

A Case Report on Traumatic Avulsion Fracture of Greater Trochanter Ipsilateral and Fixed with Closed Reduction Internal Fixation with K-Wires

Dr. Mazhar Uddin Ali Khan¹, Dr. Patlolla Karthik Reddy², Dr. Shaik Vazeeruddin³

¹Professor and Head of Department, M.S orthopaedics , M.ch.(Ortho) U.K. Department of Orthopaedics, Owaisi Hospital Research Centre, Deccan College of Medical Sciences

²Assistant Professor, M.S. Ortho, Department of Orthopaedics, Owaisi Hospital Research Centre, Deccan college of Medical Sciences

³Post Graduate, M.S. Ortho, Department of Orthopaedics Owaisi Hospital Research Centre, Deccan College of Medical Sciences

Abstract: *Isolated greater trochanter fractures are uncommon. [1] Isolated fractures of the greater trochanter are classified either as true fractures, which occur solely in adults, or as epiphyseal separations, which are found in the adolescent population. [2] It is reported that traumatic epiphyseal separations of the greater trochanter in adolescents are much more frequently encountered than true fractures in adults. [3] It is generally accepted that these fractures are caused either by direct trauma over the trochanter, such as a blow, kick or fall, or by muscular violence, in which the bony fragment is avulsed from the trochanter. We present A case of 30 years male patient with traumatic avulsion fracture of greater trochanter associated with pelvic injury treated with closed reduction internal Fixation with k wires under C-Arm fluoroscopy guidance .*

Keywords: Ipsilateral, Traumatic Avulsion greater trochanter fracture ,pelvic injury , closed reduction internal fixation k wires

1. Introduction

The greater fractures are seen as two distinctly different types, which occur in different age groups. The first are epiphyseal separations, which are found in adolescent population, usually from 7-17 years of age. In this type, the mechanism of injury is muscle contraction that results in avulsion of the entire trochanteric apophysis. The second type is a comminuted fracture of the greater trochanter, which is seen in adults, which results from direct trauma. These fractures are often seen with associated injuries.

The greater trochanter of the femur is a large, irregular, quadrilateral eminence and a part of the skeletal system. It has two surfaces and four borders. It is a traction epiphysis [1]. The lateral surface, quadrilateral in form, is broad, rough, convex, and marked by a diagonal impression, which extends from the postero-The medial surface, of much less extent than the lateral, presents at its base a deep depression, the trochanteric fossa (digital fossa), for the insertion of the tendon of the obturator externus, and above and in front of this an impression for the insertion of the obturator internus and superior and inferior gemelli muscles. Superior to the antero-inferior angle, and serves for the insertion of the tendon of the gluteus medius. The greater trochanter is the insertion site for hip abductors (gluteus medius and minimus and hip external rotators (piriformis, gemelli, obturators).

2. Materials and Methods

A 30 Years- old male patient with history of road traffic accident with sustained injury to left hip region Associated injury to head, blunt trauma to chest presented to owaisi hospital, Hyderabad with complaints of pain in left groin region ,unable to walk, multiple facial trauma, no history of

any co morbidities .on clinical examination no scar, ecchymosis, no bony deformity seen. Tenderness positive over left hip joint region, no limb length discrepancy, all movements at the left hip is painful, particularly adduction and internal rotation.

Plain radiographs X-Rays (Fig. 1) showed avulsion of the whole of the greater trochanter left hip with separation from the externally rotated femur.

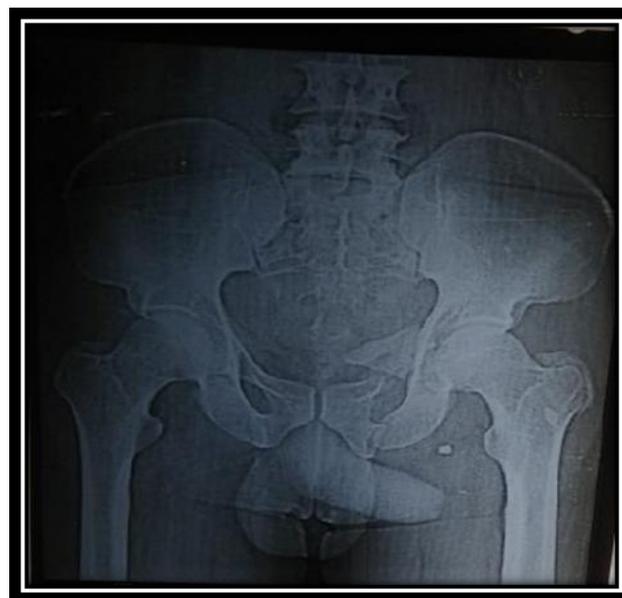


Figure 1: the above pre operative image shows left side avulsion fracture of greater trochanter displaced and superior and inferior pubic ramii fracture left side.

On CT Scan pelvis Pre operative image findings:

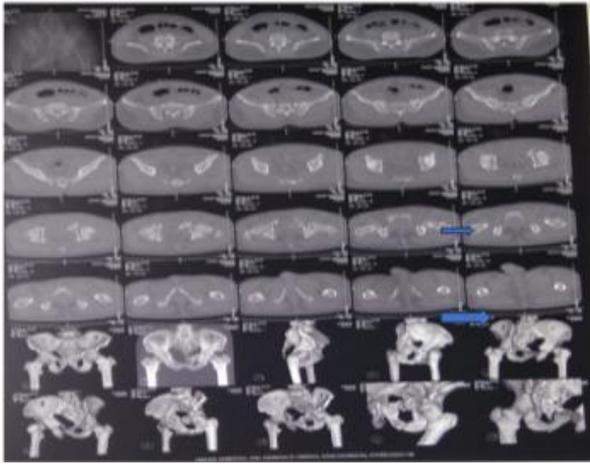


Figure 2: The CT pelvis image shows avulsion fracture greater trochanter

The patient and attendants were explained about the diagnosis and she was advised complete bed rest and was put on Bucks' traction left leg. Routine preoperative blood investigations were performed, which revealed no significant medical illness. Closed reduction and internal fixation with k-wires was planned for the left greater trochanter (GT), which was symptomatic. An informed consent for case report and publishing was taken and prognosis was explained after surgery.



Figure 3: The above intra operative image shows closed reduction and internal fixation with 4 k-wires

The post operative image was taken shows good reduction and stable fixation on fracture site



Figure 4: The above post operative image AP view shows closed reduction percutaneous k wires fixation of greater trochanter left hip



Figure 5: The above post operative lateral view image

3. Discussion

The most vulnerable part of the greater trochanter is its lip and upper portion, which protrudes in a somewhat hook-like fashion over the posterosuperior part of the femur. The medial portion of the greater trochanter, fusing as it does with the neck and shaft, is actually quite unlikely to be an isolated fracture. There is usually little or no displacement of the femur or trochanter itself in the direct trauma-induced trochanteric fractures, but seen in the muscular violence-induced avulsion-type fractures. Some displacement does occur and always in the same direction-upward, backward, and inward. Fracture of the greater trochanter are rare, they may be divided into those involving epiphyseal separation of adolescence and true fractures of adulthood. In the adults isolated fractures of the greater trochanter have been treated conservatively and surgically. Avulsion fractures of the apophyses of the pelvis and proximal femur rarely affecting the greater trochanter.

The greater trochanter fractures, the patient experiences pain and difficulty in walking although weight bearing is usually possible. Physical findings include tenderness over the trochanteric area, a flexion deformity of the hip secondary to pain and spasm and occasionally a limp. But ecchymosis directly over the trochanter is unusual. By the way of differential diagnosis, the most common considerations are transcervical fracture of the femur, contusion of the greater trochanter, intertrochanteric fractures, and peritrochanteric bursitis. These can be only be identified by X-ray and the diagnosis is most often missed by a failure to obtain X-rays at the time of injury. When minimally displaced or undisplaced trochanteric fractures are suspected, a computed tomography (CT) or MRI may reveal the fracture more accurately.^{[5],[6]} Seemingly isolated avulsion fractures of the greater trochanter often have a trochanteric extension. CT and radiography are often adequate in diagnosing fractures of the greater trochanter but not always the extension. MRI reveals the intertrochanteric extension and its complexity accurately.^[7] Joshy *et al.*,^[8] in their study to predict intertrochanteric extension of isolated greater trochanteric fractures using plain radiographs, considered two parameters. One is Extent of fracture in percentage along the intertrochanteric line other one is Angle of the fracture line. Both these parameters were measured on a plain anteroposterior radiograph. To measure the length of fracture they have drawn a straight line along the medial

border of femoral shaft extending proximally into the pelvis. Then they measured the distance between the most superior point of the fracture line on the lateral cortex and the midpoint of lesser trochanter on the first line. Then they measured the length of the fracture starting from the most superior point on the lateral cortex and estimated the percentage of this fracture length in relation to the line. To estimate the angle, they have drawn a straight line along the medial border of femoral shaft extending proximally into the pelvis. Another line is drawn in the direction of fracture starting from most superior point of fracture on the lateral cortex joining the first line. The angle is measured between these two lines. They concluded that those isolated greater trochanteric fractures, with fracture angle of more than 45° are unlikely to have an intertrochanteric extension. To estimate the angle, they have drawn a straight line along the medial border of femoral shaft extending proximally into the pelvis.

Treatment of fractures of the greater trochanter has been controversial. The first method employs wide abduction of the limb to oppose the displaced fragment from its bed. These patients are kept in skin traction and then immobilized either with adhesive strapping or a one-half hip spica cast for 6 weeks [9]. The second type of treatment is that of open reduction and internal fixation by suture, peg, or screws through a straight lateral incision over the greater trochanter [3],[10]. The third method of treatment consists of bed rest with or without traction until the acute symptoms subside (usually 10-14 days) followed by active exercises and crutch ambulation beginning with partial weight-bearing on the affected limb. Progression to full weight-bearing without crutches is gradual and usually complete in 4-6 weeks from the date of injury.

4. Conclusion

In our study, we conclude that because of very stable fixation, good reduction, closed reduction, internal fixation with K-wires is the best method for avulsion greater trochanter fracture. Avulsion fractures are due to excessive muscular forces, commonly seen in adolescents. These fractures are usually transverse, clear with sharp edges, displaced and non-comminuted. On the other hand, greater trochanter fractures in adults are usually comminuted due to direct trauma.

Apophyseal fractures of the pelvis tend to have an excellent prognosis. However, fractures of the greater trochanter can have serious consequences including avascular necrosis of the femoral head leading to severe hip deformity. We recommend a trial of closed reduction and percutaneous fixation be considered in this apophyseal injury.

References

- [1] Ang W, Lee FT, Hsu WY. Simultaneous bilateral greater trochanter avulsion fracture-A case report. *Journal of Orthopedic Surgery Taiwan* 1995;12:149-51. Back to cited text no. 1
- [2] Merlino AF, Nixon JE. Isolated fractures of the greater trochanter. Report of twelve cases. *Int Surg* 1969;52:117-24. Back to cited text no. [PUBMED]

- [3] Armstrong GE. XV. Isolated fractures of the greater trochanter. *Ann Surg* 1907;46:292-7. Back to cited text no. 3[PUBMED]
- [4] Gaumetou E, Zilber S, Hernigou P. Non-simultaneous bilateral hip fracture: Epidemiologic study of 241 hip fractures. *OrthopTraumatol Surg Res* 2011;97:22-7. Back to cited text no. 4[PUBMED]
- [5] Kim SJ, Park BM, Yang KH, Kim DY. Isolated fractures of the greater trochanter. Report of 6 cases. *Yonsei Med J* 1988;29:379-83. Back to cited text no. 5[PUBMED]
- [6] Stevens MA, El-Khoury GY, Kathol MH, Brandser EA, Chow S. Imaging features of avulsion injuries. *Radiographics* 1999;19:655-72. Back to cited text no. 6[PUBMED]
- [7] Feldman F, Staron RB. MRI of seemingly isolated greater trochanteric fractures. *AJR Am J Roentgenol* 2004;183:323-9. Back to cited text no. 7[PUBMED]
- [8] Joshy S, Maripuri S, Mohanty K. Isolated greater trochanter fractures: Can we predict intertrochanteric extension? *J Bone Joint Surg Br* 2010;92-B Suppl 2:273. Back to cited text no. 8.
- [9] Ratzan MC. Isolated fracture of the greater trochanter of the femur. *J Int Coll Surg* 1958;29:359-63. Back to cited text no. 9[PUBMED]
- [10] Watson-Jones R. *Fractures and joint injuries*. Vol. 2, 26th ed. Edinburgh: E and S, Livingstone; 1956. p. 653-4. Back to cited text no. 10.
- [11] Bloome DM, Thompson JD. Apophyseal fracture of the greater trochanter. *South Med J* 2000;93(8):832—3.
- [12] Fernbach SK, Wilkinson RH. Avulsion injuries of the pelvis and proximal femur. *AJR* 1981;137:581—4.
- [13] Hosli P, Laer L. Traumatic loosening of apophyses in the pelvic area and the proximal femur. *Orthopade* 1995;24(5):429—35.
- [14] Kaweblum M, Wallace BL, Grant AD, Strongwater A. Avascular necrosis of the femoral head as sequela of fracture of the greater trochanter. *Clin orthop* 1993; 294:193—5.
- [15] Mbubaegbu CE, O'Doherty D, Shenolikar A. Traumatic apophyseal avulsion of the greater trochanter: case report and review of the literature. *Injury* 1998;29(8):647—9.
- [16] Merlino AF, Nixon JE. Isolated fractures of the greater trochanter. *Int Surg* 1969;52(2):117—24.
- [17] Milch H. Avulsion fracture of the great trochanter. *Arch Surg* 1939;38:334—50