


Orthopaedic and Sports Injuries Services "OASIS"
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Sequential Insufficiency fractures: a case report

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Abstract

Multiple Insufficiency fracture is a rare injury .The author's report an 88 year-old lady with osteoporosis who had stress fractures of her spine with sequential insufficiency fractures of both hips. The patient's pain

was eventually resolved with sequential total hip replacements. We believe that this is an unusual presentation of a rare injury and has never been reported before.

Key words

Insufficiency fractures, multiple, femoral head, femoral neck and subchondral fracture.

Introduction

An insufficiency fracture of the femoral neck is considered when elderly women with osteopenia complain of pain in the hip joint even when there is no evidence of trauma.⁷ In these patients the pain usually has an acute onset and gradually worsens. No risk factors for osteonecrosis, including corticosteroid intake, alcohol abuse or other underlying diseases are present.¹³

Subchondral Insufficiency fractures of the femoral head generally occur in elderly patients. These fractures are nontraumatic flattened lesions related to osteopenia. They are an infrequent cause of pain in otherwise healthy adults. The condition has not been associated with other disease processes, medications and smoking or the use of tobacco products.¹¹

Some Insufficiency fractures resolve spontaneously,^{1,5} but several have been shown to progress to collapse requiring surgical intervention.^{4,13} We report on a case where there was a bilateral sequential insufficiency fracture that was managed with sequential hip replacement.

Case report

The patient was an 88 year-old lady with a long history of hip pain. There was no history of corticosteroid treatment or alcohol abuse. She had been known to suffer from osteoporosis since 1983, when she presented with a collapse fracture of L3 vertebra. Pelvic x-rays at the time showed early degenerative changes in both hips but no other abnormality. In 1989, the patient presented to another centre with right hip pain with no antecedent trauma. She was diagnosed with compression fracture of the right neck of femur, which was treated with cannulated Richards's screws. [Fig 1].

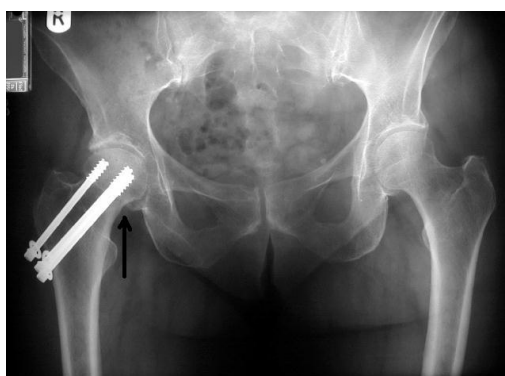


Fig 1. Right neck Compression fracture

In 1994 she presented with increasing pain in both hips and no history of trauma. X-rays showed an undisplaced compression fracture of the left neck of femur [Fig 2] that was treated with cannulated screws.

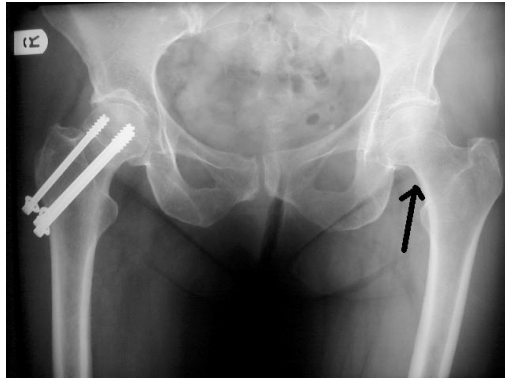


Fig 2. Left neck Compression Fracture.

Her hip pains persisted with increasing degeneration of both hips, and in 1999, an x-ray the left hip showed a subchondral insufficiency fracture 5 years after a compression fracture. [Fig 3]



Fig 3. Left Subchondral insufficiency fracture.

She underwent sequential total hip replacements in 1999, which settled her hip pains [Fig.4].



Fig 4. Total hip replacement at 3 years

The patients' past medical history included a hysterectomy and bilateral salpingo-oophorectomy in her late forties. She had also suffered a Smith's fracture of the right wrist in 1994, and a skeletal survey in 1998 had revealed collapsed T11 and T12 vertebrae. The patient maintained a normal BMI and the physical examination was unremarkable. Renal and liver function tests were normal, and the haemoglobin was normal. Full myeloma screens were negative. In 1996 the patient's serum calcium was raised at 2.68mmol/l, and she was later diagnosed with primary hyperparathyroidism. She opted for conservative management of this condition and has not developed any further insufficiency fractures since her hip replacements.

Discussion

A fatigue fracture results from the application of abnormal stress or torque to a bone with normal elastic resistance. Stress fractures can be

classified into a transverse type, which is more frequent in older patients, appears as a small radiolucent area in the superior aspect of femoral neck and becomes displaced in some situations. A compressive type, more frequent in younger patients appears as a haze of callus in the inferior aspect of the neck and is stable in most cases.¹⁰ The radiographic changes in the current case are similar to the compression type. This type of fracture is seen infrequently in the elderly but has been described by J. Iwamoto et al.⁷

The mechanism by which a fracture occurred in the inferior aspect of the femoral neck remains uncertain. A biomechanical study has showed that when walking the body weight loading focuses on the inferior aspect of the femoral neck, whereas falling down focuses mechanical stress on the superior aspect of the femoral neck.¹⁴ Therefore in the current case repetitive or spontaneous weight bearing on the hip joint when walking might have produced repetitive or spontaneous compression force on the inferior aspect of the femoral neck, which in association with bone fragility due to osteoporosis resulted in fracture of the inferior aspect of femoral neck bilaterally.

Insufficiency fracture is defined as an injury that occurs when minimal stress is applied to abnormal bone characterised by decreased elastic resistance.⁹ These fractures occur predominantly in the elderly and in patients with bone fragility.¹⁴ The spine, sacrum, pubis and femoral neck

are commonly affected.^{3,8,9} Although multiple fractures due to insufficiency are rare, they have been described in a different setting.^{11,12,13} In our case the bone was already fragile due to a combination of osteoporosis and hyperparathyroidism and it subsequently led to the subchondral insufficiency fracture in a patient who already had compression fractures due to fatigue in the neck of femur bilaterally.

A search of literature revealed no report on bilateral neck of femur with ipsilateral subchondral fracture resembling those in our case. Several conditions cause a predisposition to the development of insufficiency fractures with osteoporosis in particular recognised as the greatest contributing factor. In this case the patient had a hysterectomy and bilateral salpingo-oophorectomy, which led to the development of Type I osteoporosis over forty years, along with primary hyperparathyroidism for a number of years. Thus it can be assumed that these factors together produced a synergistic effect that resulted in the development of multiple insufficiency fractures.

Conclusion

In conclusion a case of insufficiency fracture in both neck of femur and a subsequent subchondral fracture of the head has been reported and managed with total hip replacement.

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