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Original Research Article

Pipkin Type IV Hip Fracture Dislocation Treated by Trochanteric Flip Osteotomy and Surgical Hip Dislocation through Single Approach – A Rare Case Surgical Report

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Abstract:

The classification described by Garret Pipkin in 1957 has been commonly used to evaluate femoral head fractures. Type IV fractures are thought to have the poorest prognosis out of the four types of fractures included in this classification. Dual approach has been recommended in the literature for fixation of these fractures. We report a case of Pipkin type IV fracture treated with trochanteric flip osteotomy and surgical hip dislocation through single approach. At 3 months follow up patient walks unaided full weight bearing. He is able to squat and sit cross legged and has returned to his old profession.

Keywords: Pipkin type IV fracture, Single incision, Dual approach, Safe Surgical Dislocation, Trochanteric flip osteotomy.

Introduction

Hip fracture-dislocations are uncommon injuries that typically arise from high-energy trauma [1-3]. 7–16 % of hip fracture-dislocations have been associated with Femoral Head fractures, as per the literature [4-5]. The type of fracture will mostly determine how a Femoral Head fracture is treated. Typically, non-congruent hips with major fragment displacements greater than 2 mm warrant surgical intervention [6-7]. The classification described by Garret Pipkin in 1957 has been commonly used to evaluate femoral head fractures. Type IV fractures are thought to have the poorest prognosis out of the four types of fractures included in this classification [2,7].

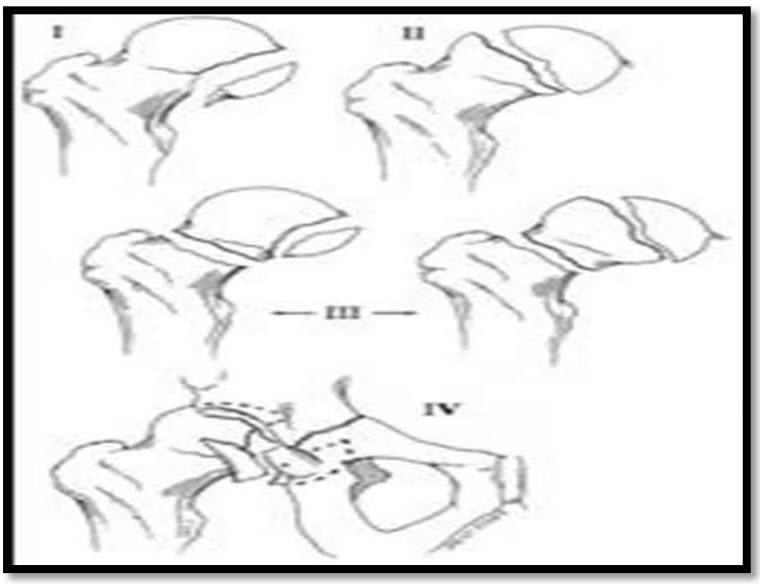

Figure 1: Pipkin Classification

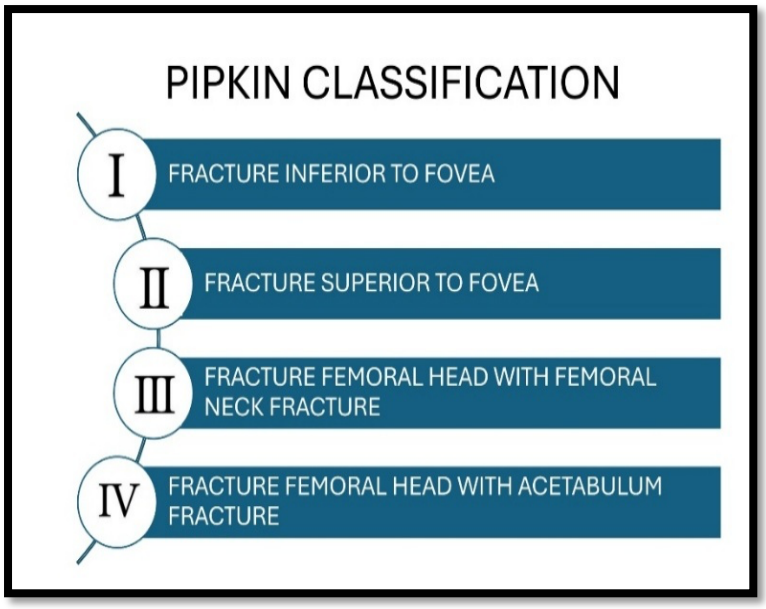

Figure 1: Pipkin Classification

Classically, dual approach has been recommended in the literature for fixation of type 4 Pipkin fractures, since the femoral head fracture fragment will be in the antero-medial part of the hip joint. Because a single surgical incision cannot fully expose the anterior and posterior aspect of the hip, it has certain limitations. Currently, surgical approach for Pipkin type IV femoral head fractures remains controversial [3].

In this article, we report a case of Pipkin type IV fracture treated with trochanteric flip osteotomy and surgical hip dislocation through single approach.

Case Report:

A young male patient presented 2 days after suffering a dashboard injury in a road traffic accident, resulting in hip pain and deformity. He had a characteristic limb attitude of posterior dislocation of the hip, which included flexion, adduction, and internal rotation along with a shortening of the affected limb. There were no distal neuro-vascular deficits. An X-ray of the pelvis with both hips confirmed the patient's posterior hip dislocation, with a fracture fragment most likely originating from the acetabulum. An attempt at reduction was made at the emergency room, and while limb length and hip external rotation was restored, the pain persisted. A closer look of the post-reduction CT scan confirmed the Pipkin Type IV Femoral Head fracture.

Figure 3: Pre reduction x-ray

Figure 4: Post reduction x-ray

Figure 5: 3D CT Reconstruction of pelvis

The patient was taken up for surgery under combined spinal and epidural anaesthesia. In right lateral decubitus position, standard Kocher – Langenbeck approach was used. Trochanteric osteotomy was performed and flipped anteriorly. The fragment of the posterior wall of acetabulum was located, reduced to its crater, and K-wire was used to temporarily anchor it. By cutting the four-holed, one-third tubular plate at one of its distal holes and bending the prongs to form a hook, a spring plate was created. To produce a buttress effect, it was positioned above the fracture and secured at a 90° angle to the articular fragment. In a neutralizing fashion, an additional eight-hole reconstruction plate was contoured and positioned over the spring plate. Then trochanter was flipped posteriorly, followed by an external rotation of the hip. A 'z'-shaped infero-medial caspulotomy and anterior dislocation of the Femoral Head was then performed. Two Herbert screws were used to fix the Femoral Head fragment, and then the hip was relocated followed by capsulorrhaphy. The osteotomy was fixed with 6.5mm Cannulated Cancellous screws. The wound was closed in a standard manner over a suction drain. Active hip rotatory movements and non-weight-bearing ambulation with a walker frame were permitted from post-operative day 1.

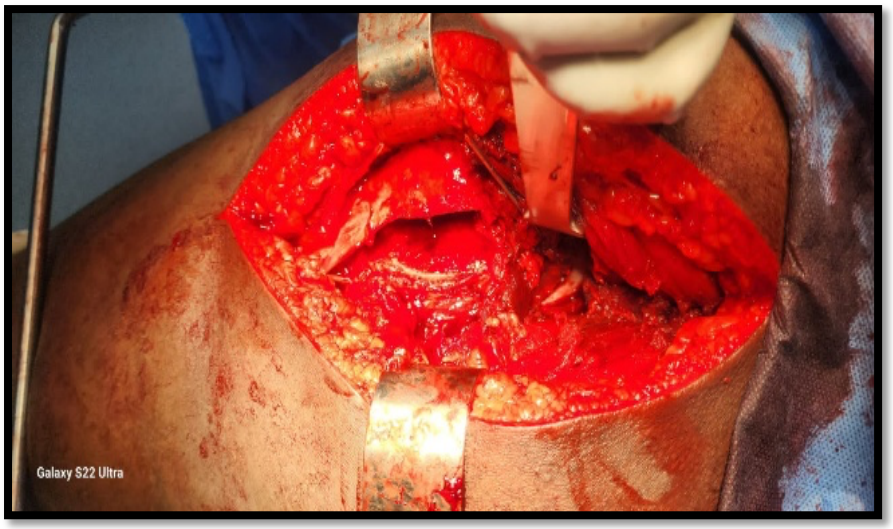

Figure 6: Trochanteric Osteotomy

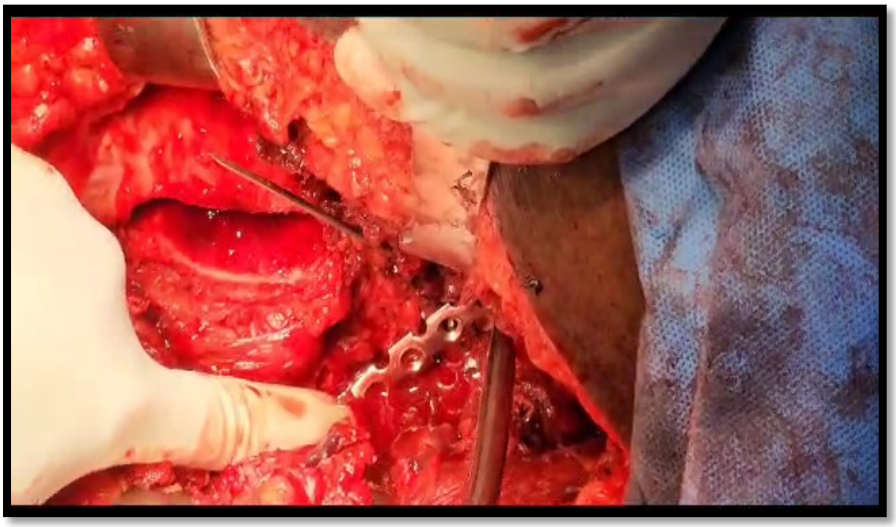

Figure 7: Plate fixation over acetabulum

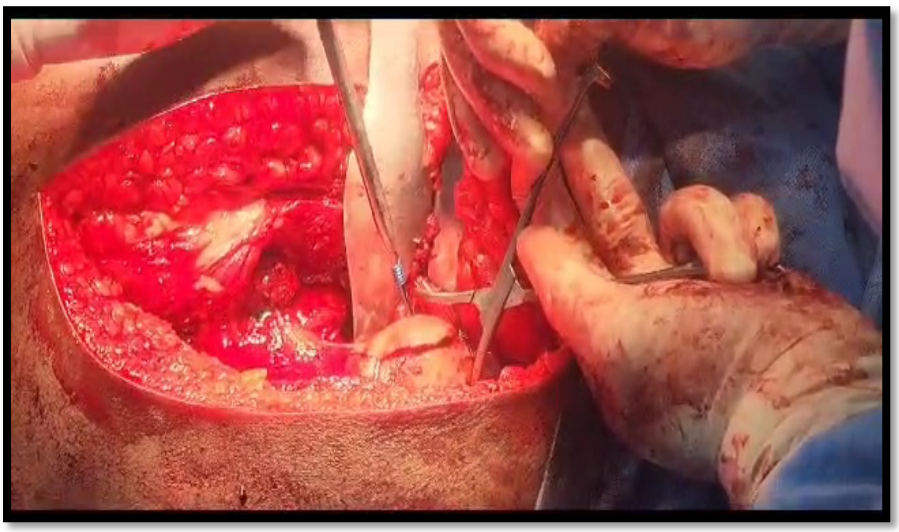

Figure 8: Herbert screw fixation for femoral head

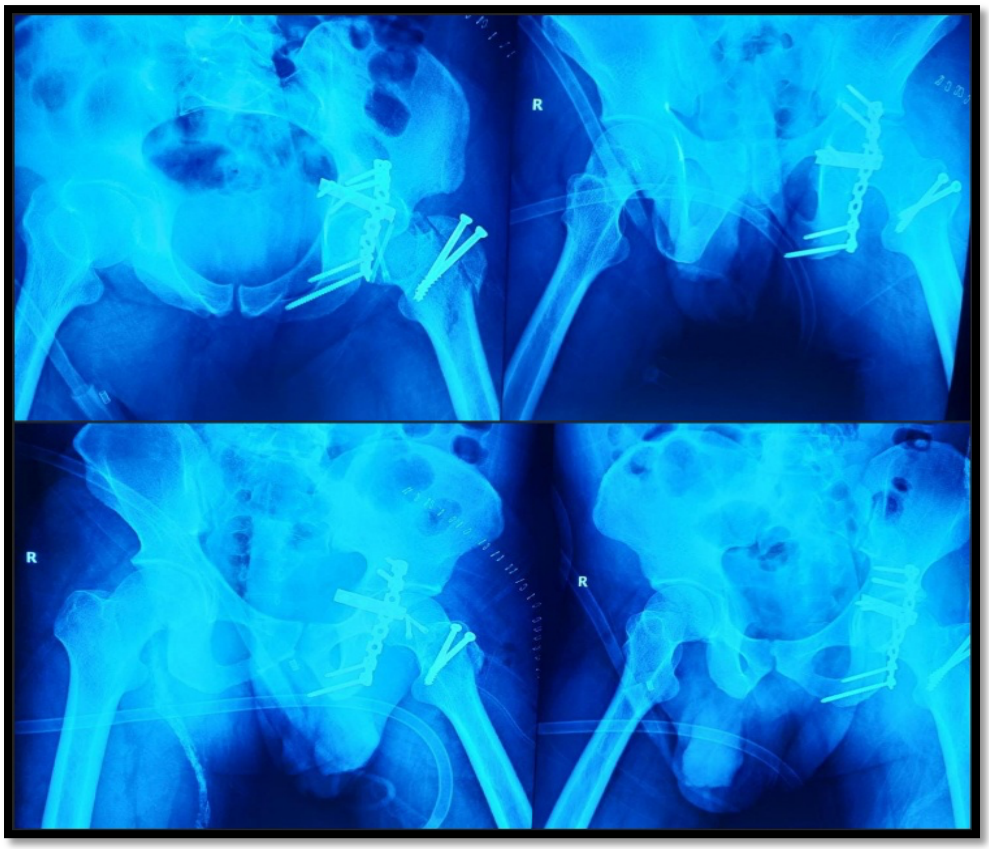

Figure 9: Post operative x-ray

Figure 10: Patient mobilised on post operative day 1

At 3 months follow up patient walks unaided full weight bearing. He is able to squat and sit cross legged and has returned to his old profession.

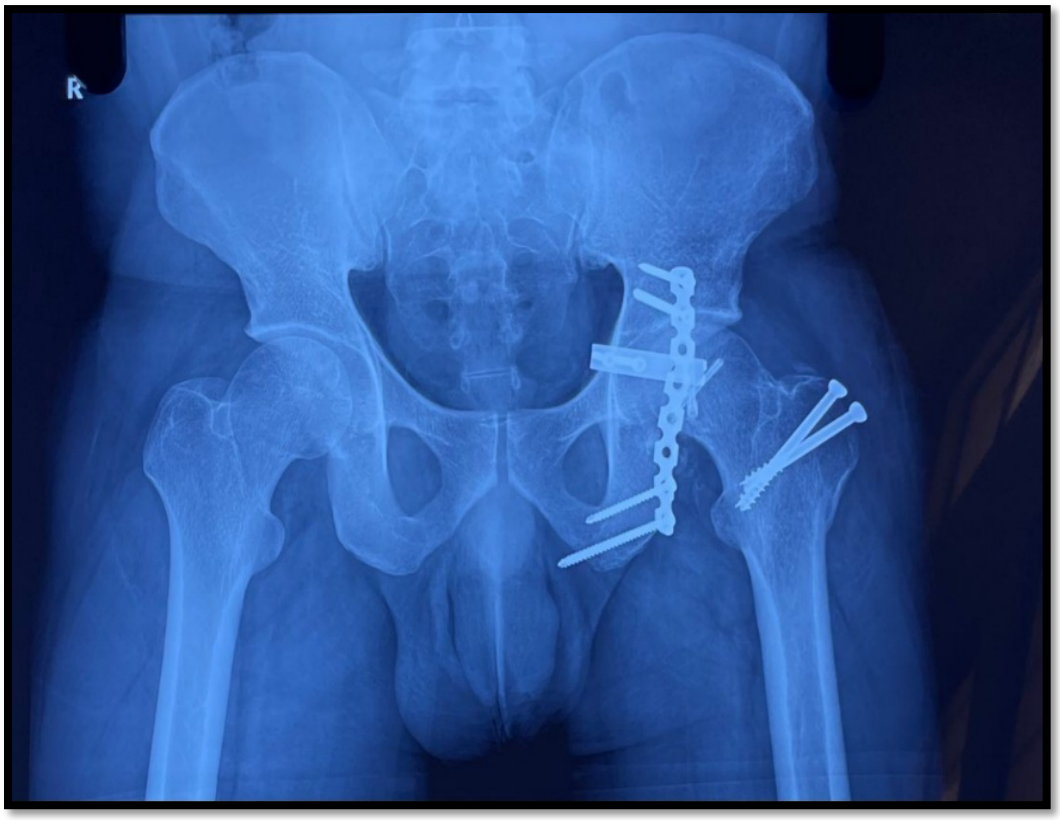

Figure 11: 3 months Follow up x-ray

Figure 12: 3 months follow up ambulation

Figure 13: Follow up movement assessment

Discussion:

Surgical intervention is the treatment of choice for Pipkin type IV femoral head fractures. In fractures involving the infra-foveal portion of the head and a congruent hip, the acetabular posterior wall fracture is surgically fixed while the femoral head is left untreated. Surgery is done on both parts for Pipkin type IV fractures when there is involvement of the supra-foveal portion of the femoral head or the infra-foveal portion with a non-congruent hip joint [3]. It is challenging to fix the Femoral Head utilizing the posterior approach and posterior hip dislocation since the fractured portion of the head is always found antero-medially. It is therefore necessary to use an alternate method for the reduction and fixing of the head.

Several approaches have been put forth for the surgical hip dislocation used to treat Femoral Head fractures. One of these is trochanteric flip osteotomy and anterior dislocation of the hip, which has the biggest advantage of providing improved exposure for anatomical reduction while conserving the femoral head blood supply [8,9]. Nevertheless, non-union, trochanter migration, and trochanteric bursitis due to the conspicuous implants are rare consequences that can arise after trochanteric flip osteotomy [10]. In this patient, we were able to prevent these morbidities and obtain stable fixation and good reduction quality. Although posterior wall fractures are the most prevalent type of acetabular fracture, comminution is uncommon [11,12]. Re-dislocation following stabilization can be a disastrous consequence if this is not treated appropriately. Lag screw fixation alone is not preferred; instead, buttressing these lag screws with reconstruction plates is the current standard approach [13].

In 1989, Matta et al. [14] introduced the concept of using spring plates as an additional fixation method for comminuted posterior wall fragments. Richter et al. [15] researched spring plate fixation further and found that it was stable enough to hold comminuted posterior wall fragments. Goulet and Bray's [16] biomechanical analysis revealed that, in comparison to reconstruction plates alone, the addition of spring plates greatly increased the load to failure.

To summarize, we present a case of a Pipkin type IV femoral head fracture that was managed with a single incision involving trochanteric flip osteotomy and anterior hip dislocation. The ability to fix the acetabular and femoral components with a single incision was the primary benefit of this. Additionally, blood supply to femoral head is preserved. Patients can be mobilized with a reduced risk of implant failure when one-third tubular plates are used as spring plates in conjunction with reconstruction plates to provide extra stability to the comminuted posterior acetabular wall.

Conclusion:

Single approach Trochanteric Flip Osteotomy with Surgical Hip Dislocation for dual fixation is a good technique for fixing Pipkin type IV fracture.

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