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Case Report

Fragility fracture in a 28 yr old male

Gagandeep Gupta[1], **Sagar**[1], **Shivang Kala**[1,*], **Abhishek Singh**[1]

[1]*Dept. of Orthopaedics, M. M. Institute of Medical Sciences and Research, Mullana, Haryana, India*

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ABSTRACT

A fragility fracture may be defined as a pathological fracture that results from trivial trauma. These "fragility fractures" are linked to significant pain and suffering. A 28-year-old male with a right side subtrochanteric fracture following a trivial injury, the possibility of a pathological fracture should always be raised. The subtrochanteric region commonly causes issues for the orthopaedic surgeon as the best method of restoration may not always be clear.

28-year-old male presented to emergency department with a/h/o deformity in right thigh and weakness in the bilateral lower limb. On examination tenderness, bony crepitus, bony irregularity was present and loss of transmission of movements. Patient was managed with closed reduction and internal fixation with long proximal femoral nail (PFN).

A long proximal femoral nail (PFN) is an excellent option for stabilising a Fragility fracture of subtrochanteric region and in-bed mobilisation helped in preventing the development of any more bed sores. The postoperative period was uneventful. The patient visited for routine follow-ups; the incision site was healthy.

1. Introduction

A fragility fracture may be defined as a pathological fracture that results from trivial trauma or no identifiable trauma at all. A fragility fracture is often the first presenting feature of undetected/undiagnosed osteoporosis, and ‘secondary’ prevention of fragility fractures is focused on the prevention of further fractures once an initial fracture has occurred. However, they can result from tumour, metabolic disorders, systemic disorders etc. These "fragility fractures" are linked to significant pain and suffering for afflicted individuals, disability and even death, as well as significant socioeconomic burden on the family and society. Bones with decreased compressive and/or torsional strength are more prone for fractures. Fractures usually lead to a loss of independence, a decline in quality of life and a need for care. This fracture is both a sign and a symptom of osteoporosis.[1,2]

Osteoporosis, which affects both men and women, is a major health problem that is distinguished by excessive bone fragility and susceptibility to low-trauma fractures. Any bone defect that makes the bone weaker increases the risk of mechanical fracture during ordinary exercise or with minimal force. It is necessary to classify the fracture that occurs from the mechanical failure as a pathological fracture. Osteoporosis, which accounts for 1.5 million fractures annually, is one of the main causes of these pathological fractures.[3]

Subtrochanteric fractures, which impact three different patient populations and 10–30% of all hip fractures, can occur in young patients who sustain high energy trauma, elderly osteoporotic patients who sustain low energy trauma and patients who have received either a high or low

* *Corresponding author*.
E-mail address: shivkl0722@gmail.com (S. Kala).

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dose of bisphosphonates. A 28-year-old male with a right side subtrochanteric fracture following a trivial injury is described in the case report below.

Therefore, the possibility of a pathological fracture should always be raised when a young adult sustains a subtrochanteric fracture after a trivial injury.

Subtrochanteric fracture stabilisation is quite challenging for anatomical and biomechanical reasons. There is shear across the fracture, a decreased cross-sectional area at the isthmus and a very high stress (1200 lb/sq inch) across the medial cortex. These issues are made significantly worse by the presence of powerful muscular vectors.[4] The biggest challenge with osteoporotic fractures is anchoring the device to the bone since bone failure happens more frequently than implant failure.[5]

The primary objectives of surgical treatment are to fix the fracture, alleviate pain and regain functional mobility. However, the subtrochanteric region commonly causes issues for the orthopaedic surgeon as the best method of restoration may not always be clear (for example: intramedullary [IM] nail or prosthesis) and as this anatomical location regularly offers technical difficulties.[6]

2. Case Report

28-year-old male presented to the M. M. Institute of Medical Sciences and Research (MMIMSR), Mullana (Ambala), emergency department with a/h/o deformity in right thigh and weakness in the bilateral lower limb. Patient was apparently alright 6 years ago when he had a history of Road Traffic Accident following which he developed the complaint of bilateral lower limb weakness. Patient got admitted in outside hospital at that time and got MRI Dorsolumbar spine done which was suggestive of compression fracture of the D5 and D6 vertebrae along with anterior wedging of D5 vertebrae with partial ankylosis of these vertebrae resulting in focal kyphosis. Patient was managed conservatively.

On April 2023 patient while doing his routine ankle pump exercises following which he felt sudden cracking sound in the right hip and thigh region and patient presented to MMIMSR Emergency and admitted under orthopaedics department for further management.

On examination the general physical examination and vitals were stable. Deformity was present in right proximal thigh. Tenderness, bony crepitus, bony irregularity was felt over the right proximal thigh. There was loss of transmission of movements. On neurological examination the power in bilateral lower limbs was 0/5 and the knee and ankle reflexes were absent in the bilateral lower limbs. Sensation was present up to the level of T6 dermatome but beyond T7 were absent. Further the patient had four healed ulcers, present over the right and left greater trochanter, sacral region and the left heel.

X-rays were done (Figures 1 and 2). Patient was diagnosed with closed subtrochanteric fracture of the femur right side with AVN of the left hip with compression fracture of the D5 and D6 vertebrae along with anterior wedging of D5 vertebrae.

Patient was planned for surgical treatment of the right subtrochanteric fracture for which all the routine workup was done. Closed Reduction and Internal Fixation with Long Proximal Femoral Nail (PFN) was done and the fracture was stabilised. (Figure 3)

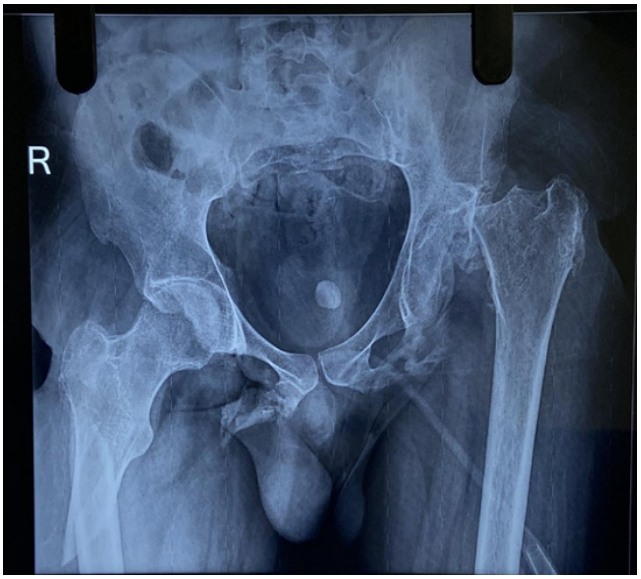

Fig. 1: Pre-op X-rays

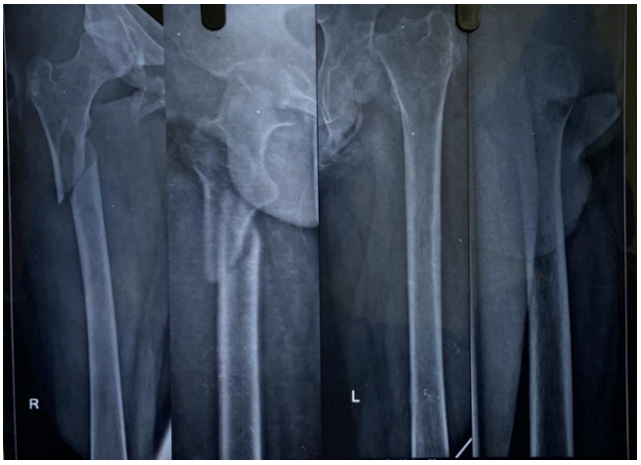

Fig. 2: Pre-op X-rays

3. Discussion

A fragility fracture may be defined as a pathological fracture that results from trivial injury (e.g. a fall

Fig. 3: Post-op X-ray

from a standing height) or no identifiable trauma at all. The fracture is both a sign and a symptom of osteoporosis.[2] Typical sites for fragility fractures include vertebrae (spine), proximal femur (hip), distal forearm (wrist) and proximal humerus.[7] The common causes of fragility fractures include osteoporosis, osteomalacia, hyperparathyroidism, renal osteodystrophy, osteogenesis imperfecta, paget's disease, osteopetrosis, postmenopausal osteoporosis, hyperparathyroidism, metastasis.[8]

Osteoporosis is defined as a disease of the bone characterized by reduced mass of the bone. When bone mass falls below the required level for mechanical support, fracture occurs.[9]

It is also an extremely common illness worldwide. It is next only to hypertension, and diabetes. Its frequency is common particularly in postmenopausal women. It is responsible for 1.5 million fractures annually. Among them, more than half a million are vertebral fractures. 3,00,000 are hip fractures. 2,00,000 wrist fractures. 3,00,000 fractures of other bones.[10,11]

Low bone mass in children and adolescents has been defined as an areal bone mineral density (aBMD) more than 2 SD below the age-adjusted mean value (Z-score<−2SD), and it has been recommended that bone fragility should not be diagnosed on the basis of low bone mass alone but requires the presence of fractures due to low trauma.[12,13] The true difficulty resides in differentiating between those young healthy individuals whose apparently low aBMD reflects low peak bone mass in relation to their body size, pubertal timing, genetic background, and environment during growth.[14–16]

Heredity, that is, the additive effects of genes and their polymorphisms, accounts for 50 to 80% of the variation in bone mass and structure among individuals[15] and likely contributes to some of the phenotypic differences between the male and female skeleton.[17] Yet gene expression depends on both the internal and external milieu, i.e., on hormone levels, particularly gonadal steroids (puberty) and the growth hormone (GH)–IGF-1 axis; nutrition, such as calcium and protein intake; physical activity, particularly load-bearing exercise; lifestyle; etc.[18]

So, any disorder appearing during growth that alters one or more of these parameters will exert a negative influence on bone modelling and remodelling, affecting bone mass acquisition and its distribution in the cortical and/or trabecular compartment, and could thereby cause bone fragility not only during growth but later on in young adults. Similarly, endocrine, nutritional, and other disturbances appearing during early adulthood will precipitate bone loss at a younger age. A typical example would be inflammatory bowel diseases (IBD), particularly Crohn's disease, which impair bone mass accrual and/or accelerate bone loss because of malabsorption and poor nutrient intake, low levels of physical activity, delayed puberty or secondary amenorrhea, in addition to systemic inflammation and, in many cases, effects of corticosteroid treatment.[12,19]

In this case report we bring to light a case of a 28-year-old male who gave a history of trivial injury following which he was diagnosed with subtrochanteric fracture of the femur right side, which usually requires high energy trauma in young adults. Fracture was fixed with a long proximal femoral nail (PFN) and as the patient is paraplegic from the waist down and in-bed movement will assist reduce the risk of bed sores.

The purpose of this case report was to highlight the presence of a fragility fractures in non-ambulatory /bed ridden young patients in the subtrochanteric region and the importance of in bed mobilisation in paralysed individuals to prevent the development of bed sores and to maintain a sufficient bone mass.

4. Conclusion

A long proximal femoral nail (PFN) is an excellent option for stabilising a Fragility fracture of subtrochanteric region and in-bed mobilisation helped in preventing the development of any more bed sores. The postoperative period was uneventful. The patient visited for routine follow-ups; the incision site was healthy.

5. Source of Funding

None.

6. Conflict of Interest

None.

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Author biography

Gagandeep Gupta, Professor https://orcid.org/0000-0002-4980-1672

Sagar, Junior Resident 3rd Year https://orcid.org/0009-0006-3373-8871

Shivang Kala, Junior Resident 2nd Year https://orcid.org/0009-0000-3763-6510

Abhishek Singh, Junior Resident 1st Year https://orcid.org/0009-0007-0791-0321

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