PROXIMAL TIBIAL STRESS FRACTURE ASSOCIATED WITH MILD OSTEOARTHRITIS OF THE KNEE: CASE REPORT

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SUMMARY – Stress fractures are considered as multifactorial overuse injuries occurring in 0.3%-0.8% of patients suffering from rheumatic diseases, with rheumatoid arthritis being the most common underlying condition. Stress fractures can be classified according to the condition of the bone affected as: 1) fatigue stress fractures occurring when normal bone is exposed to repeated abnormal stresses; and 2) insufficiency stress fractures that occur when normal stress is applied to bone weakened by an underlying condition. Stress fractures are rarely associated with severe forms of knee osteoarthritis, accompanied with malalignment and obesity. We present a patient with a proximal tibial stress fracture associated with mild knee osteoarthritis without associated malalignment or obesity. Stress fracture should be considered when a patient with osteoarthritis presents with sudden deterioration, severe localized tenderness to palpation and localized swelling or periosteal thickening at the pain site and elevated local temperature. The diagnosis of stress fractures in patients with rheumatic diseases may often be delayed because plain film radiographs may not reveal a stress fracture soon after the symptom onset; moreover, evidence of a fracture may never appear on plain radiographs. Triple phase nuclear bone scans and magnetic resonance imaging are more sensitive in the early clinical course than plain films for initial diagnosis.

Key words: *Fractures, stress – diagnosis; Tibia; Osteoarthritis*

Introduction

Stress fractures generally occur as the result of a repetitive use injury that exceeds the intrinsic ability of the bone to repair itself. Stress fractures of lower leg, particularly tibial stress fractures, are not so rare in military patients or athletes[1,2]. They have also been studied in elderly people with rheumatoid arthritis, osteoporosis, Paget's disease, pyrophosphate arthropathy, hyperparathyroidism, after total knee arthroplasty, and in people who play sports incompatible with their age[3], and rarely with severe osteoarthritis of the knee[3,4]. We present a case of proximal tibial stress fracture in a 74-year-old woman with no obvious relationship with any of the conditions mentioned above.

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Case Report

A 74-year-old woman with a 20-year history of low back pain and angina pectoris was seen for increasing pain in the proximal medial part of the tibia without history of trauma. She could only walk short distances. She did not have pain at rest. Weight bearing and walking pain was 92 mm on the visual analog scale (VAS). Prescribed nonsteroidal antiinflammatory drugs, simple analgesics and opioids were without significant effects on pain and function. Physical examination revealed localized proximal and anteromedial knee pain. Severe tenderness to palpation, mild swelling and slight temperature elevation were pres-

ent and localized at the pain site. There was no clinical effusion or malalignment, and mild crepitus was present with full range of motion. A small Baker cyst was present clinically. Body mass index was 23.8.

Routine laboratory blood tests were unremarkable. Electrocardiography and chest x-ray were normal. Lumbar spine x-ray showed moderate degenerative changes. Densitometry showed no lumbar spine and femoral neck osteoporosis.

Plain radiographs of the knee demonstrated osteopenia and mild narrowing of the medial compartment. There was no evidence of fracture. Ultrasonography showed a small Baker cyst, 3 cm in diameter. Triple phase nuclear bone scans showed an increased accumulation of radiopharmaceutical in the medial tibial condyle of the left tibia (hot spot) in early and late phase (Fig. 1).

Magnetic resonance imaging (MRI) revealed compressive fracture of proximal tibial metaepiphysis with edema of adjacent medullary bone (Fig. 2).

Discussion

Stress fracture of the lower extremity presents as localized pain not associated with trauma that worsens during exercise or weight bearing. Stress fractures are considered as overuse injury with a prevalence of 0.3%-0.8% in patients with rheumatic diseases[5,6]. The main sites are the pelvis and sacrum, parts of tibia and fibula that are close to the joints, the calcaneus, the

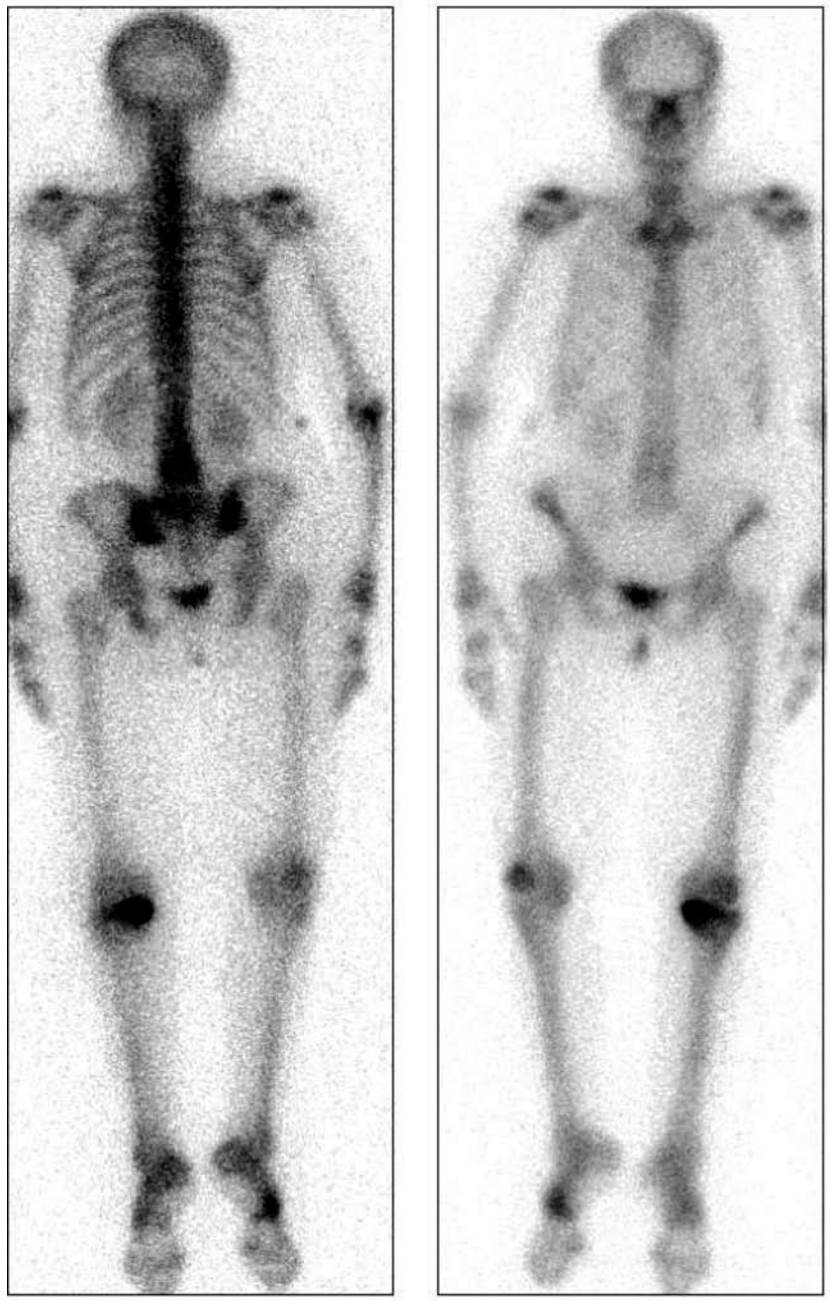

Fig. 1. Static image: whole body Tc99.

hip and metatarsal bones[5-7]. Tibial stress fractures are often encountered in young military and athletic individuals. In elderly people, they have been reported in association with various rheumatologic conditions but rarely with severe osteoarthritis of the knee[3]. Rheumatoid arthritis is a common underlying condition. In 25 rheumatologic patients with insufficiency fractures of the tibia and fibula, Alonso-Bartolome *et al.*[8] found 16 patients with underlying conditions: rheumatoid arthritis in 13, psoriatic arthritis in 2 cases, and systemic lupus erythematosus in 1 case. Elkayam *et al.*[9] report on nine patients with rheumatic diseases diagnosed as stress insufficiency fractures, eight with rheumatoid arthritis and one with polymyalgia rheumatica. Osteoporosis is a common underlying condition, reported in 50%-83% of rheumatologic patients presenting with stress fracture[6,7]. In 2009, Sourlas *et al.*[3] reviewed the English-language literature on tibial stress fractures and found only 31 cases of tibial stress fractures in elderly patients with knee osteoarthritis from 1972 and reported two new cases. All 31 patients were women, mean age 71 years, with knee malalignment found in the majority of cases (n=29), varus malalignment in 24 and valgus in five patients. When stress fracture is associated with knee osteoarthritis, it is usually severe osteoarthritis associated with obesity and knee malalignment, particularly varus malalignment[3,10-13]. Our patient presented with a mild form of knee osteoarthritis without malalignment, with chronic low back pain and osteopenia. The diagnosis of stress fractures in patients with rheumatic diseases may often be delayed or even missed. Plain radiograph is often negative, concealed by severe osteoarthritic changes and not including the entire tibia. Stress fracture should be considered in a patient with osteoarthritis presenting with sudden deterioration, severe localized tenderness to palpation and localized swelling or periosteal thickening at the pain site, and local temperature elevation. Triple phase nuclear bone scans are more sensitive in detecting stress fracture. Perfusion, early static image report and late static image report show focal 'hot spot' at the point of stress fracture. In 25 of 31 cases reviewed by Sourlas *et al.*[3], plain radiograph was used to diagnose stress fracture, with bone scan used in only four cases, computerized tomography in two cases, and no diagnostic use of magnetic resonance imaging. Plain film radiographs should be obtained in initial evaluation, but may not reveal a stress fracture soon after the symptom onset; moreover, evidence of a fracture may never appear on plain radiographs[1]. The presence of periosteal reaction on radiographs at the site of clinical symptoms correlated with magnetic resonance imaging of stress injury[14]. Triple phase nuclear bone scans are more sensitive in the early clinical course[1]. Magnetic resonance imaging scans are much better than plain films for initial diagnosis and may characterize the fracture better than bone scans[1,2]. However, clinical diagnosis is the basis followed by other diagnostic methods[15]. Most stress fractures are uncomplicated and can be managed conservatively[15]. Some stress fractures, with specific indications, can be treated surgicaly with several different techniques and approaches[16]. We treated our patient with modified rest, non weight bearing exercises, limited walking with crutches and non steroidal antiinflammatory drugs.

Fig. 2. Fracture of proximal tibia (arrow).

Conclusion

Proximal tibial stress fracture is an uncommon complication of severe osteoarthritis of the knee with malalignment and abnormal weight bearing as a causative factor. Our patient presented with mild osteoarthritis and stress fracture. The diagnosis of stress fractures in rheumatologic patients may be missed and increased awareness of this entity is of importance, especially in case of sudden deterioration of primary rheumatic disease.

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Sažetak

STRES FRAKTURA PROKSIMALNE TIBIJE POVEZANA S BLAGIM OSTEOARTRITISOM KOLJENA: PRIKAZ SLUČAJA

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Stres frakture kao sindromi prenaprezanja pojavljuju se u 0,3%-0,8% reumatoloških bolesnika udružene s već prisutnim reumatološkim bolestima, napose reumatoidnim artritisom. Sindromi prenaprezanja mogu se klasificirati prema stanju zahvaćene kosti kao: 1. sindromi prenaprezanja u užem smislu riječi koji nastaju kada je normalna kost izložena ponavljajućem abnormalnom opterećenju i 2. patološki sindromi prenaprezanja koji nastaju kada na kost oslabljenu patološkim procesom djeluje normalno ponavljajuće opterećenje. Stres frakture su u rijetkim slučajevima povezane s teškim oblicima osteoartritisa koljena, praćene patološkim otklonima osi opterećenja i pretilošću. U ovom radu predstavljamo bolesnika sa stres frakturom proksimalnog dijela tibije povezanom s blagim osteoratritisom koljena bez otklona koljenske osi ili pretilosti. Stres frakturu treba uzeti u obzir kada u bolesnika s osteoartritisom nastupi naglo pogoršanje bolesti, znatna lokalizirana osjetljivost na palpaciju, oteklina ili periostealno zadebljanje na bolnom mjestu te lokalno povišenje temperature. Dijagnoza stres frakture u bolesnika s reumatološkim bolestima često može biti odgođena, jer obične radiografske snimke ne mogu otkriti stres frakture nakon pojave prvih simptoma. Štoviše, dokaz frakture može izostati i na ponovljenim običnim rendgenskim snimkama. Scintigrafija kosti u 3 faze i magnetska rezonancija osjetljivije su metode u dijagnostici ranih promjena i metode su izbora za postavljanje početne dijagnoze.

Ključne riječi: *Frakture, stresne – dijagnostika; Tibija; Osteoartritis*