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Femoral neck stress fracture in a middle aged female: A case report

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Abstract
Stress fractures of the femoral neck are uncommon and may go unnoticed at first. Stress fractures are most commonly seen in athletes as overuse injuries. A 49 year old house wife presenting with continuous right knee pain aggravated by physical activity was diagnosed as Fullerton and Snowdy type two neck of femur stress fracture and was treated conservatively. If a stress fracture is not treated, it might deteriorate. It can cause poor healing, and even require surgery. Timely management is the key.

Keywords: Stress fracture, physical activity

Introduction
The Stress fractures are very prevalent condition that happen in certain areas and are associated with precise actions. These occur as a result of increased muscular activity on bones that have not yet been prepared to withstand the increased pull of the implicated muscles. As a growing number of middle-aged and elderly persons become more physically active, these type of stress fractures occurring in patients with bone of decreased mineral content are becoming increasingly common [2]. Stress fractures of the femur neck are extremely rare, and bilateral fractures are even rarer. These fractures most usually occur in athletes, military recruits, the elderly, or people with underlying metabolic abnormalities, and they are very seldom observed in healthy people [6]. First femoral neck stress fracture was reported by Asal in 1936 [3]. Term stress fracture describes the fracture of normal bone in healthy individuals and absence of trauma history is the most significant factor in the diagnosis [4]. The key symptom that alerts is pain during physical exercise. Early physical findings in stress fracture of the femoral neck are subtle, and there may be mild restriction of range of motion at the extremes, particularly during internal rotation. Other findings reported include a limp or antalgic gait, tenderness on direct palpation of the anterior groin or pain elicited by fist percussion over the greater trochanter, and an audible click accompanying passive hip flexion [5].

Case report
A 49 year old house wife presented with a 1 month long history of right-sided dull aching continuous right knee pain aggravated by activity and relieved by rest, but was able to do her daily activities, also sit and squat with pain. Antenatal history was uneventful and there were no significant co-morbidities. Bystander gave a history of her work pattern as recurrent climbing of stairs multiple times, and strenuous squatting daily as part of household cleaning. On examination, she had an antalgic gait with painful range of motion of right hip terminally and aggravated on internal rotation. Anterior joint line tenderness was elicited and there was no limb length discrepancy and no distal neuro-vascular deficits. Knee examination was found to be normal. She was evaluated with plain x-ray right knee Anterior-posterior view, Lateral view and pelvis with both hip Anterior-posterior which showed a doubtful right neck of femur stress fracture and the diagnosis was confirmed by screening Magnetic Resonance Imaging of the pelvis (figure1).

She was investigated for metabolic disorders with Renal function test, Liver function tests, Alkaline phosphatase, Vitamin D assay, complete blood count, serum calcium, magnesium, phosphorus and peripheral smear and all were found to be with in normal limits. She was diagnosed as Fullerton and Snowdy type 2 stress fracture of neck of femur. According to Fullerton *et al*. guidelines for type 2 femoral neck stress fractures, she was managed conservatively with strict non-weight bearing and absolute bed rest, bisphosphonates,calcium supplements, and with healthy dietary instructions. Follow up x-rays showed fracture healing with callus formation at the fracture site. (Figure 2&3)

Discussion

Bone tissue is a dynamic architectural framework that constantly remodels itself to withstand external forces and respond more efficiently to changes in the muscle activity imposed on it [2]. Many comorbidities are linked to stress fractures, and one key risk factor to consider is vitamin D levels, which have been highlighted in various reports, with one study specifically addressing it in 83.8 percent of their senior stress fractures [13]. Exercise-induced anterior groin pain is the usual presenting complaint, and discomfort at the extremities during hip range of motion is the most common examination finding [10]. It is important to understand that initial radiography may fail to show a fractured neck of femur and that, in the presence of continued severe pain, repeat X-rays should be performed even if there is no history of trauma. This is especially important in the presence of pre-existing underlying joint pathology, which may be thought to be an adequate explanation for the symptomatology [7]. Plain radiographs have just 15-35 percent sensitivity in the early stages, but radionuclide scanning and MRI are the "gold standard," with approximately 100 percent sensitivity 8.At the moment, the most generally used categorization is that of Fullerton and Snowdy, who classified femoral neck stress fracture into three classes with the help of both plain radio graphs and Bône scans.The classification involved type I involving tension side of femoral neck, type II involving compression side, and step III involving those which were displaced [11].As soon as femoral neck stress fracture is suspected, weight bearing on the afflicted hip must be avoided and an x-ray must be taken right away [14]. Once a fracture has been diagnosed, the patient should be placed on bed rest until there is no hip pain at rest. As his symptoms improve, he progresses from partial to full weight-bearing on crutches. He moves to a cane and eventually to walking without support after he is pain-free with full weight-bearing on crutches. During the cane use time, the patient may begin cardiovascular conditioning by swimming or biking [11]. The treatment regime of femoral neck stress fractures depends on the type of classification it falls under. Delays in diagnosis are prevalent, which increase the chance for déplacement of the fracture, and sporting outcomes for displaced fractures are much lower 10. K.M. Patel *et al*. developed an algorithm for assessing and treating femoral neck stress fractures in the elderly(figure 4) [9]. In a study on 24 runners with femur neck stress fracture treated conservatively, it was observed that there was an increase in returning to running time as the Arendt scale of severity increased in each cases [15]. Refracture remained the only notable complication in patients treated conservatively among several cases of displaced femur neck stress fracture [11]. Blicken staff and Morris recommended early surgical treatment for undisplaced stress fractures as 50% of them otherwise healed with a varus malunion [16].

Conclusion

In our case study, 49 year old female with history of strenuous household activities presented with right sided knee pain diagnosed with MRI while all other blood investigation for metabolical causes were found to be negative, as Fullerton and Snowdy type 2 fracture and was treated conservatively with full non-weight-bearing, ibandronic acid and calcium supplements, found to have callus formation and fracture healing on follow ups. Early recognition and timely treatment lead to better results and faster recovery.

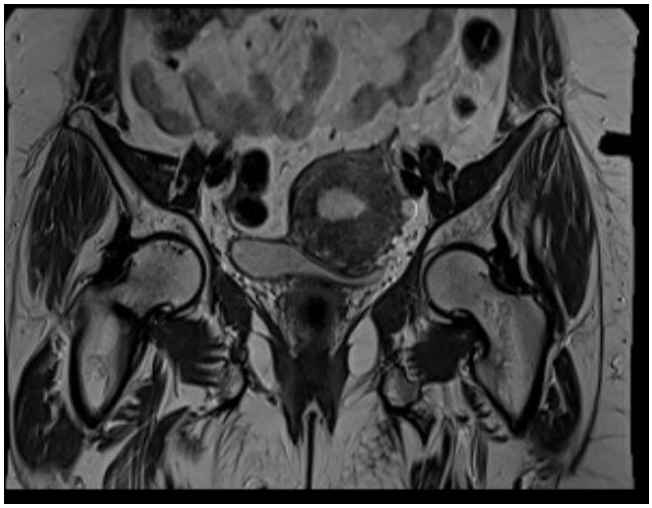

Fig 1: MRI pelvis showing stress fracture right neck of femur

Fig 2: 2 month follow up plain pelvic x ray showing fracture healing with callus formation

Fig 3: 6th month follow up plain pelvic x ray showing fracture healing with callus formation

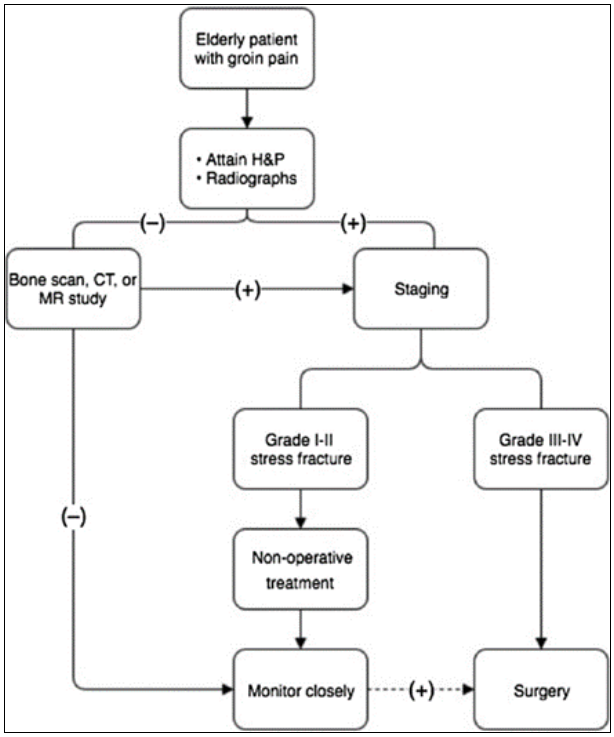

Fig 4: Stress fracture management algorithm by K M Patel, *et al*.

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