



Fracture of the femoral head without hip dislocation in a young adult

¹ Dr. Somashekar, ² Dr. Santosh Kumar, ³ Dr. Karan C L

¹ Professor, ² Assistant Professor, ³ Junior Resident

Kempegowda Institute of Medical Sciences, Bengaluru

***Corresponding Author:**

Dr. Karan C L

Kempegowda Institute of Medical Sciences, Bengaluru

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Abstract:

Fractures of the femur head are uncommon injuries and are followed by high energy trauma. Isolated femoral head fractures without dislocation are rare injuries and only few cases have been described in literature. Pipkin classification is most accepted and is considered valuable in predicting treatment outcomes. Surgical management is by open reduction and stable fixation of fracture fragments. The surgical procedure can be challenging due to the intra-articular involvement, vulnerable blood supply of proximal femur and small size of the fragments. The goal is to achieve anatomic reduction, to regain full mobility post-operatively and to prevent long term complications. We report a case of a 27 year old male patient with Pipkin type 2 fracture of head of left femur managed with open reduction and internal fixation with Herbert screws and its functional outcome.

Keywords: Nil

Introduction:

Femoral head fractures are typically the result of a high-energy mechanism. They are seen in 5%–15% of the cases with posterior hip dislocation¹. These fractures are technically difficult to address and the management is challenging. The Pipkin classification is the most accepted and widely used to classify these fractures. Isolated femoral head fractures without hip dislocation are not included in this classification. It is divided based on the relation of the fracture fragment to the fovea capitis into Type 1 and 2.² The ligamentum teres remains attached to the inferior fragment in a Type 2 injury where femoral head fracture is cephalad to the fovea capitis femoris. This causes a substantial rotation of this fragment and can prevent concentric reduction of the fragment by closed methods. An open reduction and internal fixation is considered for patients with Type 2 injuries³. The fixation must be subarticular with the use of headless compression screws, countersinking of screws, or repair using anchor suture⁴.

Complications may include secondary osteoarthritis, avascular necrosis and heterotopic ossification. We report a case of a 27 year old male patient with Pipkin type 2 fracture of head of left femur managed with open reduction and internal fixation with Herbert screws and its functional outcome.

Case Report:

A 27 year old male patient came to our out-patient department with a history of self-fall one day back from a height of about 12 feet. Following the incident, the patient complained of pain in the left hip, swelling in the left hip and inability to bear weight over the left lower limb. On examination, a swelling was noted in the left thigh, and the patient had tenderness in the left hip anterior and posterior joint lines, with restriction of movements. Radiograph was suggestive of a fracture of head of the femur with fracture fragments within the joint. CT imaging suggested of a fracture involving the head of left femur in the posterior-medial part

proximal to fovea capitis and superior-lateral part with displacement of fracture fragments and widening of hip joint space. The patient was diagnosed to have a Pipkin's type 2 fracture of head of left femur.

The patient was a known alcoholic and had a history of loss of consciousness following the fall. The patient was evaluated by laboratory investigations and clearance for surgery were taken. The patient was put on upper tibial skeletal traction over a BB splint during this time. The patient was planned for surgical management with open reduction and internal fixation with Herbert screws to left head of femur. The patient was operated two days after trauma. The patient was placed in right lateral position and an incision of about 15 cm was made in the posterior-

lateral aspect of left hip. After dissection of underlying tissues, the capsule of hip joint was identified and cut. Left hip is dislocated and the head of the femur was exposed. The fracture fragments were reduced to the femur head under direct vision and fixed using six Herbert screws. The articular surface of the femur head was found to be satisfactory and was reduced into the acetabulum. The left lower limb was elevated over a BB splint.

Rehabilitation was started with graded physiotherapy exercises and non-weight bearing mobilization with walker support. At the end of 3 months, the patient was allowed full weight bearing as tolerated. The patient had good active range of movements of the left hip and returned to all of his activities of daily living.



Fig 1: Pre-operative radiograph showing fracture fragment inferiorly without dislocation of hip joint.

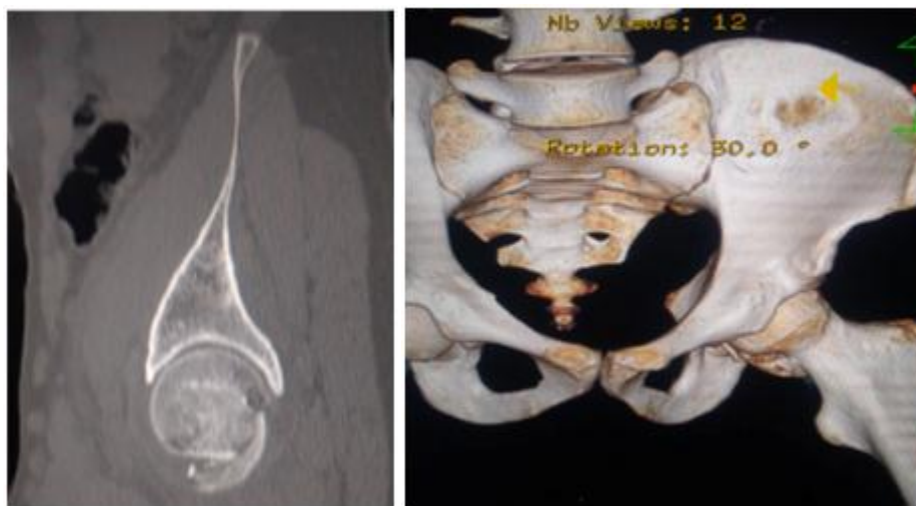


Fig 2: Pre-operative CT images showing Pipkin type 2 fracture head femur

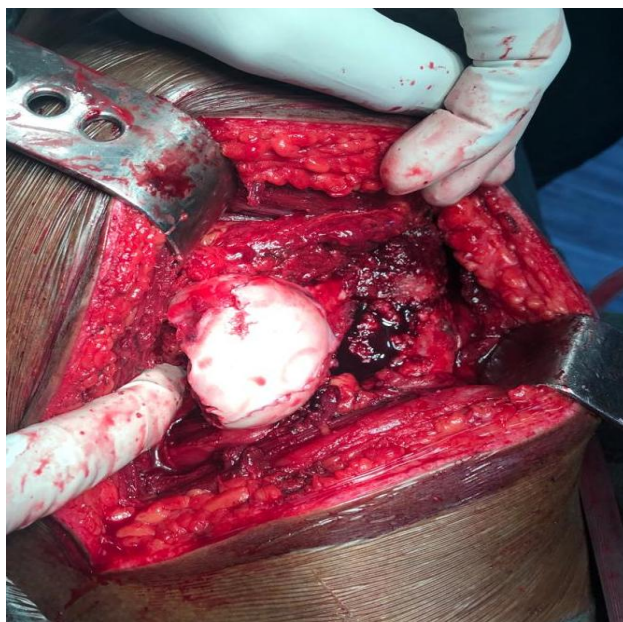


Fig 3: Exposure of the hip joint



Fig 4: Femoral head fracture fragments

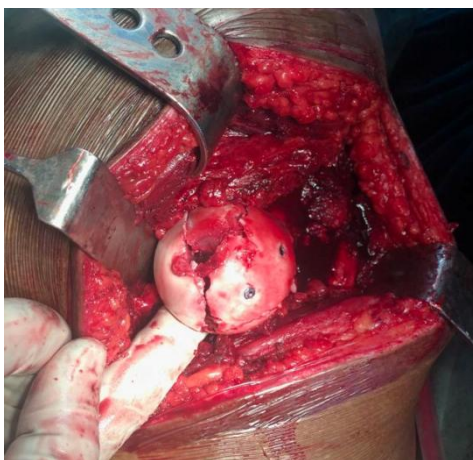


Fig 5: Intra-operative anatomic reduction of fracture fragments and fixation with Herbert screws



Fig 6: Intra-operative fluoroscopy image and immediate Post-operative radiograph

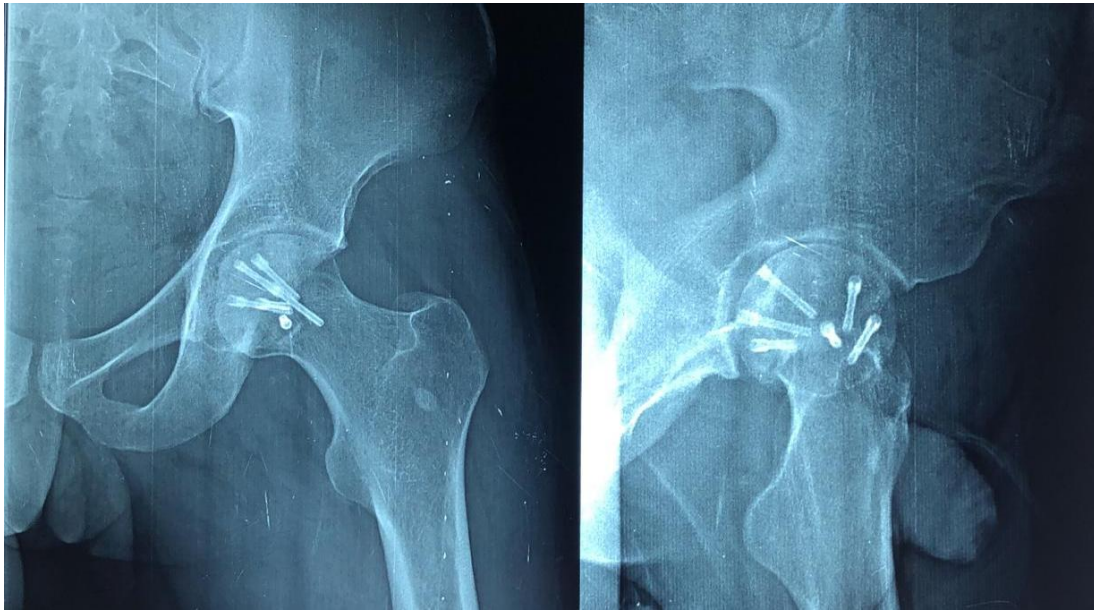


Fig 7: X-ray of hip joint at 3 months follow-up



Fig 8: Patient on follow-up showing good mobility of left hip joint.

Discussion:

A nonconcentric hip carries the risk of additional trauma which causes abrasion to the articular cartilage and bone contusion at the head of the femur. Open reduction is preferable to restore the joint surface in young patients⁵. The surgeon performing open reduction must be very familiar with the surgical anatomy of the hip and the choice of approach⁶.

In a review of literature by Shaikh A et al⁷. found only 8 case reports of femoral head fractures without

hip dislocations. Of which only 4 were isolated femoral head fractures without dislocation. Our patient was a young adult who sustained the injury following a high energy trauma with a Pipkin type 2 fracture of head without dislocation.

Surgical management of femur head fractures are generally complex due to the intra-articular involvement, vulnerable blood supply of proximal femur and small size of the fragments. The surgical approach chosen should provide a good exposure in order to achieve anatomic reduction. Anterior (Smith-

Petersen), posterior, posterolateral (Kocher-Langenbeck), and trochanteric flip approaches have been proposed in literature. There are few reported cases where surgical hip dislocation was carried out⁸. Surgical hip dislocation gives the advantage of fully exposing the femoral head and the acetabulum which enables the surgeon to reduce the fracture anatomically and treat associated injuries⁹.

The choice of surgical approach for fracture fixation is controversial. There are no universal guidelines dictating the line of management and approach to be used. The goal of surgical management must be to achieve anatomic reduction, to regain full mobility post-operatively and to prevent long term complications. When the fragment is anterior, it is preferable to use either the anterior Smith-Petersen approach or the Watson-Jones anterolateral approach⁵. Trochanteric flip approach is associated with less operative time and improved visualization for direct screw fixation compared with Kocher-Langenbeck approach. The risk of avascular necrosis was found to be relatively more with posterior approach than trochanteric osteotomy group. However, a good final outcome does not necessarily follow a specific approach used¹⁰. We used a posterior approach with a Moore's incision in our case to access the hip joint and a surgical hip dislocation was done, all displaced fragments were reduced under direct view.

A primary total hip arthroplasty can be done in elderly patients as compared to an open reduction to lower the risk of prolonged immobilization and development of late complications requiring a THA later. A primary THA in elderly has the benefits of a better clinical outcome and quick functional rehabilitation⁷. Arthroscopic removal of fracture fragments are very rarely reported. Femoral head fractures are rare and are usually associated with

other injuries such as an acetabular fracture, an open reduction with fixation of both is necessary¹¹.

Complications may include secondary osteoarthritis, avascular necrosis and heterotopic ossification. In a systematic review of the literature conducted by Giannoudis et al¹². found avascular necrosis in 11.9% and post-traumatic arthritis in 20% of the cases. Alessandro Massè et al¹³. found in their study that the heterotopic ossification rate with surgical dislocation was high and noted it to be around 15.3% and suggested that heterotopic ossification should be considered as a complication when this technique is used. Our patient was followed up for a period of two years, at the end of which we found good functional outcome and no signs of complications.

Since this type of injury is rare, there is little evidence regarding the mechanism of injury, management based classification system and factors of outcome assessment for the surgeons to provide evidence based management. Further research will guide the treating surgeons to understand the injury better and improve the outcome.

Conclusion:

Fractures of the femur head are uncommon injuries. Surgical management is generally complex and is done by open reduction and stable fixation of fracture fragments. The goal is to achieve anatomic reduction, to regain full mobility post-operatively and to prevent long term complications. Further research will guide the treating surgeons to provide evidence based management.

Consent And Competing Interests:

The patient has given their informed consent.

The author(s) declare that they have no competing interests.

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