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Brucella Osteomyelitis of the Pubic Bones: Report of Two Cases

Brucellosis is a common and serious infectious disease in many parts of the world. Skeletal complications are reported in the majority of cases with Brucellosis and include arthritis, spondylitis, osteomyelitis, tenosynovitis, and bursitis. Pubic bone involvement is very rare in Brucellosis and there are only two case reports in the literature. We here report two patients with osteomyelitis of the pubic bones due to Brucellosis.

Keywords: Brucellosis, Osteomyelitis, Pubic Bone

Introduction

Brucellosis is an important public problem in many developing countries. Brucellosis occurs worldwide, but certain areas are hot zones for the disease. Major endemic areas include: countries of the Mediterranean basin, the Persian Gulf, the Indian subcontinent and parts of Mexico, Central and South America.^{1,2} In the Islamic Republic of Iran, Brucellosis represents a major health problem and continues to be reported with increasing frequency from different parts of the country.³

The clinical features of Brucellosis infection are various and nonspecific. Constitutional symptoms including fevers, sweats, weight loss, and anorexia may be acute or insidious in onset.² Osteoarticular complications have been reported in 10% to 80% of cases depending on the series, the age of the patients, and the infecting *Brucella* spp.⁴ Sacroiliitis and spondylitis are the most frequent sites involved. Overall, the sacroiliac joint is the most commonly reported site of involvement.⁵

Pubic osteomyelitis is very rare in Brucellosis and there are only two case reports in the literature.^{6,7} Herein we report two patients with Brucella osteomyelitis of the pubic bones.

Case Presentation

Case 1

A 55-year-old woman was admitted to our hospital with a 3-month history of progressive pain in the lower abdomen, radiating to both groins and medial thighs. She was living in suburban Mashhad, had five healthy children and had seen three physicians prior to admission in our hospital. Besides cholecystectomy 13 years prior to presentation, she had no previous medical problems. The laboratory tests including complete blood count, erythrocyte sedimentation rate (ESR), serum C reactive protein (CRP), routine blood chemistries and urinalysis, were all normal, except for a mild raised erythrocyte sedimentation rate (ESR 45mm in 1st hour) and a serum C-reactive protein (CRP) level of 8mg/dl (normal < 6mg/dl). Her pelvic X-ray was normal at the beginning of her symptoms

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(Fig.1-a). During this period, she was given different non-steroidal anti-inflammatory drugs (NSAIDs), but her symptoms did not resolve.

On examination, there was marked tenderness over the symphysis pubis and inferior pubic rami. On evaluation, she had anemia (Hb, 11.6 g/dl), raised ESR (62 mm/hour) and a serum CRP level of 9mg/dl (normal <6mg/dl). The purified protein derivative (PPD) test was negative. Repeated blood cultures and urine cultures were negative. Chest X-ray was normal. Plain radiography of the pelvis demonstrated bilateral involvement of the pubic bone and adjacent rami, widening and bony erosions of the symphysis pubis (Fig. 1-b). Bone scintigraphy (Technetium-99m

methyl diphosphate bone scan) revealed increased perfusion, blood pool and bone uptake in both pubic rami (Fig. 1-c) and CT scan showed destruction and sclerosis of pubic bones without a soft tissue mass (Fig. 1-d). These findings were consistent with osteomyelitis of the pubis or osteitis pubis.

In spite of the failure to prove bacterial infection, a diagnosis of osteitis pubis was made with a high index of suspicion of septic osteomyelitis. Intravenous cephalotin was started, but after 2 weeks, there was no change in the patient's symptoms, physical examination and pelvic X-ray. Her laboratory investigations now showed leukopenia (WBC, 3700/mm³), anemia (Hb, 10.5 g/dl) and an elevated erythrocyte sedimen-

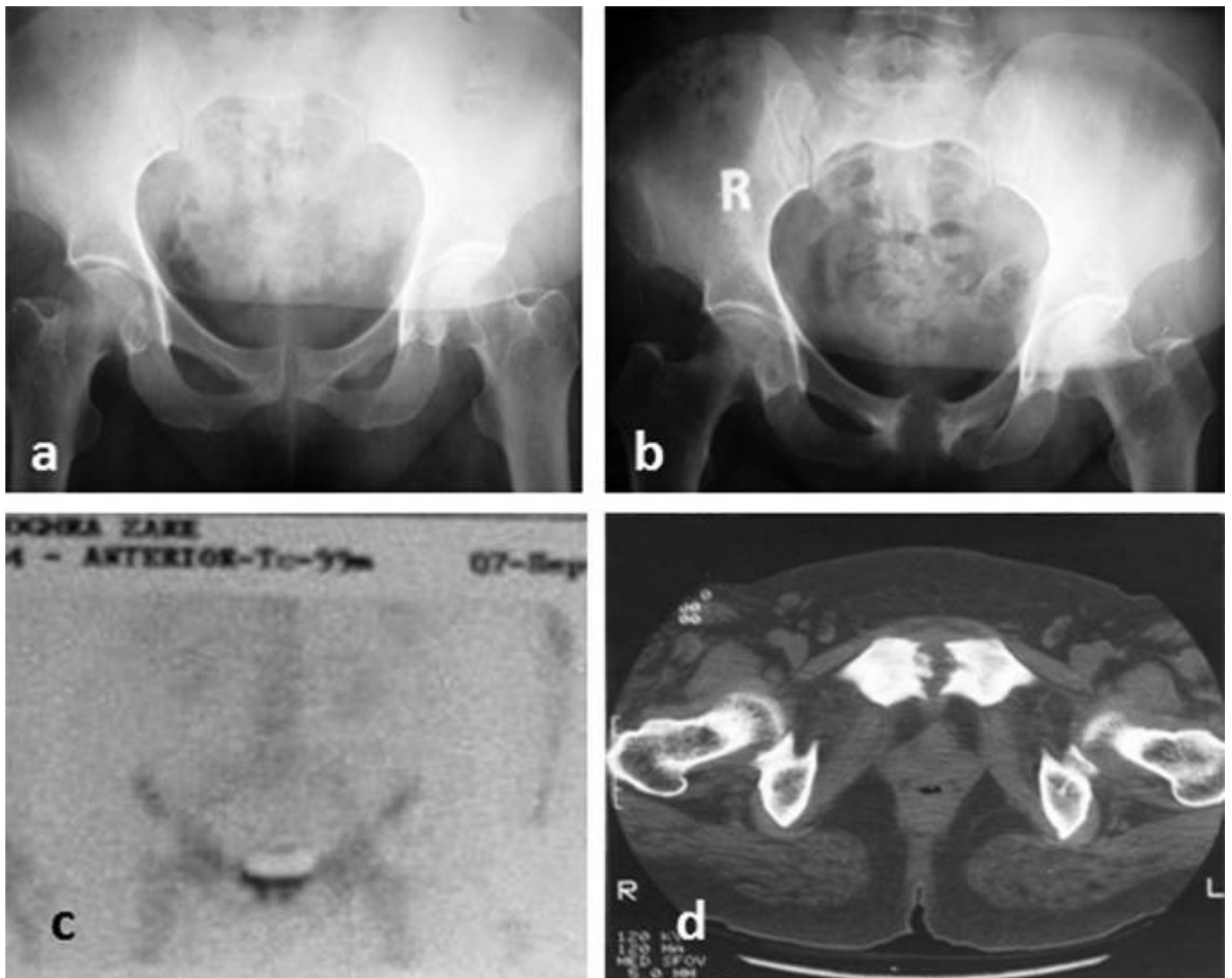


Fig. 1. A 55-year-old woman with Brucella osteomyelitis of the pubic bones.

- a. Pelvic X-ray at the beginning of symptoms showing no significant abnormality in symphysis pubis and pubic bones.
- b. Pelvic X-ray three months later showing widening and destruction of symphysis and pubic bones.
- c. Anterior planar image from radionuclide bone scintigraphy showing increased uptake in the region of symphysis pubis.
- d. Computed tomography scan: a section through symphysis pubis showing widening and destruction of symphysis pubis.

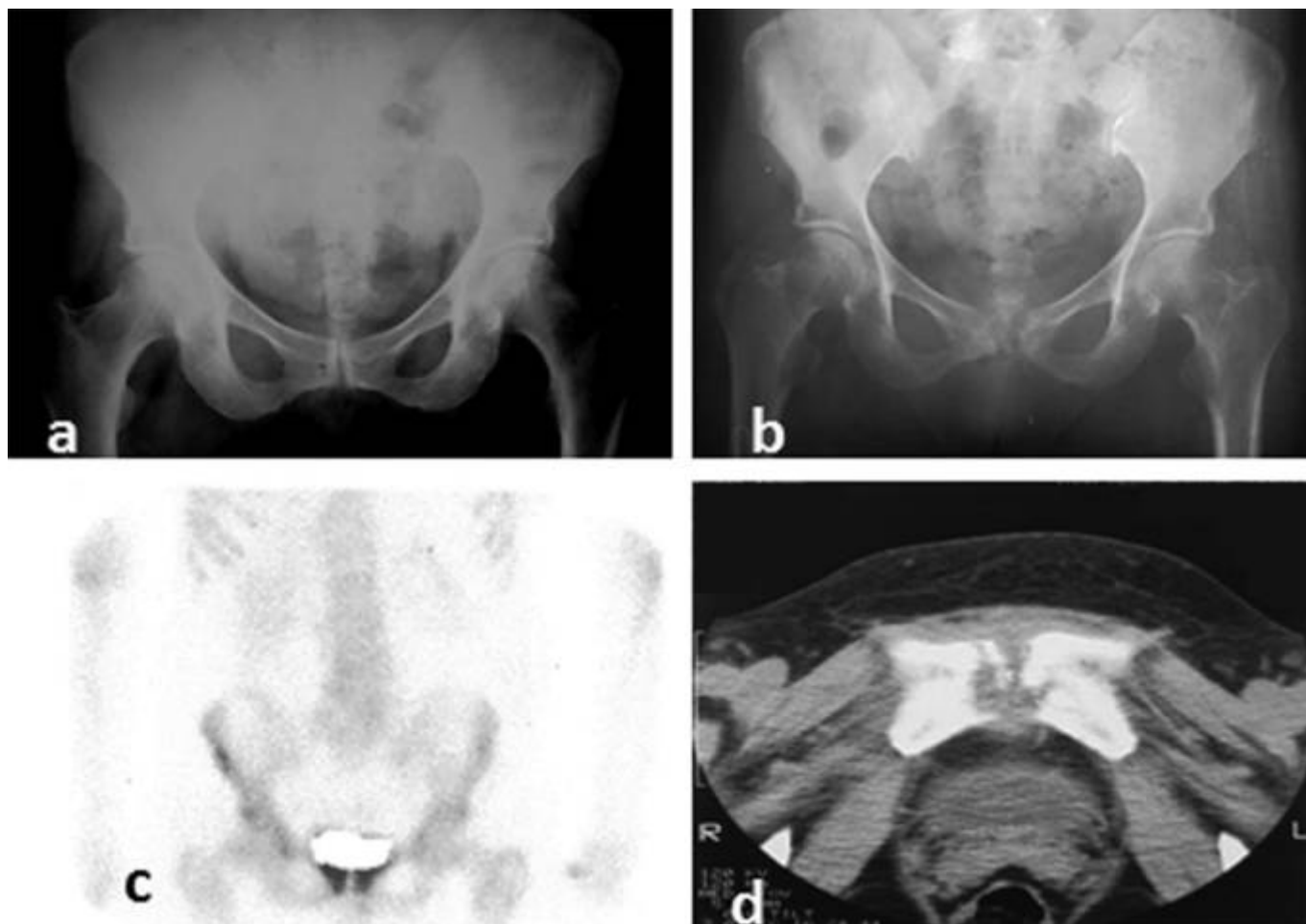


Fig. 2. A 71-year-old woman with *Brucella* osteomyelitis of the pubic bone.
a. Pelvic X-ray at the beginning of symptoms showing no significant abnormality in symphysis pubis.
b. Pelvic X-ray 2 months later showing widening and destruction of symphysis pubis.
c. Anterior planar image from radionuclide bone scintigraphy showing increased uptake in the region of symphysis pubis.
d. Computed tomography scan: section through symphysis pubis showing widening and destruction of symphysis pubis.

tation rate (ESR, 71 mm/hr). In view of the probability of brucellosis, serum agglutination test (SAT) and 2-mercaptoethanol (2ME) test were performed, which were positive (SAT, 1/640; 2ME, 1/640) and a diagnosis of brucella osteomyelitis of the pubic bones was made. The patient was treated with doxycycline (100 mg oral twice daily for 8 weeks), rifampin (600mg daily for 8 weeks) and streptomycin (1 g/d IM for 3 weeks). After 2 months treatment she was pain-free. Her ESR had dropped to 25mm/hr and the serological tests were negative. She remained symptom free in the next 6 months of the follow-up.

Case 2

A 71-year-old female was admitted to our hospital complaining of fever, sweats, anorexia, pelvic and hip pain, and difficulty walking of 2 months duration. She was living in a rural area. Her husband was a

dairy farmer. She had seen two physicians prior to admission in our hospital. She had had a series of laboratory tests including CBC, ESR, CRP, routine blood chemistries and urinalysis, all of which were normal, except for mild elevation in inflammatory markers (ESR, 50 mm/hr; CRP 9mg/dl). She had a normal pelvic X-ray at the beginning of her illness (Fig. 2-a). Except for ischemic heart disease, her past medical history was unremarkable.

On physical examination, her temperature was 38.6°C, and she did not appear well. There was marked tenderness over the symphysis pubis and inferior pubic rami. Investigations included hemoglobin, 12.6 g/dl; total leukocyte count, 5300 /ml; ESR, 40mm/hr and CRP, 9 mg/dl (normal < 6 mg/dl). Routine blood chemistries and urinalysis were normal and the PPD test was negative. Repeated blood cultures and urine cultures were negative. Chest x-ray

was normal. Plain radiographs of the pelvis demonstrated widening and bony erosions of the symphysis pubis (Fig. 2-b). Whole body Technetium-99m methyl diphosphate bone scan showed abnormal increased uptake on both sides of the pubis (Fig. 2-c). CT scanning showed widening of the symphysis and destruction of adjacent bones (Fig. 2-d). Serological tests for Brucellosis were ordered that were highly positive (SAT, 1/1280; 2ME, 1/640) and a diagnosis of pubic osteomyelitis due to Brucellosis was made. The patient was treated with oral doxycycline (100mg twice daily), rifampin (600mg daily) and streptomycin (1 g/d IM for 3 weeks). After 8-weeks, the patient still had pain and his ESR was 35mm/hr. Doxycycline and rifampin were continued, and after a total of 12 weeks treatment she was pain-free and walking normally. Her laboratory tests were in normal range (ESR 22mm/hr, SAT, 1/80; 2ME, negative). At 3 and 6 months follow ups she was symptom free.

Discussion

Brucellosis is a zoonotic infection transmitted from animals to humans. Brucellae are aerobic gram-negative coccobacilli. At least six species have been identified, four of which can cause human disease. It is always thought that in humans Brucellosis is derived from exposure to infected animals through ingestion of unpasteurized dairy products, inhalation of aerosolized bacteria, or from direct contact with contaminated animals through contaminated skin or conjunctiva. Upon entry into the body, the pathogens enter the lymphatic system and replicate in regional lymph nodes. Brucellae are facultative intracellular pathogens that have the capacity to survive within the phagocytic cells of the host. Hematogenous dissemination is often followed by bacteria taking residence in organs rich in reticuloendothelial cells, such as the liver, spleen, and bone marrow.⁸

Virtually any organ system can be involved with Brucellosis and localization of the process may cause focal symptoms or findings. The most common sites for localization are osteoarticular, genitourinary, neurobrucellosis and endocarditis.⁸

Osteoarticular complications have been reported in 10% to 80% of cases depending on the series, the age of the patients, and the infecting *Brucella* spp.⁴ Sa-

croiliitis and spondylitis are the most frequent sites involved.^{9,10} Large weight-bearing joints (e.g., hips, knees, ankles) are involved more often than small joints. When effusions are present, they contain a preponderance of lymphocytes, but Brucellae are isolated in fewer than half the cases. A post-infectious spondyloarthritis, bursitis, tenosynovitis, and infection of joint prostheses have also been reported.⁸ Radiographic abnormalities of osteoarticular Brucellosis are generally late findings, whereas bone scans may detect inflammation earlier in the disease. Computed tomography is especially useful for detecting joint destruction, vertebral osteomyelitis, and paraspinal abscess.¹¹

Osteomyelitis of pubic bones is a very rare manifestation of Brucellosis, and there are only 2 case reports in the literature.^{6,7} In a retrospective study, scintigraphic findings of 214 patients with Brucellosis and musculoskeletal manifestations were analyzed. There were three (1.5%) patients with increased uptake in the symphysis pubis. The author did not discuss the clinical and radiographic findings in these three cases.¹² As the Brucellae osteomyelitis of the pubic bone is very rare, diagnosis is usually difficult unless a high index of suspicion is maintained. Laboratory tests often reveal only subtle abnormalities such as mild elevation in inflammatory markers. These abnormal laboratory tests may also be seen in osteitis pubis. Radiographic changes are also nonspecific, with findings often mimicking osteitis pubis and osteomyelitis due to other organisms.⁸

Osteitis pubis is a painful, noninfectious, inflammatory condition involving the pubic bone, symphysis, and the surrounding structures. It has been reported after various urological and gynecological procedures and in athletes ranging from long-distance runners to weight lifters. A gradual onset of pain in the pubic region is the primary symptom; the pain may radiate into the groin, along the medial aspect of the thighs, or into the abdomen. Eventually, increasing pain may make ambulation difficult, and an antalgic or waddling gait may develop. Roentgenographic changes may not be apparent for 2 to 3 weeks after the symptoms appear, but bone scans usually show diffuse uptake in the pubis much earlier. Characteristic roentgenographic changes include symmetrical bone resorption at the medial ends of the pubic bones, wi-

dening of the symphysis pubis, and rarefaction or sclerosis along the pubic rami.¹³ Other conditions that may mimic these radiographic findings are normal symphyseal separation and hypermobility that may occur during pregnancy, ligamentous injury in athletes, pubic osteomyelitis, seronegative spondyloarthropathies, subchondral resorption of the bone in primary and secondary hyperparathyroidism, stress and insufficiency fracture and following radiation therapy.¹⁴

Because the signs and symptoms of Brucellosis are nonspecific, and the causative organism can be difficult to isolate, the diagnosis often depends on serologic techniques.¹⁵ We did not isolate the microorganism from the symphysis pubis, but highly positive serological tests, response to treatment with doxycycline and rifampin and decrease in antibody titers after treatment were highly suggestive of Brucellosis.

Several regimens have been used to treat Brucellosis. At present, there are two recommended regimens for adults: Regimen A — Doxycycline 100 mg oral twice daily for six weeks plus streptomycin 1 gram IM daily for the first 14 to 21 days. Regimen B — Doxycycline 100 mg oral twice daily plus rifampin 600 to 900 mg oral (15 mg/kg) once daily for six weeks.¹⁶ Patients with osteoarticular complications may benefit from a longer course of therapy. This was illustrated in a prospective study of 90 patients with osteoarticular Brucellosis in which the relapse rate was lower in two groups: patients treated for more than five months compared to the usual six weeks of therapy, and those treated with a three-drug regimen (adding streptomycin to doxycycline-rifampin).¹⁷

Conflict of Interest

There is no conflict of interest regarding this article.

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