

## Bilateral Neck of Femur Fractures in a Young Male Following Physical Assault

Deepak Kumar, Ansh Gupta, Tarkik Thami\* and Harshith M

Department of Orthopedic Surgery, Post Graduate Institute of Medical Education & Research (PGIMER), India

\*Corresponding author: Tarkik Thami, Department of Orthopedic Surgery, Post Graduate Institute of Medical Education & Research (PGIMER), Chandigarh, 160012, India

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### Abstract

**Introduction:** Bilateral simultaneous neck of femur fractures, although rare; usually occur due to seizures or electrical shock, the underlying mechanism being a sudden violent muscle contraction.

**Presentation of Case:** We would like to report a case of bilateral neck of femur fracture which occurred due to external hyper-abduction forces, secondary to physical assault as a mechanism of trauma. Distinct fixation methods were applied to the right and left sides, tailored to their respective fracture morphologies. Unfortunately, the left side did not achieve union and required revision surgery with addition of biological bone graft. Long-term follow-up revealed bilateral union with complete symptomatic relief and an acceptable range of motion.

**Discussion:** Forceful hyper-abduction of the lower limbs resulting from a road traffic accident or assault can cause a simultaneous fracture of the bilateral femoral necks. It is imperative to choose a biomechanically stable fixation construct to achieve absolute stability in such fractures to prevent non-union and avascular necrosis as potential complications.

**Conclusion:** Given the propensity for delayed union or non-union in neck femur fractures, surgeons must intervene early, revising the fixation construct if necessary and considering the addition of bone graft if indicated.

**Keywords:** Bilateral neck of Femur fracture; Non-union; Hyper-abduction injury

### Introduction

Neck of femur fractures are relatively common orthopedic injuries frequently affecting elderly females (with a risk of fracture increasing exponentially with age). However, as ubiquitous as femoral neck fractures get, simultaneous bilateral neck fractures are very rare and need tailored management [1]. Cases have been reported in patients with chronic diseases like malnutrition, hyperparathyroidism, cystic fibrosis, metastatic bone tumors, renal osteodystrophy, and HIV infection. Other predisposing risk factors include osteoporosis; long term intake of drugs such as Selective serotonin reuptake inhibitors (SSRIs), Proton pump inhibitors (PPIs), Steroids; and seizure disorders [2]. Violent muscle contractions seen in electric shocks and convulsions are a known cause. Cases may occur in younger populations after high-velocity trauma [3]. Management options vary from cannulated screw system, sliding hip screw, hemi and total arthroplasty [2,3]. All work reported in this article is in line with SCARE criteria [4].

A written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

### Case Presentation

A 38-year-old Asian male presented with complaints of bilateral hip pain and an inability to bear weight following a physical assault. He was resuscitated according to the ATLS protocol; on examination, abrasions and swelling were noted over the left thigh and groin. Both limbs exhibited external rotation, and



Figure 1: Anteroposterior radiograph of the pelvis with bilateral Hip joints.

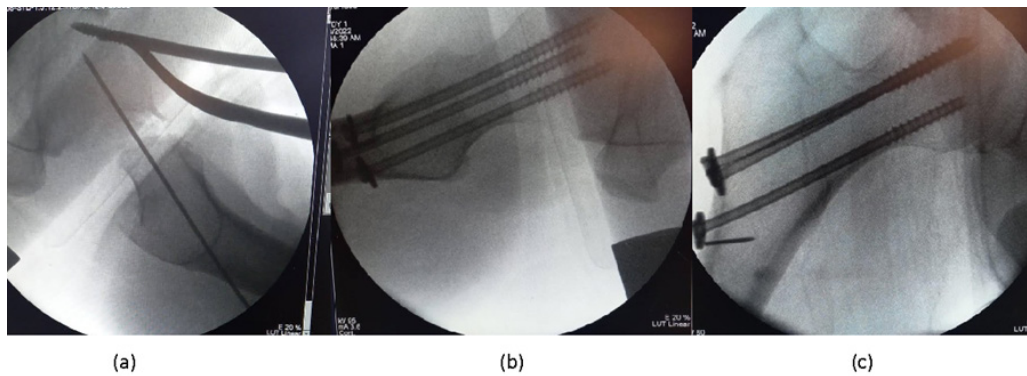


Figure 2: Intraoperative C arm shots of the reduction of the left side (a) and fixation of the right side fracture (b, c).



Figure 3: Postoperative radiographs after the primary surgery.

tenderness in the groin was elicited during passive hip examination. X-rays and a CT scan revealed an undisplaced fracture in the right femoral neck and a displaced fracture in the left femoral neck (**Figure 1**). Routine blood investigations, including a metabolic panel (Vitamin D and parathyroid hormone), were conducted to rule out abnormalities in calcium-phosphate metabolism, and all reports returned within normal limits.

### Treatment and Follow Up

The patient underwent a single stage fixation of bilateral neck of femur fractures under regional Anesthesia, in a supine position. On the right side, closed reduction and percutaneous fixation was done with three 6.5 mm cannulated cancellous screws. However, on the left side closed reduction was not successful, so open reduction through an anterolateral approach was done and fracture was fixed with a Dynamic Hip Screw (DHS). Both reductions were confirmed intra operatively under C arm guidance (**Figure 2**).

Immediate postoperative radiographs were satisfactory (**Figure 3**). Postoperative period was uneventful and the patient was kept on protected weight bearing till six weeks.

On follow up, it was noted that the patient had persistence of dull aching pain in the left hip. Sequential x-rays of the left side did not show any progression of fracture union.

The femoral head didn't show signs of avascular necrosis on radiographs however MRI couldn't be performed due to the

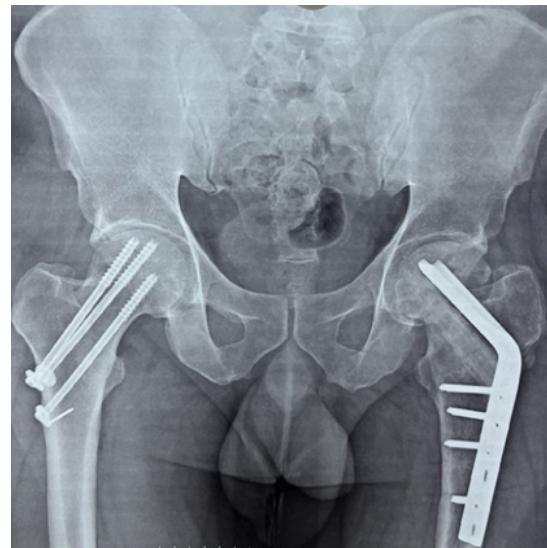


Figure 4: Postoperative radiographs at 8 months after the revision surgery on the left side.

presence of implant in situ. After a close follow up of 9 months, patient was counseled regarding the requirement of a revision surgery for a non-union of the left neck of femur fracture. We decided to revise the dynamic hip screw to an angled blade plate (ABP) with a non vascularized free fibular graft and cancellous bone grafting from the ipsilateral iliac crest. After a follow up period of 8 months, the fracture showed satisfactory union which was confirmed through radiographs & CT scan (**Figure 4,5**). Subsequently, our patient was allowed full weight bearing. At 1 year follow up, the patient shared his perspective & was able to perform all activities of daily living without any restrictions.

### Discussion

Bilateral femoral neck fractures, albeit rare, have been reported in patients with metabolic derangements like chronic kidney disease, and seizure disorders. Abnormal bone quality is a potential risk factor [2,5-7]. High velocity trauma is another potential cause which has been reported infrequently. This may

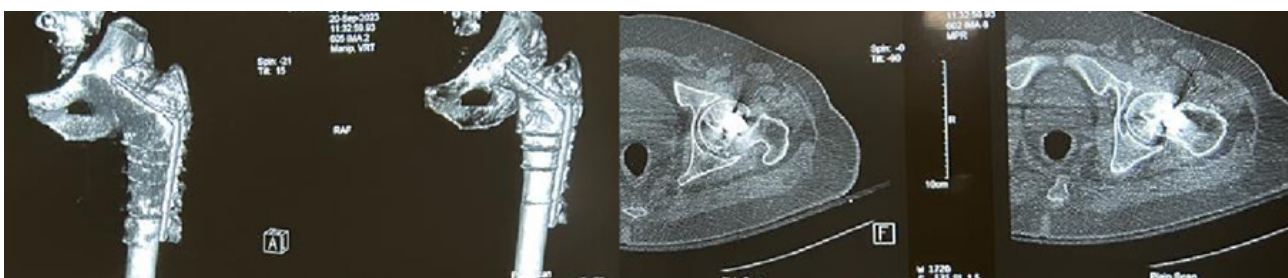


Figure 5: CT scan after revision surgery of the left hip.

be associated with upper limb injuries, femoral shaft fractures, hip dislocations and pelvic injuries (2, 8, 9). One case due to assault has been reported in a 64 year-old prisoner [3].

To the best of our knowledge, a comparable clinical presentation in a young male subsequent to an assault hasn't been reported in the existing literature. We propose a distinctive trauma mechanism involving hyper-abduction forces with variable degrees of external rotation, possibly leading to the observed fracture morphology. The bilateral posterior-superior cortical comminution in the femoral neck may serve as a distinctive indicator for the aforementioned trauma mechanism. Given the patient's youth, osteosynthesis was deemed as the preferred treatment. For the relatively undisplaced right side, a minimally invasive percutaneous fixation was chosen. A Single-stage bilateral fixation was performed to expedite early mobilization.

The potential cause for the nonunion on the left side may be attributed to the initial degree of fracture displacement. The requirement of an open reduction also resulted in the loss of the fracture hematoma and its associated growth factors. In contrast to the approach taken by Alzarhani et al [10], who opted for total hip arthroplasty in a similar case of non-union, we chose to address our situation by revising the fixation construct using an angled blade plate and incorporating bone grafting. Our decision was influenced by the patient's young age. For elderly individuals, arthroplasty is the preferred treatment and can be conducted in a single stage [11-13].

### Conclusion

When dealing with bilateral neck of femur fractures, emphasis should be laid on comprehensive history-taking to comprehend the mechanism of injury. All instances of low-velocity trauma should undergo screening for potential systemic disorders. The management approach should be tailored to the specific fracture pattern, potentially requiring distinct fixation techniques for different fracture morphologies based on the pauwels' angle. Prompt internal fixation is essential to mitigate potential complications like avascular necrosis and to facilitate early rehabilitation. Continuous monitoring through regular follow-ups is imperative to track the progression of union. In instances of neck of femur nonunion, prioritizing osteosynthesis over arthroplasty is recommended, particularly in younger individuals, provided there are no indications of avascular necrosis in the femoral head.

### Declarations

**Ethics approval:** Not Applicable.

**Consent to participate:** A written informed consent was taken from the patient stating his participation

**Consent to publish:** A written informed consent was taken from the patient regarding publishing of clinical images and other details

**Funding:** There weren't any sources of funding in our study.  
**Competing Interests:** The authors declare no competing interests.

**Availability of data and materials:** All data and materials shall be provided to the editors on request.

### References

1. Maimin DG, Meneses-Turino L. Seizures Causing Simultaneous Bilateral Neck of Femur Fractures. *Case Rep Orthop*, 2019; 2019: 4570578.
2. Gao YS, Zhu ZH, Zhang CQ. Simultaneous bilateral fractures of the femoral neck caused by high energy: A case report and literature review. *Chinese Journal of Traumatology*, 2015; 18(5): 304-306.
3. Aggarwal S, Arora C, Kumar V, Kumar P. Bilateral Neck Femur Fracture during Prison Confinement: An Atypical Mechanism of Injury. *J Orthop Case Rep*, 2020; 10(5): 31-33.
4. Agha RA, Borrelli MR, Farwana R, Koshy K, Fowler A, Orgill DP, For the SCARE Group. The SCARE 2018 Statement: Updating Consensus Surgical Case REport (SCARE) Guidelines, *International Journal of Surgery*, 2018; 60: 132-136.
5. Grimaldi M, Vouaillat H, Tonetti J, Merloz P. Simultaneous bilateral femoral neck fractures secondary to epileptic seizures: Treatment by bilateral total hip arthroplasty. *Orthopaedics & Traumatology: Surgery & Research*, 2009; 95(7): 555-557.
6. Francis AK, Jacob M, Koshy JM, Finny P. Tenofovir Induced Fanconi Syndrome Complicated by Bilateral Neck of Femur Fractures. *Indian J Endocrinol Metab*, 2021; 25(6): 569-571.
7. M Shah H, Grover A, Gadi D, Sudarshan K. Bilateral Neck Femur Fracture Following a Generalized Seizure- A Rare Case Report. *Arch Bone Jt Surg*, 2014; 2(4): 255-257.
8. Dhar D. Bilateral Traumatic Fracture of Neck of Femur in a Child: A Case Report. *MOJ*, 2013; 7(2): 34-36.
9. Atkinson RE, Kinnett JG, Arnold WD. Simultaneous fractures of both femoral necks: Review of the literature and report of two cases. *Clinical Orthopaedics and Related Research*, 1980; NR.152: 284-287.
10. Alzahrani MA, Alsabieh M, Alzomor HH, Abdelrahman WA. Simultaneous Bilateral Neck of Femur Fracture After Spiritual Therapy. *Cureus*, 14(9): e29469.
11. McGoldrick NP, Dodds MK, Green C, Synnott K. Management of Simultaneous Bilateral Neck of Femur Fractures in an Elderly Patient. *Geriatr Orthop Surg Rehabil*, 2013; 4(3): 71-73.
12. Sood A, Rao C, Holloway I. Bilateral femoral neck fractures in an adult male following minimal trauma after a simple mechanical fall: a case report. *Cases J*, 2009; 2: 92.
13. Lancer HR, Smitham P, Ray P. Bilateral Neck of Femur Fractures in a Bilateral Below-Knee Amputee: A Unique Case. *Case Rep Orthop*, 2016; 2016: 7083671.