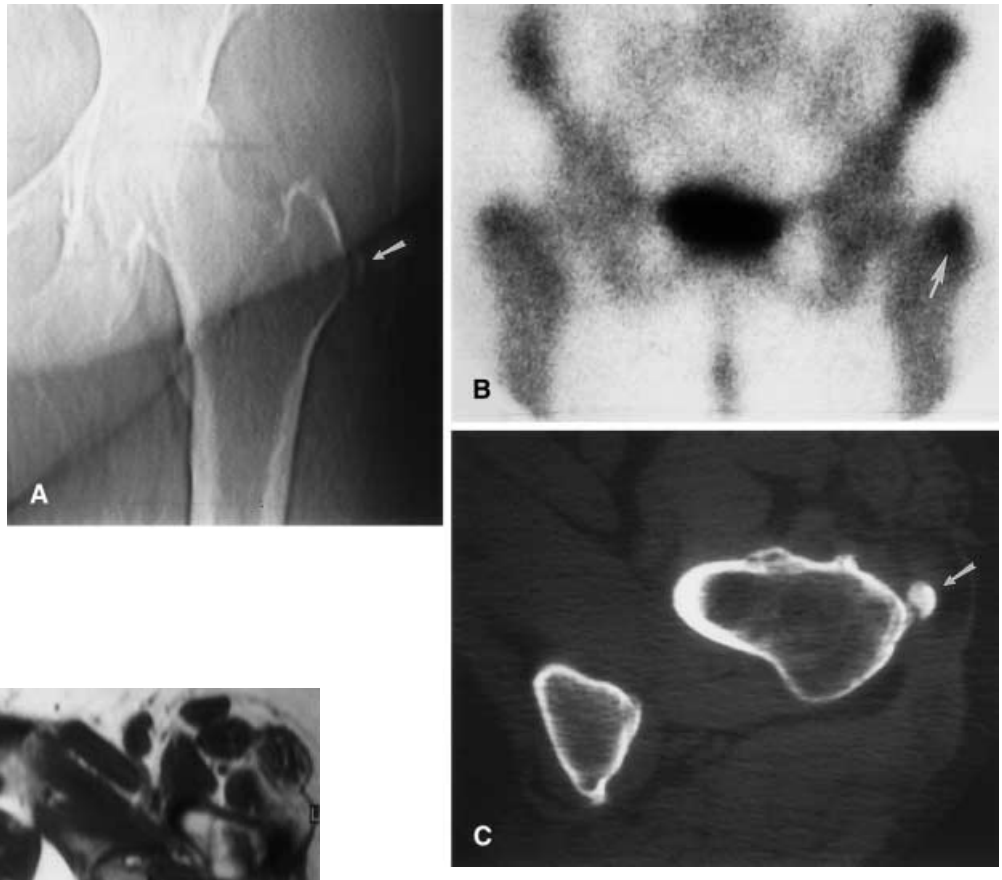

Fig. 1 **A** Digital CT scout image shows a grossly normal appearance of the greater trochanter of the proximal left femur. There is an oblong amorphous calcification adjacent to the greater trochanter (*arrow*). **B** On the radioisotope bone scan, there is moderate increased radionuclide uptake in the area of the calcification (*arrow*). **C** CT scan reveals a small focus of amorphous calcification (*arrow*) immediately adjacent to the lateral aspect of the left greater trochanter, located either within or immediately adjacent to the gluteus medius tendon near its insertion on the greater trochanter. The adjacent bone shows no evidence of lytic or blastic lesions

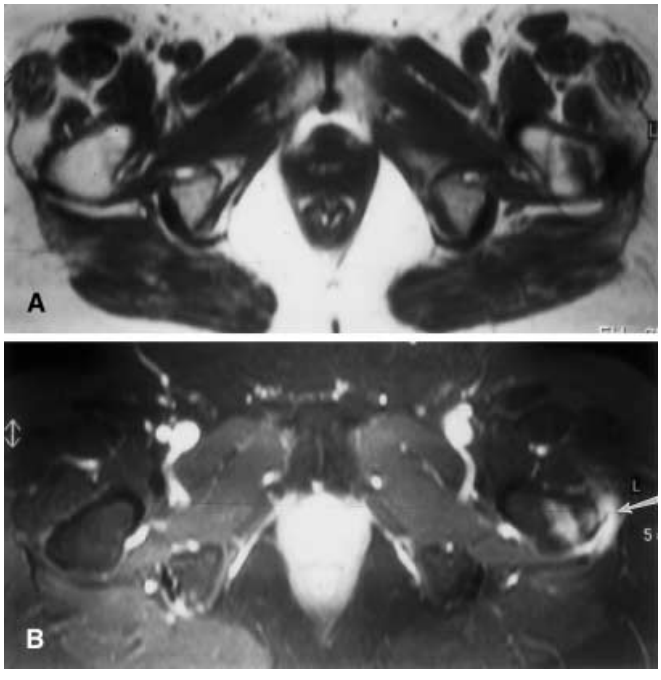

Fig. 2 MR imaging: T1-weighted axial (**A**) and T2-weighted axial (**B**) images demonstrate abnormal signal within the the greater trochanter on the left and in the adjacent soft tissues. The soft tissue signal abnormality is most pronounced in the region of the gluteus medius, with increased signal on T2-weighted image (**B**) consistent with soft tissue edema in this location. The signal abnormality within the marrow at the level of the greater trochanter has similar signal characteristics, and is nonspecific. The differential diagnosis of the bone marrow abnormality alone would include reactive edema, trauma, inflammation, and neoplasm. The recognition of the small calcification (**B**, *arrow*) in the gluteus medius tendon insertion effectively narrows the differential diagnosis to calcific tendinitis

with edema within the gluteus medius muscle and adjacent soft tissue. A small inconspicuous area of low signal was identified adjacent to the greater trochanter, corresponding to the calcification seen on other studies. Finally, there was focal intramedullary signal abnormality in the greater trochanter consisting of decreased T1-weighted signal and increased T2-weighted signal, which is most consistent with bone marrow edema in this location.

The patient was referred to our institution's multidisciplinary bone metastasis clinic for management of disease suspected to be metastatic breast cancer. All the outside imaging examinations were reviewed at that time. The overall radiologic appearance, with amorphous calcification and adjacent soft tissue edema corresponding to the insertion of the gluteus medius tendon, was felt to be most consistent with HADD, or calcific tendinitis of the gluteus medius muscle. The adjacent bone marrow edema was felt to be a reactive process, as opposed to coincidental metastatic disease to bone. On this basis, it was elected to pursue a conservative treatment course, consisting of direct injection with local anesthetic and steroids at the gluteus lesion, and anti-inflammatory agents. Biopsy was deferred. Her symptoms resolved slowly, and no further imaging was performed. She remains symptom free at the 24-month clinical follow-up.

Discussion

Calcification adjacent to the greater trochanter has been reported in up to 40% of patients with trochanteric bursitis, and calcification is typically located at the insertion

of the tendons rather than in the bursae [6]. Goldenberg and Leventhal [7] reviewed radiographs of 550 hips and found calcified deposits near the greater trochanter in 30 (5.4%). The calcifications occurred in three anatomic locations: (1) in the tendon of the gluteus medius, (2) in the bursa between the tendon of the gluteus medius and the greater trochanter, and (3) on the undersurface of the gluteus medius. Most of these cases appear to have been of the chronic type, analogous to the painful shoulder with an unerupted hydroxyapatite deposit. In a study of trochanteric bursitis, Anderson [8] noted that the tenderness was located over the insertion of the gluteus medius muscle in 38 of 45 patients, but calcification in soft tissue about the greater trochanter was demonstrated by roentgenograms in only 8 of the 45 cases reviewed.

Jones and England [1] reviewed seven cases of acute clinical episodes associated with calcification around the hip joint, but gluteus medius calcification was identified in only one case. According to these authors, calcified material was either on the undersurface of the gluteus medius or in the capsule of the joint, causing acute synovitis of the hip. They suggested that the deposit ruptured into the hip joint, rather than from tendon into soft tissues or into bursa. The calcified material is extremely irritating and provokes a hyperemic reaction with acute synovitis, which facilitates its spontaneous absorption. It may be that this type of calcification in the joint capsule is particularly liable to give rise to an acute episode because rupture into the joint occurs easily [1].

MR imaging has enabled new insight into the precise nature of HADD and calcific tendinitis. MR findings of calcific tendinitis of the gluteus maximus have been described [4], and consistently show muscle, tendon, and adjacent soft tissue edema. The calcific deposit itself is frequently quite inconspicuous, being of low signal intensity on all sequences. In these cases, the edema appears to localize in the periarticular tissues as opposed to within the joint, as evidenced by the lack of joint effusion in most cases. Recently Kingzett-Taylor et al. [4] reported MR imaging findings of tendinosis and tears of gluteus medius and minimus muscles as a cause of hip pain. Among 250 MR examinations of the hip, 35 cases met their criteria for tendinitis. However, these authors described no cases of calcific tendinitis at the gluteus medius. To our knowledge, ours is the first report of MR findings of gluteus medius calcific tendinitis.

Regarding bone changes in cases of HADD, Berney [2] described a case of tendinitis of the gluteus maximus insertion showing loss of the sharp cortical margin of the adjacent bone, although frank bone erosion was not described. Hayes et al. [9] reported five cases of calcific tendinitis with radiographic evidence of cortical bone erosion. Wepfer et al. [3] reported three cases of gluteus maximus tendinitis, apparently none of which showed bone destruction. However, we are unaware of any previous description of osseous marrow edema associated with HADD. It is possible that newer, more water-sensitive fast spin echo MR sequences with fat saturation make bone marrow edema more conspicuous than previously. In cases in which bone erosion or bone marrow edema is present, awareness of the precise anatomic location of the calcific deposit is essential for the accurate diagnosis of calcific tendinitis.

Calcific tendinitis with bone erosion or bone marrow edema may be mistakenly diagnosed as malignancy or infection, particularly when in an atypical location, as in this case. Other soft tissue calcifications which enter into the differential diagnosis at this location include small foci of heterotopic bone, which can be distinguished from HADD on the basis of their corticated rim. Several other radiographic features may help distinguish this entity from others. When unusual soft tissue calcifications are identified, having knowledge of the location of tendon insertions on radiographs or CT should lead to inclusion of calcific tendinitis in the differential diagnosis. Awareness of the precise anatomic location of the calcific deposit is therefore essential. With MR imaging, edema in the involved muscle is usually obvious. However, if MR imaging is the only modality available, one must search carefully for the calcified deposit, for it may be quite easily overlooked.

In summary, this case of calcific tendinitis of the gluteus medius demonstrated typical but inconspicuous calcification and adjacent bone marrow edema, which raised suspicion for metastatic disease in a woman with prior breast cancer. Close review of all the imaging modalities in this case led to the correct, if unusual, diagnosis.

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