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Subacute Acetabular Osteomyelitis Caused by Proteus Mirabilis. A Case Study

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SUMMARY

Subacute acetabular osteomyelitis is a rare disease of bone. Deep location of the infection site sometimes may delay diagnosis. The most common cause is Staphylococcus aureus, whereas Proteus organisms are very rare etiologic agents. The aim of this case report is to present an unusual case of subacute acetabular osteomyelitis caused by Proteus mirabilis in a 12-year-old boy. Subacute acetabular osteomyelitis can be induced by Proteus mirabilis in the absence of previous trauma, predisposing conditions or disease. The patient was successfully treated with antibiotics. Local biopsy was essential in diagnosing this infection. Antibiotics should be given only after clinical sampling and susceptibility tests.

Key words: osteomyelits, hip joint, bone infection

BACKGROUND

Subacute osteomyelitis is defined as an infectious process in bone characterized by mild localized bone pain without systemic manifestations. It is difficult to diagnose because the signs and symptoms of the acute form are usually absent [1]. Males are affected more often than females with an age range of 1.5 months to 17.5 years [2]. The most common cause of osteomyelitis is Staphylococcus aureus, but in some cases other organisms can be retrieved, such as Group A Streptococcus, Salmonella, Haemophilus parainfluenzae, Enterobacter cloacae, Pseudomonas aeruginosa and Kingella kingae [3]. Proteus organisms are very rare causes of osteomyelitis [4]. Diagnosis is usually based on radiologic findings [1]. Magnetic resonance imaging (MRI) and nuclear medicine are the most sensitive and specific methods for the detection of osteomyelitis [3,5]. Antibiotics are generally sufficient in treating pelvic osteomyelitis [3]. We report on a case of subacute acetabular osteomyelitis caused by Proteus mirabilis in a young boy and review the relevant literature.

CASE PRESENTATION

A 12-year-old boy without any predisposing conditions, previous surgery or congenital abnormality was consulted at the outpatient clinic of the Orthopedic Department at the University Clinical Centre of Kosova because of limping and right knee pain without local tenderness. These complaints had been present for two weeks before the visit. During this time he had no fever. Clinical examination of the ipsilateral hip was normal. Same-day right knee radiography revealed no traumatic or other significant changes. The patient often rode his bicycle, but he had not experienced a fall or another injury. The pain was treated with analgesics (Ibuprofen) and he was advised to take a rest. One week later he came back complaining of hip pain and restricted hip movements. He was able to walk, but still with mild limping. He did not have fever. Laboratory tests taken on the same day revealed mildly elevated CRP (12 mg/dL), ESR (14/hr) and normal white blood cell count (7.0 /μL). Urine and blood cultures were negative. Chest radiography, abdominal ultrasonography, hip radiography and ultrasound examination were normal. An MRI of the right hip was performed one day after admission and a ^{99m}Tc Bone Scan, 3 days later (Fig. 1 and Fig. 2). In both cases, the findings suggested the presence of an acetabular bone tumor and a guided biopsy was performed which excluded malignancy, but the culture grew Proteus mirabilis which was resistant to nitrofurantoin and tetracycline and sensitive to aminoglycosides, cephalosporins and floroquinolones. The patient was treated with ceftriaxone 1 g two times a day for a period of three weeks and non-weight bearing. After two weeks of treatment, laboratory tests and clinical examination were normal. The treatment continued with an oral antibiotic (Cefixime sirup 100 mg/5 ml) twice a day for two weeks and partial weight bearing. During this time he did isometric strengthening exercises for the lower limb muscles. A follow-up MRI two months later showed resolution of the acetabular lesions (Fig. 3). There was no recurrence of symptoms at 13 months after the onset of disease.

DISCUSSION

Osteomyelitis is an infection of bone and bone marrow that usually occurs by hematogenic spread or following an open fracture. In pelvic osteomyelitis, the most commonly affected bone is the ilium

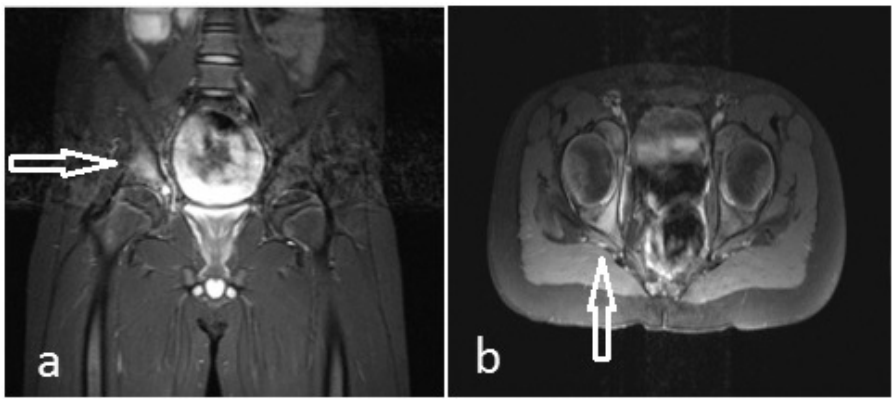

Fig. 1. Magnetic resonance imaging: T1 TIRM sequence in coronal plane (a) and T1 SE with FS in axial plane (b) of the pelvis taken on the 2nd day of hospitalization. High intensity signal of acetabulum, ilium and ischium on the right side (arrows)

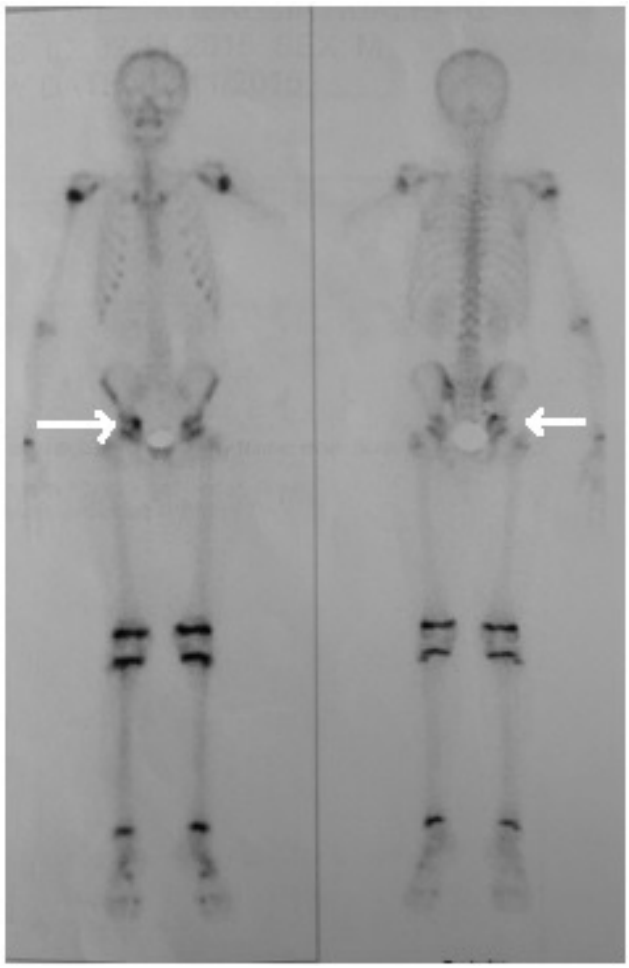

Fig. 2. Increased isotope uptake on right side after 99mTc Bone Scintigraphy (arrows) taken on the 3rd day after admission to hospital

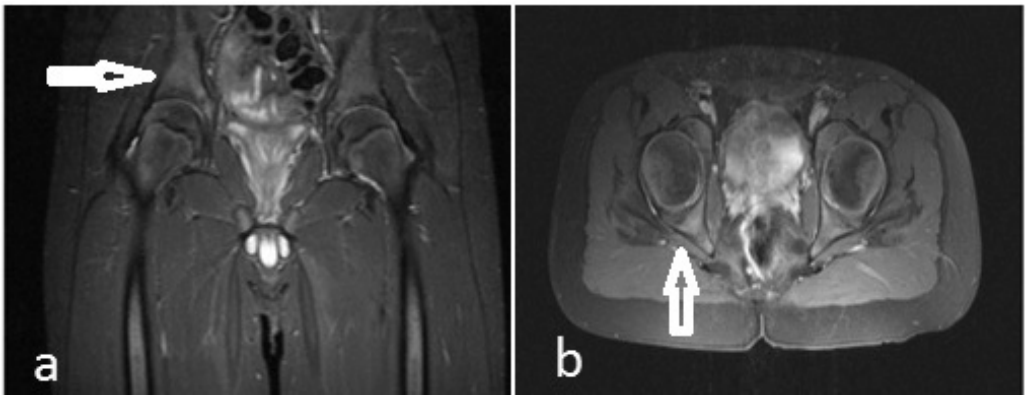

Fig. 3. Magnetic resonance imaging: T1 TIRM sequence in coronal plane (a) and T1 SE with FS in axial plane (b) of the pelvis taken at 2 months after hospitalization. It shows resolution of right acetabular changes (arrows)

(38%) because of its rich vascular supply, followed by the ischium (19%), pubic bone (14%) and the acetabulum (12%). Patients may be admitted to hospital with pain in the hips, thigh, abdomen or spine and difficulty walking [3,6]. This condition does not induce a systemic response and there is a general delay in diagnosis with a mean duration of illness prior to diagnosis of 11 days [3]. Detection of bone involvement with pelvic radiography is difficult in early stages of disease. The sensitivity of bone scintigraphy is higher. Pelvic MRI is the best diagnostic imaging modality, with 82-100% sensitivity and 75-96%

specificity for diagnosis [5]. Most patients with pelvic osteomyelitis were treated for 4-6 weeks [3]. Subacute acetabular osteomyelitis is a rare disease, covering 2-11% of all cases of osteomyelitis. Pelvic osteomyelitis is an unusual bone infection in children and occurs more frequently in older children (mean age 8.7 years), affects males slightly more often and is less likely to present after antecedent trauma [3]. Staphylococcus aureus is the most common causative microorganism (90%) [6]. Proteus organisms are very rare causes of osteomyelitis, also in immunocompromised patients [4,7,8]. To our knowledge, this is the first case report of Proteus mirabilis pelvic osteomyelitis in a previously healthy child. Proteus species are Gram-negative bacilli within the Enterobacteriaceae family. Proteus mirabilis is a facultative anaerobe bacterium characterised by swarming motility and ability to ferment maltose [9]. Proteus species cause approximately 10% of urinary tract infections [4,9]. Nevertheless, Proteus vertebral osteomyelitis is rare and has been reported in medical literature in only four cases during the last 30 years. The diagnosis in previous cases was made on blood or urine culture combined with radiological evidence of acute osteomyelitis. The mainstay of treatment is surgery and antibiotics. The majority of previously reported cases of Proteus vertebral osteomyelitis improved with antibiotics and the duration of treatment is usually between 3 months and 12 months. Surgery combined with antibiotic therapy is successful in 70-90% of cases. With or without surgery, all reported cases had a favourable prognosis [4].

CONCLUSION

Subacute acetabular osteomyelitis can be induced by Proteus mirabilis without any previous trauma, predisposing conditions or disease. It was very successfully treated conservatively with antibiotics. Local biopsy was essential in diagnosing this infection. The isolation of Proteus species in this case reminds clinicians about the diagnostic importance of biopsy. Antibiotics should be given only after clinical sampling and susceptibility tests.

Abbreviations

MRI: Magnetic resonance imaging; CRP: C-reactive protein; ESR: Erythrocyte sedimentation rate; ^{99m}Tc: 99m Technetium; TIRM: Turbo inversion recovery magnitude; SE: Spin echo; FS: Fat saturated.

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