

A case of posterior HIP dislocation with intertrochanteric fracture: Beware of the sharp calcar spike

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ABSTRACT

Posterior dislocation of hip is commonly associated with acetabular lip fractures. Involvement of neck, trochanter or intertrochanteric region is uncommon. Very few cases of posterior hip dislocation with ipsilateral intertrochanteric fracture in the absence of head or acetabular fracture have been reported in the literature. We report such a case in a 19yr male treated with open reduction and internal fixation with sliding hip screw with good functional and radiological outcome at 1 year. Being an extremely rare form of injury, such an injury pattern does not exist in present classification systems. There is a need to revise the existing classification systems and formulate a protocol for the management of the same. Such fractures may also be associated with a sharp calcar spike of the proximal fragment impinging femoral vessels and branches. Attempt at closed reduction without adequate anatomical orientation of the spike can lead to hazardous vascular consequences.

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1. Introduction

Traumatic hip dislocations are a result of high energy trauma.¹ It is most commonly associated with acetabular lip fracture. Associated fractures of intertrochanteric region are rare and may indicate even more severe injury. Posterior hip dislocation is approximately 9 times more frequent than the anterior type.²

A hip dislocation constitutes an orthopedic emergency because delaying its reduction increases the risk of osteonecrosis of the femoral head. A reported osteonecrosis rate of 4.8% if reduction occurred within 6 hours of injury compared with 53% if reduction was delayed for more than 6 hours after injury.³

A case of traumatic hip dislocation with no fracture in acetabulum and head with fracture of intertrochanteric region is a rare entity. These intertrochanteric fractures may be associated with a sharp calcar spike. It is also associated with a higher rate of avascular necrosis of the femoral head. Such patients can be managed by reduction and osteosynthesis or primary replacement arthroplasty. Attempted closed reduction without anatomical consideration can lead to hazardous vascular consequences. The purpose of this case report is to present the need for revision of existing

classification systems and present a technique for reduction of a dislocated hip with an anteriorly prominent calcar spike of proximal femur fracture fragment.

2. Case report

A 19-year-old Male came to the receiving room of a tertiary care hospital of Mumbai, with a history of Road traffic accident, 2 days after trauma. The patient was travelling on passenger seat of the car while hitting another vehicle coming from the opposite side. The patient had pain in the right groin and was unable to move his right lower limb. On clinical examination, the right lower limb was short and externally rotated with swelling the right hip region. There was no sciatic nerve palsy or any vascular deficit.

Plain radiographs revealed right sided intertrochanteric femur fracture with posterior hip dislocation and right sided superior pubic rami fracture [Fig. 1a and b].

Computed Tomography of the pelvis and the hip was done to delineate the fracture geometry and to plan out the treatment. Intertrochanteric fracture with a sharp calcar spike impinging anteriorly was noted in the CT scan. Acetabulum and femoral head were found intact [Fig. 2a and b].

Closed reduction of hip was not attempted. Osteosynthesis after open reduction was planned after explaining the risk of avascular necrosis of the hip. Hip was exposed using the standard Kocher-Langenbeck approach in the lateral position. After adequate

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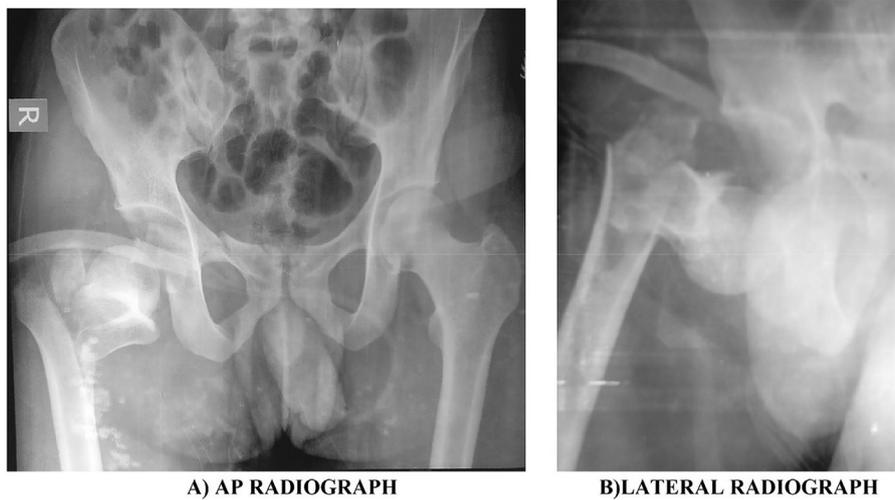


Fig. 1. A) Preoperative anteroposterior radiograph showing right sided intertrochanteric femur fracture with hip dislocation and fracture of right sided superior pubic rami. B) Preoperative lateral radiograph showing the intertrochanteric femur fracture with head dislocated out of the acetabulum.

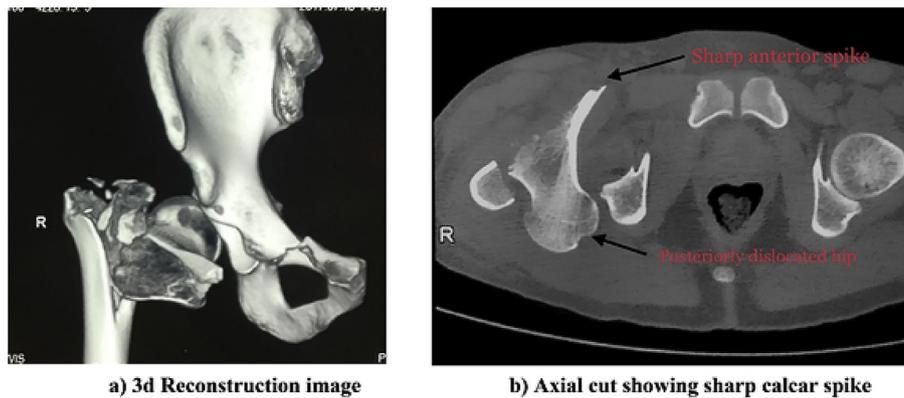


Fig. 2. a) 3d reconstruction CT scan image showing the Comminuted Intertrochanteric fragment with sharp anteriorly directed spike. b) Axial image of CT scan showing the posteriorly dislocated head with Calcar spike pointing anteriorly.

exposure the head was seen buttonholing from the short posterior external rotators and torn posterior hip capsule [Fig. 3a].

The quadratus femoris muscle was found intact. The short external rotators were care-fully dissected. The calcar spike was found jetting out into the surrounding soft tissues. The anterior capsule with retinacular vessels was lifted subperiosteally. The proximal fragment was cleared of the soft tissue anteriorly and rotated externally to aid the reduction.

Reduction was confirmed by palpation of the anterior surface and fluoroscopy. It was held temporarily using K wires [Fig. 4a]. Stabilization using a sliding hip screw system was done. Greater tuberosity was repaired using stainless steel wire in figure of 8 pattern. [Fig. 4b and c]. Following this, the muscles, subcutaneous tissue and skin were closed in layers. Post-operative radiographs showed good alignment of the fracture and stable fixation (Fig. 5a and b).

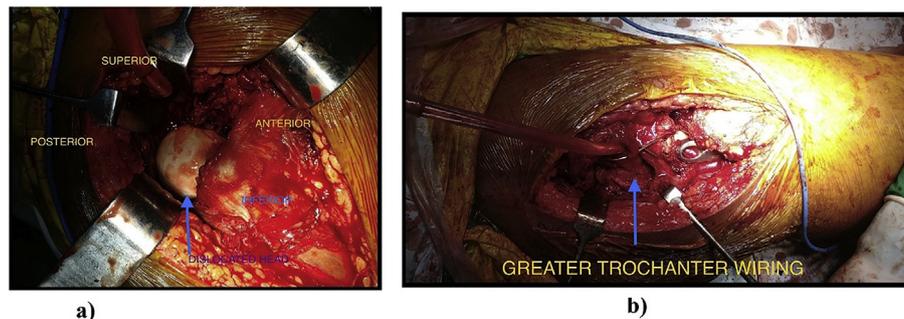


Fig. 3. Intraoperative photographs showing a) Femoral head buttoning out of through a small rent in the posterior hip capsule and lying under the gluteus maximus. b) Reconstruction of the greater trochanteric using Stainless steel wire in Figure of 8 pattern.

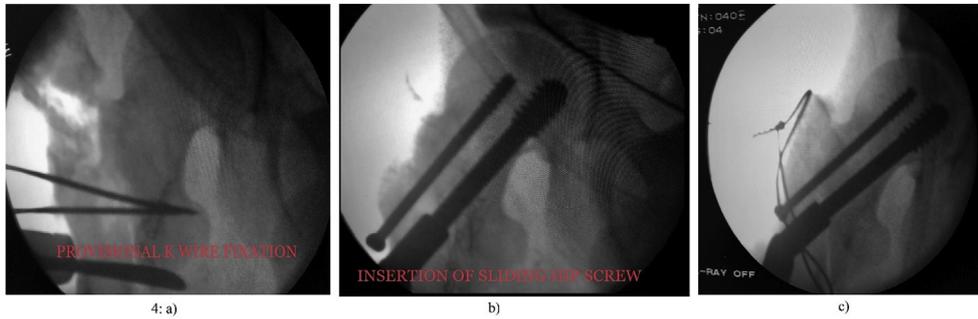


Fig. 4. Intraoperative fluoroscopic images: a) Provisional reduction and stabilization using 2 kirschner wires across the fracture site. b) Passage of the Reichert screw of the sliding hip screw system with 6.5mm derotation screw. c) Reconstruction of the fractured trochanter using stainless steel wire in figure of 8 pattern.

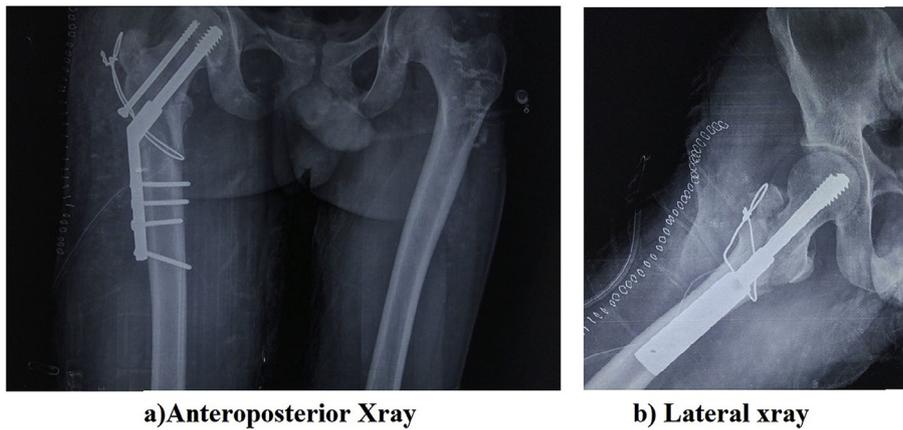


Fig. 5. a) Post operative anteroposterior radiograph: showing good reduction and fixation of the fractured fragments. b) Post operative Lateral radiograph showing good reduction.

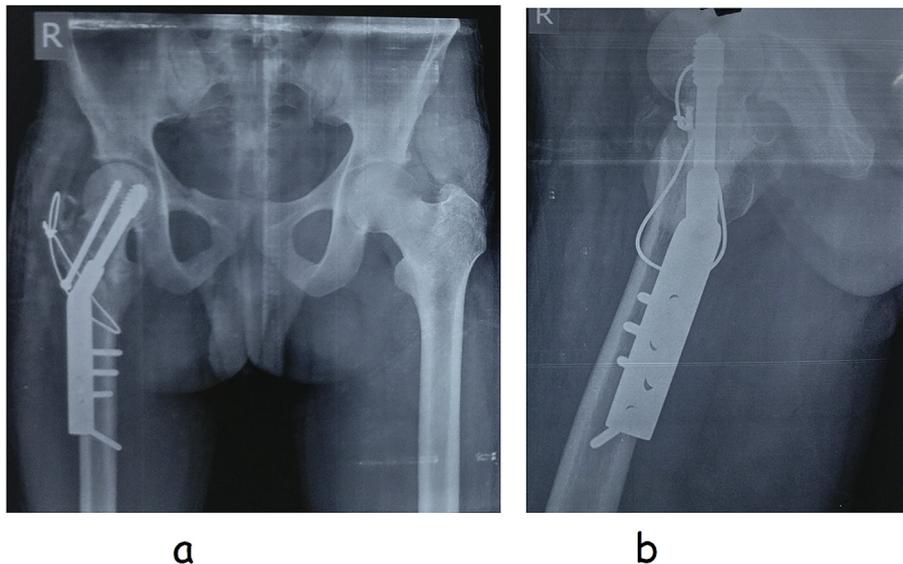


Fig. 6. a and b: Post operative 6 month followup radiograph showing solid fracture union.

Patient was kept nil weight bearing for 8 weeks and an abduction brace was used for 6 weeks. Partial weight bearing allowed at 8 weeks. The hip abductor weakness improved over 3 months.

6 month [Fig. 6a and b] and 1-year follow-up [Fig. 7a and b] radiographs showed solid union at the fracture site with no signs of

avascular necrosis of the head. Patient is able to walk full weight bearing, and able to squat and sit cross legged. [Fig. 8a, b, 8c]. The patient has a painless limp with a Harris hip score of 84 indicating a good hip function.

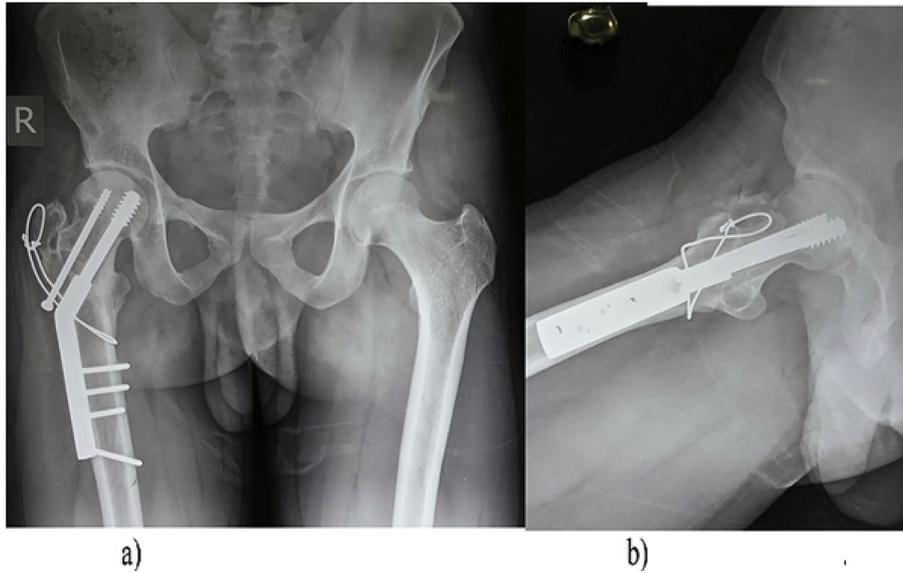


Fig. 7. A and b) Post operative 1 year followup radiographs showing no signs of Avascular necrosis.

3. Discussion

Association of posterior hip dislocation with intertrochanteric femur fracture has been noted in the literature. There have been a few isolated reports, but the instances being extremely rare, no definite classification system or treatment guideline exists for the same.

Displaced femoral intertrochanteric fractures and fracture-dislocation of the hip are accompanied by a higher risk of avascular necrosis of the femoral head, caused by the damage to the retinacular vessels at the time of injury.

The position of the leg at the time of the accident determines whether the hip dislocates with or without additional osseous lesions of the femoral head or posterior wall of the acetabulum.⁴ Posterior dislocations occur as a result from a posteriorly directed force to the flexed knee with the hip in a flexed position.³ The

mechanism of the injury in the majority of cases is a dashboard injury.^{4–8} If the hip is flexed less than 60°, the femoral head impinges against the firm posterior superior rim and a fracture of the femoral head may occur. Direct trauma to the greater trochanter has also been described as a mechanism.

In our patient the injury occurred with patient sitting in the passenger seat of the car, with knee and hip in flexed position. The probable mechanism of injury being a longitudinally directed force in the line of femur with hip in flexion and adduction causing posterior dislocation of the femoral head followed by external rotational injury leading to the intertrochanteric fracture of femur, the posterior rim of acetabulum locking the femoral head posteriorly. It denotes a high velocity injury.

Our patient being of a young age, a reasonable trial of osteosynthesis was given.

Key points considered while managing the case were:

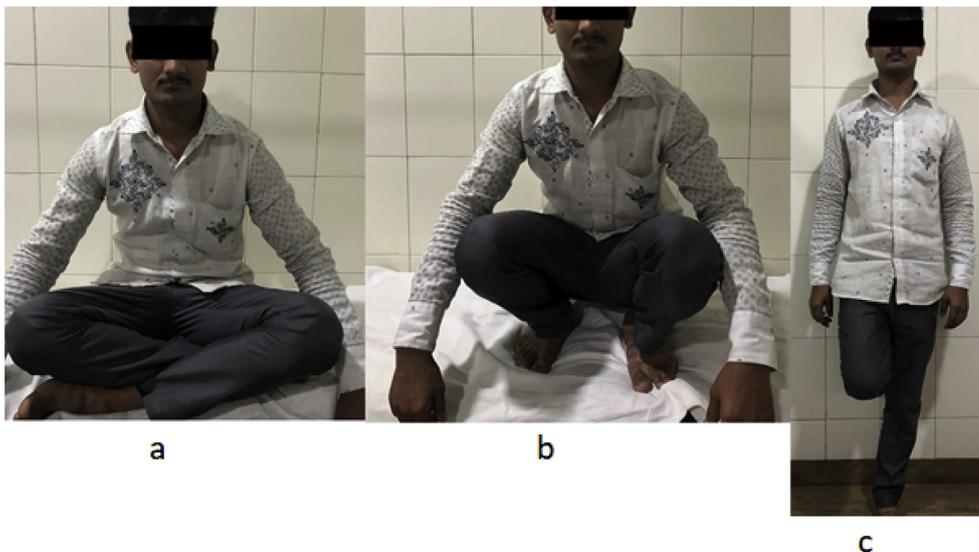


Fig. 8. 1 year followup Photographs a) Painless cross legged sitting b) Painless and comfortable Squatting.c) Good abductor strength and strong single leg stance.

Table 1

Literature of similar case reports of hip dislocation with ipsilateral intertrochanteric femur fracture.

AUTHOR	YEAR	AGE (yrs.)	SEX	TIME SINCE INJURY	TYPE OF HIP DISLOCATION	TYPE OF IT FRACTURE	OTHER INJURIES	REDUCTION	FOLLOW-UP	AVN
Barquet A et al. ⁹	1983	25	M	5d	Posterior	Stable IT with GT#	Shaft Femur fracture	OR	27 m	NO
Singh et al. ¹⁰	2006	–	–	–	Inferior	unstable IT fracture	–	CR	2.5yr	NO
Agarwal R ¹¹	2007	40	M	3d	Posterior	IT with subtrochanteric extension		OR	1yr	NO
Rodriguez-Martin J et al. ¹²	2009	27	M	14d	No mention	unstable IT fracture	Femur head fracture	OR	18 m	NO
Alexa ¹³	2009	41	M	<1d	Posterior	Stable IT fracture		OR	–	–
Radulescu R et al. ¹⁴	2013	44	M	<3hr	Anterior	Stable IT fracture		OR	1yr	NO
Yousefi A et al. ¹⁵	2013	43	M	4hr	Posterior	unstable IT fracture	Posterior acetabular wall fracture	OR	8 m	NO
Zhen P ¹⁶	2013	59	M	<1d	Inferior	comminuted IT fracture	medial Acetabulum fracture	OR	6 m	THR
Sinha S et al. ¹⁷	2013	45	M	<1d	Posterior	comminuted IT fracture	posterior column Acetabulum fracture	OR	6 m	NO
Jamshidi MH et al. ¹⁸	2014	26	M	1d	Posterior	unstable IT fracture	Acetabulum fracture, Tibia fibula shaft fracture	OR	1yr	NO
Fageir M et al. ¹⁹	2015	31	M	<1d	Posterior	comminuted IT fracture		OR	10 m	NO
Chotai PN et al. ²⁰	2015	25	M	<1d	Posterior	Stable IT fracture	Proximal tibia fracture, popliteal artery injury	OR	16 m	NO
Ul Haq R et al. ²¹	2016	26	M	5d	Posterior	comminuted IT fracture		OR	1yr	NO
Ul Haq R et al.	2016	36	F	1d	Posterior	comminuted IT fracture	Femur head fracture	OR	1yr	NO

Abbreviations: IT- Intertrochanteric femur, M- Male, F- Female, OR- Open reduction, CR- Closed reduction, AVN- Avascular necrosis, THR- Total hip replacement, GT- Greater trochanter.

- 1) No emergency closed reduction to be attempted without the proper orientation of the fracture anatomy and appropriate planning to be done before attempting reduction.
- 2) The close proximity of the calcar spike with the neurovascular structures should be considered and blunt dissection to be done before attempting reduction.
- 3) To minimize the alteration in the anatomy to aid, in case of requirement of an arthroplasty procedure in future.

Lateral position was preferred over the supine fracture table as traction would further exacerbate the anterior tilting of the calcar fragment. Lateral position allows an easier anterior and posterior access and facilitates tracing the integrity of Sciatic nerve. Closed reduction in the emergency room should not be attempted due to the absence of lever arm necessary to transmit the force and due to the close proximity of the vital neurovascular structures.

The proximal fragment should be adequately mobilized with blunt finger dissection from the neck to the calcar region. The head and the neck should be reduced carefully by delicate finger manipulation. Steinman pin may be used to joystick the proximal fragment. Anatomical reduction is should be confirmed by fluoroscopy. K wires may be used for temporary stabilization. Fractured trochanter may be fixed using wires or screws.

Injury to the femoral vessels may take place due to inadvertent closed manipulation. Injury to the retinacular vessels during repeated maneuvering may worsen the prognosis of the head. The patient should be followed up regularly to check for any signs of avascular necrosis.

Table 1 gives the literature review of similar cases of hip dislocation with ipsilateral inter-trochanteric femur fractures [Table 1].

4. Conclusion

An intertrochanteric femur fracture can co-exist with hip dislocation in scenarios of high velocity injuries. Planned open reduction and internal fixation has shown consistently good results. Adequate radiographic analysis should be done before managing such type of dislocations. Hasty closed reduction maneuvers can lead to further damage to the precarious blood supply to the head of femur and can traumatize the surrounding neuro-vascular structures. We believe that standardized treatment guidelines of

such a fracture pattern need to be formulated and the pattern need to be included in the existing classification systems.

Conflicts of interest

There is no conflict of interest.

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