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CASE REPORT

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Isolated iliac bone tuberculosis: A case report

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Summary

Background: Isolated iliac bone tuberculosis is not easy for diagnosis as it can mimic many other conditions. The presentation of our case of isolated iliac bone tuberculosis with special emphasis to imaging findings is justified, by its rarity and not uncommon delay in diagnosis and therapy of such cases.

Case Report: A case of isolated iliac bone tuberculosis, initially presented with low back pain and swelling, was unsuccessfully treated for three months before final diagnosis was established. Plain radiography revealed only slight sclerosis of the iliac side of the right sacro-iliac joint. MRI provided more precise and detailed information regarding the site, size and nature of the bony and soft tissue components of the lesion. The bony lesion showed low T1, high T2 signal and marginal enhancement on fat suppressed T1 post-gadolinium images. The soft tissue components also showed post-gadolinium enhancement and abscesses formation. CT scan confirmed the bony lytic lesion and provided guidance for biopsy. Histology confirmed tuberculous nature of the lesion.

Conclusions: Imaging presentation of tuberculous osteomyelitis is nonspecific and may mimic many inflammatory and neoplastic conditions. Correlation with the patient's history, immune status, ethnicity, social environment is necessary in narrowing differential diagnosis. This means that iliac tuberculosis, despite its rarity, should be considered as one of diagnostic possibilities, especially in the patients from endemic areas. However, definitive diagnosis is best established with bone needle biopsy.

Key words: tuberculosis • bones • musculoskeletal • radiography • MRI • CT

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Background

Despite advances in chemotherapy, tuberculosis continues to be a major health hazard in the contemporary world, with high morbidity and mortality in developing, and to lesser extent, in industrial countries. It is estimated that 10 million people are infected and 3 million die annually of the disease [1]. Tuberculosis is on the increase in the developed world due to drug resistance, the increasing prevalence of addiction and immunocompromised individuals [2].

Ten to fifteen percent of tuberculosis is extra pulmonary [3]. Skeletal tuberculosis constitutes about 10% of extra pulmonary disease; half of the cases are of spinal involvement [3]. It can also affect hip joint, knee, wrist, elbow, sacroiliac joint, sacrum and pubic bones. Isolated iliac bone involvement is extremely rare and presents difficulties in diagnosis [4].

The presentation of our case of isolated iliac bone tuberculosis with special emphasis on imaging is justified, by its rarity and the usual delay in diagnosis and therapy of such cases.

Case Report

A 26 year old Indian male presented to the outpatient clinic with mild low back pain and swelling of the right lower back for the past three months. During this period of time he was treated unsuccessfully with anti-inflammatory medication. There was no history of weight loss, anorexia, chest, urinary or bowel complaints; neither any history of trauma, intravenous drug abuse, blood transfusion, anti-tubercular treatment nor family history of tuberculosis. Blood pressure, pulse rate and body temperature were normal. The physical examination revealed non-tender, soft swelling at the right upper glutei region. Local temperature was not raised.

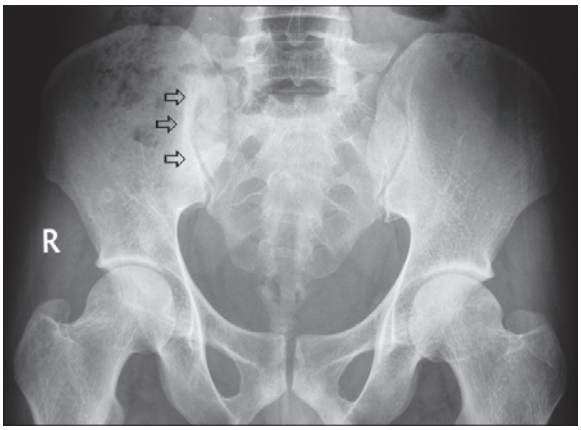
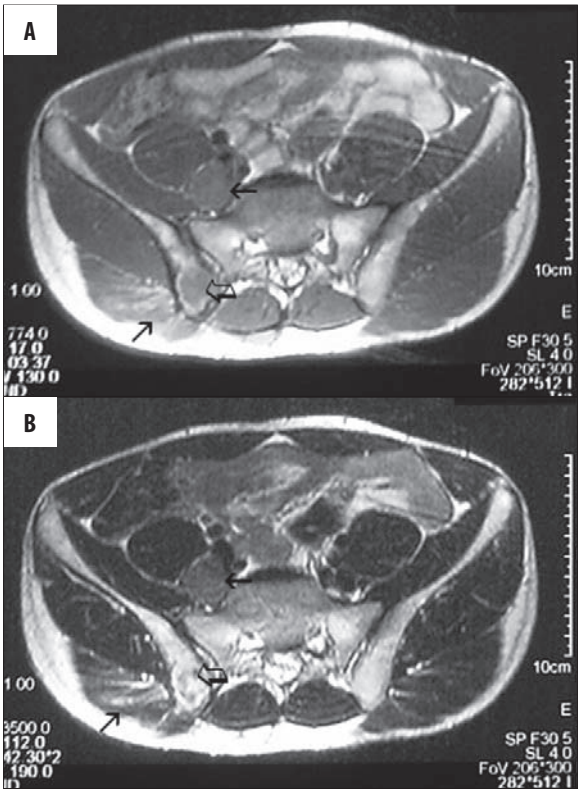


Figure 1. Plain radiograph of pelvis: slight subchondral sclerosis of the right iliac bone adjacent to the sacro-iliac joint (open arrows).



Laboratory investigations revealed Haemoglobin 12.3 g/dl, ESR 64 mm/h.

Chest X-ray was normal. X-rays of lumbo-sacral spine and pelvis revealed sub-chondral sclerotic changes of the iliac side of the right sacro-iliac joint (Figure 1).

MRI examination of the pelvis (Figure 2) revealed an intra-osseus well-defined cystic lesion 2.0×2.5 cm at the posterior aspect of the right iliac bone, adjacent to the right sacro-iliac joint.The lesion showed low signal intensity on T1WIs, uniform marginal contrast enhancement and high signal on T2WIs. There was suggestion of cortical interruption at the lateral bony cortex. In addition, the lesion had an extra- and intra-pelvic soft tissue component. They

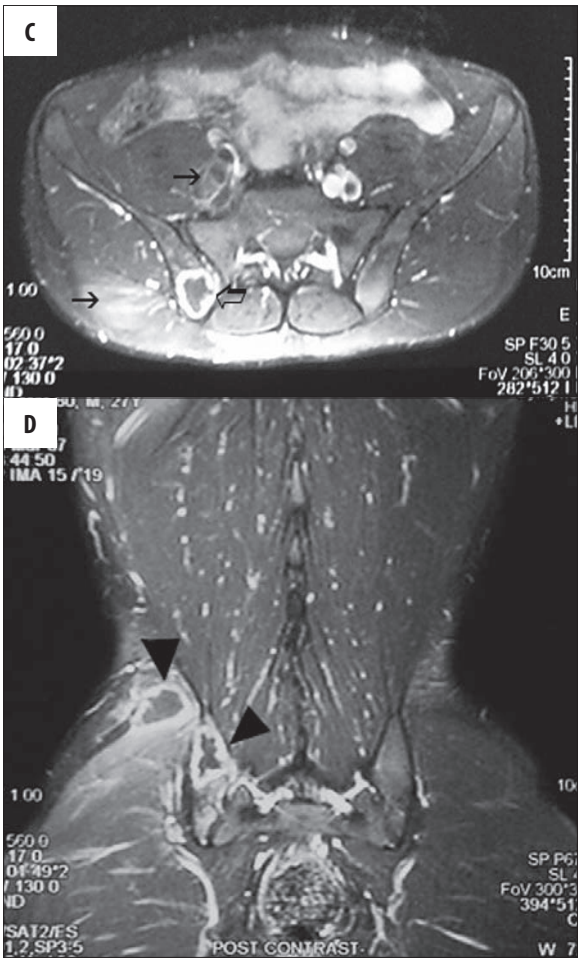


Figure 2. MRI of pelvis: (**A**) Axial T1WI: a well defined right iliac bone lesion adjacent to the sacro-iliac joint showing low signal intensity (open arrow); two further slightly hyper intense soft tissue lesions; one is abutting the right iliacus and psoas muscles, another is extra-pelvic in the right gluteus maximus and medius muscles (arrows). (**B**) Axial T2WI: high signal intensity of the bony lesion (open arrow) as well as the intra- and extra-pelvic soft tissue lesions (arrows). (**C**) Axial fat suppressed T1WI after IV Gadolinium-based contrast: uniform marginal enhancement of the iliac lesion representing bone abscess (open arrow); the intra-pelvic lesion shows enhancement with small underlying abcesses (arrow); the right gluteus muscles are also enhancing (arrow). (**D**) Coronal fat suppressed T1WI after IV Gadolinium-based contrast: uniform marginal enhancement of the iliac lesion representing bone abscess (arrow head); the right gluteus muscles are also enhancing with a small abscess formation (arrow head).

were enhancing on post-contrast T1 fat suppressed images with underlying marginally enhancing cystic-like lesions. This suggests inflammation and abscesses formation. The diagnosis was: Right iliac bone osteomyelitis with intra- and extra-pelvic soft tissue inflammation and abscesses, likely of tuberculous etiology.

CT images obtained during CT-guided biopsy confirmed the previously suggested cortical bony defect (Figure 3). Histopathology revealed tuberculous caseating granuloma.

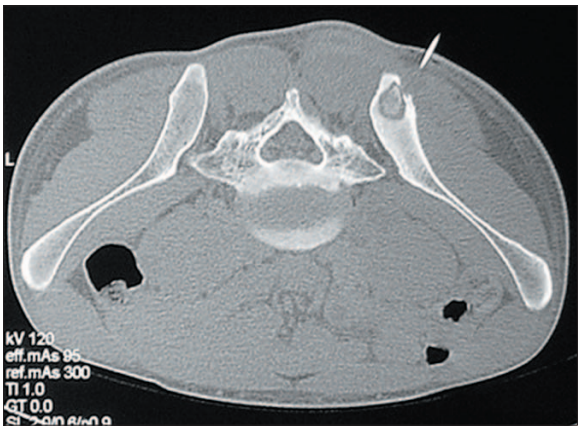


Figure 3. CT scan performed while the patient was in prone position during needle biopsy, showing the lytic lesion in the right iliac bone.

Discussion

Isolated iliac bone tuberculosis is a rare entity and accounts of approximately less than 1% of skeletal tuberculosis [4]. The uncommon localisation of the disease, its ability to mimic other pathological conditions and the lack of awareness from the physician side makes early diagnosis difficult [2,4].

Tuberculous osteomyelitis is usually haematogenous as dissemination from primary infected focus [2]. The primary focus may be active or quiescent, apparent or latent, either in lungs or in other viscera [5].

The association of skeletal tuberculosis with pulmonary manifestation of the disease is only approximately 50% [6,7]. Thus, there might be decrease in alertness of tuberculosis as diagnostic possibility in patients with negative chest X-ray. In our case the chest X-ray was normal and thus possibility of tuberculosis was not even considered in early clinical differential diagnosis.

Most of recently published cases of iliac tuberculosis are presented in immunocompromised patients [4]. However, our patient was not immunocompromised and was initially treated with non-steroidal anti-inflammatory drugs. This obscured his symptoms leading to diagnostic delay.

Nowadays, with people migrations across the globe, such cases may present far from the endemic regions, raising difficult diagnostic problem. In our case, the patient origin prompted us to consider the radiological diagnosis of tuberculosis as the first possibility.

The radiological manifestation of skeletal tuberculosis varies according to the stage of the disease. Early lesions can be easily missed as x-ray usually demonstrates normal bone and soft tissue swelling may be the only abnormality [8,9]. Subsequently, localised osteopenia followed by destructive bony focus formation and minimal surrounding sclerosis can occur. The process of healing manifests itself by progressive obliteration of the destructive focus and marginal sclerosis [10]. In cancellous bone, like iliac bone, a lytic area with hazy irregular soft shadow in the middle with little surrounding sclerosis may be seen [4].

In our case, there was only subtle radiographic manifestation in the form of slight sclerosis of the iliac side of the right sacro-iliac joint. However, this finding and lack of satisfactory response to anti-inflammatory therapy prompted for further MRI examination.

On this occasion, MRI examination provided more precise and detailed information of the lesion. It accurately showed the site, size and lytic nature of the bony component of the lesion. It also gave precise information regarding the surrounding extra- and intra-pelvic, marginally enhancing multiloculated soft tissue extensions, considered as multiple abscesses.

The MRI findings in our case are in full conformity with MRI features of musculoskeletal tuberculosis described in the literature [4]. MR imaging is more sensitive than CT in detecting bone marrow oedema secondary to tuberculous osteomyelitis and the associated soft-tissue inflammatory changes.

Regarding the affected bone, T1-weighted images demonstrate low signal intensity and high signal intensity on T2-weighted images. Gadolinium-based enhanced MR images provide detailed demonstration of the bone and soft tissue extent of the pathological process [11–13]. Regarding the soft tissue, MR imaging may show a fluid collection which is hypointense on T1-weighted images, hyperintense on T2-weighted images. In post gadolinium-based contrast administration peripheral rim enhancement can be seen [11]. These findings are helpful to differentiate abscesses from cellulitis or fasciitis [14–16]. Pyomyositis may also appear as a central area of low signal intensity within the muscle on T1-weighted images and occasionally is surrounded by a peripheral rim of high signal intensity that most likely represents blood products [17,18]. Pus inside the abscess can be either isointense or hyperintense with T1-weighted sequences depending on the proteinaceous content of the fluid collection. On T2-weighted and short inversion time inversion-recovery (STIR) images, the abscess contents is hyperintense. Post-gadolinium images demonstrate necrotic tissue manifests as a low-signal-intensity area surrounded by a hyper intense enhancing rim [17,18].

The role of CT in diagnosis of iliac tuberculosis is inferior or secondary to MRI [9]. Nevertheless, CT can demonstrate soft-tissue swelling, periosteal reaction, medullary changes, and focal cortical erosions or trabecular coarsening [9]. CT can also show the presence of abscesses, which typically appear as well-defined fluid collections with enhancing walls [9]. In our case CT images obtained during biopsy confirmed the bony lytic lesion and overlying cortical defect. CT is also extremely useful in providing localization for therapeutic aspiration and surgical planning [19].

In our case, the radiological diagnosis of iliac bone tuberculosis was confirmed by histopathology.

Conclusions

In general, imaging findings in tuberculous osteomyelitis are nonspecific and may also be observed in fractures, neoplasma, and metabolic processes. The differential diagno-

sis should include chronic pyogenic osteomyelitis, Brodie's abscess, granulomatous lesions and tumours, like chondroblastoma, osteoid osteoma or sarcoma, Kaposi sarcoma and non-Hodgkin lymphoma [11,20,21]. Correlation with the patient's history, ethnicity, and social environment is essential in formulating differential diagnosis. This means that iliac tuberculosis, despite its rarity, should be considered as one of diagnostic possibilities, especially in the patients from endemic areas. However, definitive diagnosis is best established with bone needle biopsy.

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