Bilateral Insufficiency Fractures of Hip with SIF A Case Report and Literature Review

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ABSTRACT

Multiple Insufficiency fracture is a rare injury. To have a compression Sub Chondral Insufficiency fracture (SIF) in same hip is even rarer. The author's report an elderly lady with osteoporosis who had stress fractures of her spine with subsequent insufficiency fractures of both hips and a SIF. 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. We describe the circumstances and a literature review

Keywords: Insufficiency fractures femoral head, femoral neck and subchondral fracture.

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INTRODUCTION

An insufficiency fracture of the femoral neck is considered when elderly patient with osteopenia complain of pain in the hip joint even when there is no evidence of trauma [2]. The differential includes Pathological fractures and stress fractures [2] In these patients the pain usually has an acute onset and gradually worsens. Most of patient with insufficiency fracture presented with acute onset without underlying risk factor or disease [1] [26].

A subchondral insufficiency fracture (SIF) of the femoral head is a recently proposed concept, which needs to be differentiated from osteonecrosis. Clinically, SIF has generally been observed in the osteoporotic elderly women or renal transplant recipients. Radio graphical changes are not obvious in its early phase; however, some cases undergo subchondral collapse (crescent sign). Subchondral Insufficiency fractures of the femoral head generally occur in elderly patients. These fractures are non-traumatic flattened lesions related to osteopenia. They are an infrequent cause of pain in otherwise healthy adults. [5]

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Most of Insufficiency fractures resolve spontaneously [7-8] but there are reports of collapse [3 & 11]. We report on a case where there was a bilateral sequential insufficiency fracture and SIF that was managed with sequential hip replacement.

CASE REPORT

An elderly female patient with long history of hip pain. She had been known to suffer from osteoporosis since 1983, when she presented with a collapse fracture of L3 vertebra. Pelvic x-rays at that 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 history of fall or trauma. She was diagnosed with compression fracture of the right neck of femur, which was treated with cannulated Richards's screws. [Fig1].

In 1994, she presented with increasing pain in both hips but no history of trauma.

Radiographs showed undisplaced compression left neck of femur fracture [Fig 2] that was treated with cannulated screws.

Her hip pains persisted with increasing degeneration of both hips until 1999, on x-ray the left hip showed a subchondral insufficiency fracture 5 years after a compression fracture despite treatment of her osteoporosis. [Fig 3]

The patients' past medical history included a pelvic surgery (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.

Fig 1: Right neck Compression fracture

Fig 2: Left neck Compression Fracture.

Fig 3: Left Subchondral insufficiency fracture.

Upon admission (2014), the patient was systemically well. She denied any recent weight loss. The cardio respiratory and abdominal examinations were unremarkable. Haematology, Renal & liver parameters were normal. The patient was found to have raised serum calcium of 2.77mmol/l. A full Myeloma screen, including trephine biopsy was negative but the Parathyroid hormone level was elevated at 248mmol/l, leading to the conclusion that she was suffering from Primary Hyperparathyroidism. She opted for conservative management of her Hyperparathyroidism. She subsequently underwent sequential total hip replacement that settled her hip pain,

At 3 years follow up she is pain free and has no other insufficiency fractures to date. (July 2017) ([Fig 4]

Fig 4: Total hip replacement at 3 years

DISCUSSION

Bilateral femoral neck fracture is not common as unilateral femoral fracture. Femoral neck fracture generally occurs by the high energized traumas. Traffic accidents and fallings are the most common reason for this fracture kind. Minor traumatic fractures are not common. Especially, in the hormonal and pathogenic fractures is not common. [4] The fracture occurs in the background of medical conditions like hyperparathyroidism. It can be said chronic hyperparathyroidism conditions must be determined for femoral neck fracture. Because these patients are little disturbed by this fracture, diagnosis can be missed many times. [3]

Risk factors for osteoporosis can be summarised below.

The ones that affect the risk of falling and the response to trauma, the ones that affects BMD and the ones that influence the skeletal resistance but are independent from BMD [21]

The main risk factors are genetics, female sex, postmenopausal age, sex hormones deficiency, excessive smoke and alcohol abuse, very low physical activity, insufficient calcium and vitamin D dietary intake, low body weight. Osteoporosis can also be secondary to chronic illnesses, amenorrhea, and long-time use of particular drugs, long term immobilization and Hyperparathyroidism. [21]

Untreated primary hyperparathyroidism is a common endocrine disorder that leads to loss of bone mineral density over time, raising a concern about the development of osteoporosis and greater fracture risk. [9] [10]

Fragility fractures, low-energy injuries that occur from a fall from a standing or lower height, represent a serious public health problem. After age 50, the lifetime risk of having a fragility fracture is 33% for a woman and 20% for a man. [12]

Nice guidelines 2012 UK describe a 2% incidence of fragility fracture and increases to 25% after age 80. [13]

Stress fracture or fatigue fracture occur with the application of torque within normal resistance of bone which can be classified into transverse & compression fracture. Transverse fracture is most common in adult & occurs on the superior aspect of femoral neck while compression type is common in young population & mostly found at the base [14]. In this case study, elderly patient had suffered compression fracture which is not so common in adult but has been described by J. Iwamoto et al [3]

Fracture of inferior aspect of femoral neck in adult is still a topic of debate. One of the studies has explained that during walking weight transmit through inferior aspect of femoral neck which can cause fracture [16]. As in this case repetitive weight bearing stress leads to compression fracture in osteoporotic bone in elderly female

Insufficiency fracture occurs with minimal force to abnormal bone which has decreased elastic resistance commonly in adults. Common locations of insufficiency fracture are sacrum pubis & femoral neck. [16, 17, 19 & 20]

Late segmental collapse after internal fixation for femoral neck fracture is the phenomenon observed in post-traumatic osteonecrosis of the femoral head (ON), which has generally been reported to occur over a year or more after internal fixation. Subchondral insufficiency fracture of the femoral head (SIF) has also been recognized to cause femoral head collapse, however, only two cases of SIF after internal fixation for femoral neck fracture have been reported. [6]

Hip fractures are the most serious complication of osteoporosis. The cost of this fracture is huge with very high disability and complications rates; the orthopaedic treatment varies if the fracture is intra or extra capsular. The conservative treatment is restricted to the incomplete undisplaced fractures or in case the patient or the family refuses the operation. In the complete undisplaced or slightly displaced fractures the preferred treatment is the osteosynthesis with 3 cannulated screws inserted percutaneously. [21]

In presence of complete displaced fractures the operation needed is a hip prosthetic replacement. The prosthesis substituting only the femoral part (Hemi) is the most frequent operation in elderly patients. In case of younger patients with quite good bone quality and radiographic signs of acetabular osteoarthritis the preferred operation is a total hip replacement with a metallic component inserted also in the pelvis. (THR) [21]

Current literature suggests that total hip replacement (THR) is superior to hemiarthroplasty (HA) for neck of femur fracture in selected group of patients. The outcomes of THR undertaken for trauma setting remain unclear when comparing with elective THR. The trauma cohort had higher surgical complication rate (9% vs 4%), particularly higher dislocation rate (7% vs 1%); and higher medical complication rate (32% vs 6%). These were consistent with the literature. [24]

Surgeons gradually realize that other factors may have equally significant influences on patient outcome. Instead of concentrating solely on pursuing excellence in surgical techniques to fix a fracture more stably, should we also put a big effort to improve the performance of existing medical care for such patients? Are these hip fracture surgeries done promptly without delay as in the case of other long bone fractures? Are the surgeries left in the hands of residents who are relatively inexperienced? How about the other medical illnesses of these patients that may alter significantly the eventual outcome? In many parts of the world, a system of orthopaedic trauma service and the organization of the hospital that values prompt treatment of these patients is lacking. [21]

Prolonged use of bisphosphonates in patients with osteoporosis reportedly induces femoral insufficiency

fractures. However, the natural course of these fractures and how to treat them remain unknown. Femoral insufficiency fractures after pro- longed bisphosphonate therapy seldom healed spontaneously and most patients had surgery either for fracture displacement or persistent pain. [15]

No case of bilateral insufficiency fracture of femoral neck with unilateral subchondral femoral fracture (SIF) has been reported yet

In our case several factors lead to multiple insufficiency fracture (i) osteoporosis(ii) history of hysterectomy + Bilateral salpingo oophorectomy) (iii) hyperparathyroidism

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 contributory factor. In this case the patient had a hysterectomy and bilateral salpingo-oophorectomy, which lead to a Type I osteoporosis for over forty years, along with Primary hyperparathyroidism for 4-5 years, thus it can be assumed that these factors together produced a synergistic effect that resulted in the development of multiple insufficiency fractures.

CONCLUSION

With this case report the authors highlight the need to investigate patients with Bilateral fractures in elderly with minimal trauma to exclude pathological causes including Hyperparathyroidism long standing osteoporosis and other rare differentials, as evidence has shown that occult symptoms are usually explained by insufficiency fractures.

It is worth mentioning that Bisphosphonate treatment does not exclude the diagnosis as evidence is there that long-term management with Aldronate indeed can cause fragility fractures of hip (FFH)

It is also worth remembering that such fractures have to have a surgical management with medical management otherwise outcome is poor.

In this case study case of elderly female with multiple insufficiency fracture of bilateral hip (bilateral neck of femur fracture + unilateral subchondral femoral head fracture left side SIF) has been managed successfully by total hip replacement.

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