Bilateral Distal Femur Stress Fracture
(Case Report)

Abstract
Stress fractures are rare injuries that occur due to redundant mechanical pressure or overuse of the bone. We aim to report a case of bilateral distal femoral stress fracture with intra-articular extension in an old woman with degenerative joint disease (DJD) and osteoporosis. Here we report a bilateral intra-articular distal femoral stress fractures in an elderly woman with a history of osteoporosis and osteoarthritis with complaints of intensification of pain, limitation of movements and weight bearing. Unfortunately, the patient neglected, and did not visit for more than a year after the initial visit. She underwent total knee arthroplasty for both knees three months apart. After two years of follow-up, her knees were free of pain, and no specific complaint was mentioned. Stress fractures even with intra-articular extension in the elderly with osteoarthritis may mimic arthritis symptoms and hide behind them. Orthopedics must consider stress fractures in the differential diagnosis of elderly patients with osteoarthritis and persistent pain.
Keywords: Stress fractures, Distal femur fractures, Total knee arthroplasty.

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Introduction

Stress fractures are rare injuries that occur due to redundant mechanical pressure or overuse of the bone[1,2]. Stress fractures are classified into insufficiency and fatigue fractures. According to the definition, insufficiency fractures (IF) is defined as abnormal bone fractures under normal stresses, and fatigue fractures are described as normal bone fractures under abnormal pressures as seen in athletes or militaries[1,3,4]. These types of fractures occur less often in the areas around the knee, i.e., distal of the femur, femoral condyles, proximal femoral metaphyses, and patella[5]. Stress fractures in the elderly population can occur mainly due to osteoporosis[6], deformities after traumas[7], deformed degenerated knees[8-13], total knee arthroplasty (TKA)[14-17], rheumatoid arthritis[12,13], osteoarthritis[8,9,11], Paget's disease[18], and pyrophosphate arthropathy[19]. Early diagnosis of femoral stress fractures is so difficult, so, these fractures may misdiagnose or ignore in 75% of the examinations[20]. On the other hand, managing these fractures in patients with osteoarthritis is also challenging, because internal fixation of the fracture site is difficult due to the osteoporosis and changes that have occurred secondary to the underlying disease[21-23]. Rest with or without casting, is commonly used for treating stress fractures[10,11,24], while, surgeries are rarely used[16,19,24]. Internal fixation followed by TKA in second stage, or just one stage TKA with long stem tibial or femoral components are surgical treatment options for these types of fractures[21]. Here, we aimed to report a case of a bilateral distal femoral stress fracture with intra-articular extension in an old woman with a long history of degenerative joint disease (DJD) and osteoporosis.

Case report

A 71-year-old obese woman presented to our center with complaints of intensification of pain, limitation of movements and weight bearing. The patient's pain had onset years ago, and there was no significant change in its severity until one month before the visit. The pain had been aggravated about a month ago with a preference for the right knee without a history of trauma or excessive using the extremities. She mentioned a 10 years history of DJD and osteoporosis but denied any history of trauma or knee surgeries.

She had painful range of motion and her knee motion was much limited in the right knee. Any sign of erythema, swelling, or warmth on her knees was not noted. The examination of her remaining musculoskeletal system was normal. Anteroposterior and lateral radiographs of the right knee were requested, which showed signs of osteoarthritis and a stress fracture of the right distal femur (Figure 1A). Due to the limited facilities, we planned on knee immobilization and non-weight bearing for three months so that after bone union she candidate for total knee arthroplasty. The patient did not visit at the appointed time and after a year and a half from the initial visit, she presented again with worsening pain in both knees, this time with preference for left knee pain. Bilateral knee X-rays were demonstrated, complete bone union on the right side, and a stress fracture of the left distal femur (Figure 1B).

Right total knee arthroplasty and knee immobilization with non-weight bearing for the left side were planned. After the bone union of the left knee, she underwent total knee arthroplasty on the left side (Figure 2). In both surgeries, knee mobilization was started postoperatively on the same day of surgery and partial weight bearing the next day of surgery. But in the interval between the two surgeries, it was recommended not to put too much pressure on the opposite knee. After two years of follow-up, her knees were free of pain, and no specific complaint was mentioned. The radiographs showed a well-located knee prosthesis in situ without any sign of fractures (Figure 3).

Discussion

Stress injuries occur when the force repeatedly applied to the bone is less than the force required to cause a fracture[25]. A combination of stress and insufficiency fractures due to abnormal bone (i.e. osteoarthritis) and abnormal stresses (i.e. deformities) caused stress fractures in elderlies[26]. Stress fractures of the femur accounts up to 7% of all these fractures[27,28].

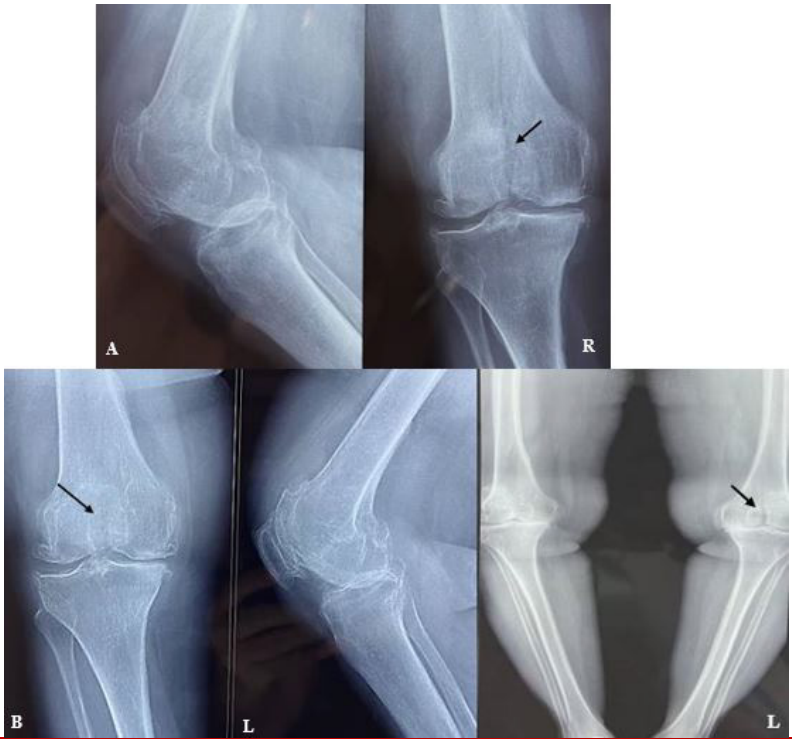

Figure 1: Anteroposterior and lateral plain radiographs revealed signs of osteoarthritis and A) a stress fracture of the right distal femur and B) left distal femur about a year and a half from the initial visit.

Studies suggest that femoral neck is the most frequent area of the femur bone that affected[29-31]. Also they mentioned that in the knee area, proximal tibia stress fractures are much common than distal femur fractures[21]. Distal femur fractures with intra-articular involvement are complex and rare injuries[32]. Complex fractures usually occur after high-energy traumas in young people and as a result of osteoporosis in elderly patients[33]. When stress fractures occur, osteoclasts absorb the damaged bone tissue, and then the osteoblasts form new bone to reinforce the damaged area. If physical stress continues before the bones are reinforced, inflammation, micro-fractures, and cortical breaks occur[34]. It is important to suspect stress fractures in addition to other differential diagnoses such as bursitis, tendonitis, mechanical causes, tumor, etc. when patients present with localized pain that begins suddenly and worsens with physical activity[5,35].

Conservative and surgical treatments are the recommended methods of managing this type of fractures. Braces and casts are used for conservative treatment. This technique is the cause of more knee stiffness in patients with arthritis due to long-time immobilization even after physiotherapy[9-11,26].

Distal femur fractures, which are associated with intra-articular involvement, have always been challenging for orthopedic surgeons. For the treatment and management of this type of fracture, surgery is the preferred method[33]. Osteotomy without or with TKA can achieve acceptable results[36], but it requires two surgical steps, which can cause implant failure or non-union[26]. One-stage TKA with internal fixation of the stress fracture involves only one stage of anesthesia and surgery, though this procedure is more extensive and requires longer incisions. This method, while stabilizing the fracture, corrects the deformation and unfavorable biomechanics at the fracture site and treats arthritis in one step, on the other hand, it also provides the possibility of early movement[26,37]. The prognosis of stress fractures that are diagnosed early is good, while delayed diagnosis and treatment can cause non-union and poor outcomes. Muscle weakness, gait abnormalities, and chronic pain are some long-term symptoms[35]. Osteopenia, using corticosteroids, and disorders of calcium metabolism cause decreasing bone strength and increase the risk of non-union[26]. In our case, we faced bilateral distal femur stress fractures with intra-articular extension in an elderly with DJD. She could mobilize her knee just after the surgery, and a complete radiographic bone union was achieved. She was symptom free and did not mention any complaint about her knees. To the best of our knowledge there are limited reports about distal femoral fracture with intra-articular extension in the literature.

Conclusion

In conclusion, stress fractures even with intra-articular involvement in the elderly with underlying diseases such as osteoarthritis may not have special symptoms and can mimic arthritis symptoms and hide behind them. Misdiagnosed and neglected these factures have severe consequences. Orthopedics must consider stress fractures in the differential diagnosis of elderly patients with DJD and persistent pain.

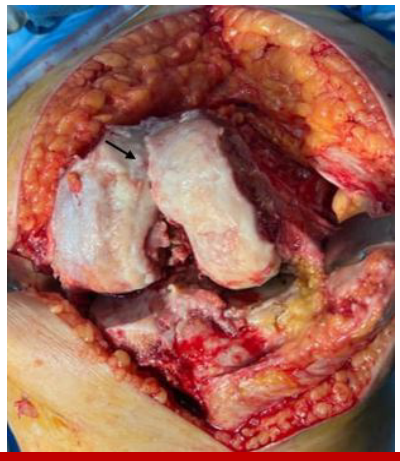

Figure 2: Intra-operative view of the fracture and intra-articular involvement.

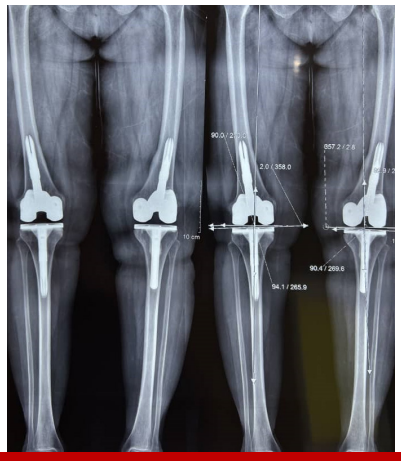

Figure 3: The radiographs showed a well-located knee prosthesis in situ without any sign of fractures post-operatively.

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