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CASE REPORT

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Bilateral Simultaneous Femoral Neck and Shaft Fractures Managed with Dual Implant Fixation in a Resource-Limited Setting: A Case Report

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Research performed at Mbeya Zonal Referral Hospital, Mbeya, Tanzania

ABSTRACT

Introduction: Simultaneous ipsilateral femoral neck and shaft fractures are uncommon injuries, accounting for approximately 2–6% of all femoral fractures, and are usually associated with high-energy trauma. Bilateral simultaneous involvement is exceedingly rare. Delayed or missed diagnosis of the femoral neck component has been reported in up to 30% of cases and may lead to devastating complications such as nonunion and avascular necrosis of the femoral head.

Case Presentation: A 40-year-old male presented one day after a high-energy road traffic accident involving a tricycle. Clinical and radiographic evaluation revealed bilateral basicervical femoral neck fractures associated with bilateral comminuted femoral shaft fractures. No major visceral injuries were identified. Surgical management was performed in two stages. In each femur, the femoral neck fracture was stabilized first using 6.5-mm cannulated compression screws, followed by fixation of the shaft fracture using a retrograde reamed intramedullary nail. The left femur was operated on day three after admission and the right femur on day twelve. Weight bearing was restricted for ten weeks. At four months postoperatively, the patient was pain-free, had achieved full weight bearing without assistive devices, and demonstrated full range of motion of both hips and knees. Radiographs demonstrated satisfactory fracture healing without evidence of fixation failure.

Discussion: Bilateral simultaneous femoral neck and shaft fractures are extremely rare injuries that pose significant diagnostic and therapeutic challenges. Early identification of the femoral neck fracture is critical because missed injuries may result in displacement, nonunion, or avascular necrosis. Various fixation strategies have been described, including reconstruction nails, cephalomedullary nails, and dual-implant constructs. In this patient, independent fixation of the femoral neck and shaft fractures resulted in favorable clinical and radiological outcomes.

Conclusion: A high index of suspicion, meticulous radiographic evaluation, and timely surgical intervention are essential for successful management of bilateral femoral neck and shaft fractures. Dual-implant fixation using cannulated compression screws and retrograde intramedullary nails can provide stable fixation and excellent functional outcomes, even in resource-limited settings.

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Introduction

Simultaneous ipsilateral femoral neck and shaft fractures are uncommon injuries, representing approximately 2–6% of all femoral fractures and are typically associated with high-energy trauma such as road traffic accidents, falls from height, and crush injuries. Bilateral simultaneous femoral neck and shaft fractures are exceptionally rare, with only a limited number of cases reported in the literature. Most patients are young adults who sustain multiple injuries following high-energy mechanisms [1-6].

Accurate diagnosis of the femoral neck component is critical because missed injuries have been reported in 19–35% of cases. Delayed diagnosis may lead to fracture displacement, nonunion, osteonecrosis of the femoral head, and poor functional outcomes. Consequently, careful radiographic evaluation of the pelvis and hip should be performed routinely in all patients presenting with femoral shaft fractures after high-energy trauma [7-12].

Various treatment options have been described, including reconstruction nails, cephalomedullary nails, dynamic hip screw constructs, and dual-implant fixation techniques. However, there is no consensus regarding the optimal fixation strategy. We present a rare case of bilateral simultaneous femoral neck and shaft fractures successfully managed using cannulated compression screws and retrograde intramedullary nails in a resource-limited setting [13-17].

Case Report

A 40-year-old male presented to Mbeya Zonal Referral Hospital one day after a road traffic accident while traveling as a passenger on a tricycle. He complained of severe pain and inability to bear weight on both lower limbs. Physical examination revealed deformities of both thighs with associated facial bruises and a soft tissue contusion over the left shoulder. No neurovascular deficits were identified.

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Radiographic evaluation included an anteroposterior pelvis radiograph and bilateral femoral radiographs, which demonstrated bilateral basicervical femoral neck fractures associated with bilateral comminuted femoral shaft fractures (Figure 1). The femoral neck fractures were identified at the time of admission, allowing early treatment planning.

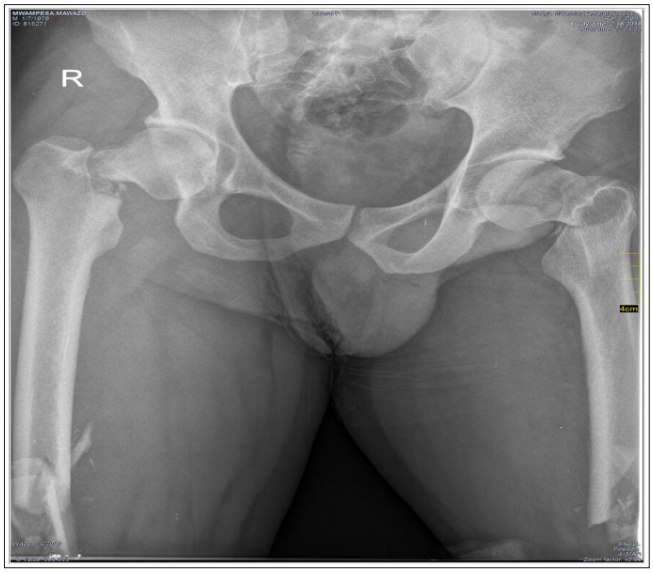

Figure 1: Radiographic X-Ray Pre-Operation

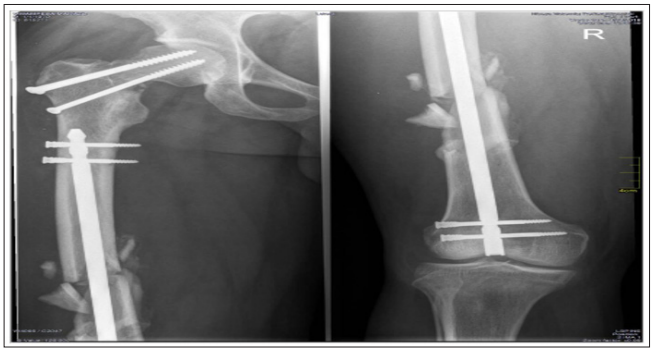

Figure 2: Post- Operative X Ray of the Right Femoral Neck and Femoral Shaft Feacture

Definitive fixation was performed in two stages. The left femur was operated on the third day after admission, while the right femur was operated on the twelfth day after admission because of financial constraints. During each procedure, the femoral neck fracture was stabilized first using 6.5-mm cannulated compression screws. The femoral shaft fracture was subsequently stabilized using a retrograde reamed intramedullary nail measuring 9 × 34 mm (Figures 2 and 3).

Because a fracture table was unavailable, reduction was achieved using manual traction provided by surgical assistants. Despite these technical challenges, satisfactory fracture reduction and implant positioning were obtained.

Figure 3: Post-Operative X Rays of the Left Femoral Neck and Shaft Fractures

Postoperatively, weight bearing was restricted for approximately 8–10 weeks. Progressive rehabilitation was initiated with supervised range-of-motion exercises. At four months postoperatively, the patient was pain-free, had achieved full weight bearing without assistive devices, and demonstrated full range of motion of both hips and knees. Radiographic assessment demonstrated progressive fracture union without implant failure, loss of reduction, or evidence of osteonecrosis.

Figure 4: Clinical Presentation 18 Weeks Post-Operation

Discussion

Simultaneous ipsilateral femoral neck and shaft fractures account for approximately 2–6% of all femoral fractures and are generally associated with high-energy trauma. Bilateral involvement is exceedingly rare and has been described only in a limited number of reports. Due to the uncommon nature of this injury pattern, management recommendations are primarily based on retrospective studies and case reports [18,19].

One of the major challenges in treating these injuries is the timely diagnosis of the femoral neck fracture. Previous studies have reported missed diagnosis rates ranging from 19% to 35% because attention is frequently directed toward the more obvious shaft fracture. Failure to identify the femoral neck fracture can result in displacement, nonunion, and osteonecrosis of the femoral head. For this reason, dedicated radiographic assessment of the hip and pelvis is recommended in all patients presenting with femoral shaft fractures after high-energy trauma. In the present case,

both femoral neck fractures were identified immediately upon admission, allowing appropriate treatment planning [20-24].

The mechanism of injury typically involves high-energy axial loading through the femur. The shaft absorbs most of the impact energy, resulting in a comminuted fracture, while residual forces are transmitted proximally, producing a relatively undisplaced femoral neck fracture. This mechanism explains why femoral neck fractures are frequently overlooked when associated with shaft fractures.

The optimal fixation method remains controversial. Numerous treatment strategies have been described, including cephalomedullary nails, reconstruction nails, dynamic hip screw constructs, and dual-implant fixation techniques. Implant selection depends on fracture characteristics, surgeon experience, implant availability, and local resources.

Several authors advocate fixation of the femoral neck before stabilization of the shaft fracture to minimize displacement and preserve femoral head vascularity. In the present case, both femoral neck fractures were stabilized first using cannulated compression screws, followed by retrograde intramedullary nailing of the shaft fractures. This sequence provided independent control of both fracture components and facilitated satisfactory reduction and stabilization.

Although single-implant constructs such as reconstruction nails and cephalomedullary nails allow simultaneous fixation of both fractures, these techniques may be technically demanding and can increase the risk of displacement of an initially nondisplaced femoral neck fracture during nail insertion. Dual-implant fixation permits precise reduction and stabilization of each fracture independently. In our patient, the combination of cannulated compression screws and retrograde intramedullary nails provided satisfactory biomechanical stability and resulted in successful fracture healing.

This case also highlights the challenges of managing complex trauma in resource-limited settings. The absence of a fracture table required manual traction during surgery, increasing the technical difficulty of fracture reduction and fixation. Additionally, financial constraints contributed to a delay in definitive treatment of the second femur. Despite these limitations, adherence to sound orthopedic principles enabled successful management and an excellent functional outcome.

At five-month follow-up, the patient had achieved painless full weight bearing, restoration of hip and knee motion, and radiographic evidence of fracture union without implant failure or loss of reduction. No evidence of osteonecrosis was observed during the follow-up period. Nevertheless, continued surveillance remains important because osteonecrosis may develop several months or years after injury [25].

patient for publication of this case report and accompanying images.

Ethics Statement

Ethical approval was not required for publication of this single case report according to institutional policy. The study was conducted in accordance with the principles of the Declaration of Helsinki.

Conflict of Interest

The authors declare no conflict of interest.

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Author Contributions

Lunemo Sakafu: Conceptualization, patient management, manuscript preparation, and final approval.

Raymond Lyimo: Patient management, data collection, manuscript review, and final approval.

Data Availability

All relevant data are included within the manuscript. Additional information may be available from the corresponding author upon reasonable request.

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