Isolated Fractures of the Greater Trochanter
Report of 6 Cases

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Isolated fractures of the greater trochanter are unusual injuries. Because of their relative rarity and the unsettled controversy regarding their etiology and pathogenesis, several methods of treatment have been advocated. Furthermore, the reports on this particular type of injury are not plentiful and the average textook coverage afforded to this entiry is limited. These fractures are seen as two distinctly different types which occur in different age groups. The first type are epiphyseal separations which are found in the adolescent population, ususally from seven to seventeen years of age. In this type, the mechanism of injury is muscle contraction that results in avulsion of the entire trochanteric apophysis and it can be displaced up to 6 cm. The second type is a comminuted fracture of the greater trochanter seen in adults. In this type, the mechanism of injury is usually a direct blow to the greater trochanter that results in a comminuted fracture, and only a part of the greater trochanter is generally involved.

The objective of this report is to draw attention to this entiry because of its relative rarity and to introduce the good prognosis with proper treatment.

CASE REPORTS

Case 1.

A 23-year-old male laborer was knocked unconscious when he fell from a height of 10m. Upon admission, known injuries consisted of a cerebral contusion, a traumatic subarachnoidal hemorrhage and a contusion of the right buttock. It was not until three months later that a concomitant fracture of the right greater trochanter was diagnosed via roentgenograms obtained when the patient complained of anal bleeding. Roentgenograms disclosed a healed fracture of the gerater trochanter of the right femur with cephalad and medial displacement of the trochanteric fragment. His right hip was eventually pain-free but the patient was discharged from the hospital at 8

months in a wheelchair due to the sequelae of the head injury (Fig. 1).

Case 2.

A 30-year-old male pedestrian was knocked unconscious when struck by an automobile. Upon admission to our hospital, known injuries consisted of a cerebral contusion and multiple traumatic intracranial hemorrhage. It was not until two months later that a concomitant fracture of the right greater trochanter was diagnosed via roentgenograms obtained when the patient complained of an incidental pain during walking. The patient was in a bedridden state with gradual progressive ambulation starting 5 weeks post-injury. Roentgenograms disclosed a healed fracture of the greater trochanter with minimal cephalad and medial displacement of the trochanteric fragment (Fig. 2).

Case 3.

A 37-year-old male fell from a 2.5m ladder. Upon admission to our hospital, he complained of pain in the left hip joint area. Positive physical findings were limited to an inability to bear weight on the left leg because of pain in the region of the left greater trochanter by passive and active motion of the left

Summary of Cases

Case	Sex/Age	Mechanism of injury		Method of treatment
1	M/23	fall		Bed rest
2	M/30	direct trauma		Bed rest with progressive ambulation and exercise starting 5 weeks post-injury.
3	M/37	fall	at admiss.	Bed rest with Buck's traction for 2 weeks, then partial weight bearing for 3 weeks
4	M/41	direct trauma	at admiss.	Bed rest with Buck's traction for 2 weeks, then partial weight bearing for 2 weeks
5	M/44	direct trauma	at 1 week	Ambulation without weight-bearing for 2 weeks, then partial weight bearing for 3 weeks
6	F/65	direct trauma	at admiss.	Bed rest with Buck's traction for 3 weeks, then partial weight bearing for 3 weeks

Fig. 1. *M/23 A healed fracture of right greater trochanter with cephalad and medial displacement was seen.*

Fig. 2. *M/30 A healed fracture of right greater trochanter with minimal cephalad and medial displacement was seen.*

hip and tenderness localized to the same area. Roentgenograms disclosed a non-displaced fracture of the gerater trochanter of the left femur. This patient was treated with bed rest with Buck's traction exerted on the left lower extrmity for two weeks followed by progressive ambulation. He was discharged three weeks after admission and was ambulating painlessly with crutches. The patient was ambulating in a normal manner 5 weeks after admission (Fig. 3).

Case 4.

A 41-year-old male was struck by an automobile, causing fractuers of his right distal radius, nasal bone and right greater trochanter. Roentgenograms disclosed a non-displaced fracture of the right greater trochanter. Treatment was conservative and consisted of bed rest with Buck's traction. By the end of the second week the patient was ambulating with crutches. In another two weeks, he had completely regained

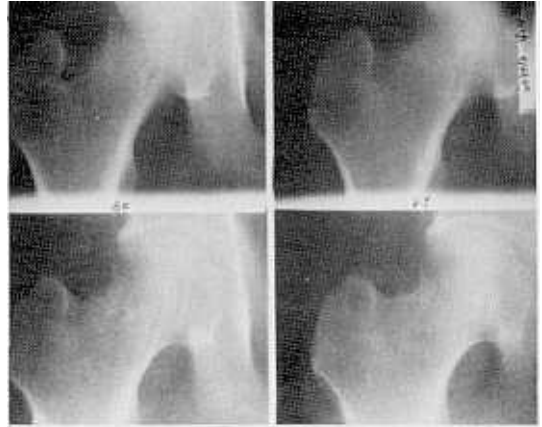**Fig. 3.** *M/37 A non-displaced fracture of left greater trochanter was seen*

Fig. 4. *M/41 Tomogram reveals a non-displaced fracture of right greater trochanter was seen*

Fig. 5. *M/44 A non-displaced fracture of left greater trocahnter was seen*

Fig. 6. *A fracture of left greater trochanter with minimal displacement was seen*

normal function of his right hip and was walking without external support aids (Fig. 4).

Case 5.

A 44-year-old male fell down a flight of stairs and landed on his left hip, following which he experienced severe pain in his left hip. However, he was able to walk, although this activity resulted in aggravation of the pain. When his symptoms failed to dissipate, he visited the hospital at one week post-injury. Positive physical findings were left hip pain, tenderness of the left greater trochanter area and weakness of abduction. Roentgenograms disclosed a non-displaced fractuer of the greater trochanter. Treatment consisted

of ambulation without weight bearing on crutches with gradual progressive ambulation starting two weeks post-injury. Five weeks after the injury, the patient was ambulating in a normal manner (Fig. 5).

Case 6.

A 65-year-old female fell down a flight of stairs, fracturing her left greater trochanter, right patella and both distal radii. Roentgenograms disclosed a fracture of the greater trochanter with minimal displacement. Treatment consisted of bed rest with Buck's traction with gradual progressive ambulation starting three weeks post-injury. The patient was ambulating in a

normal manner upon discharge six weeks after admission (Fig. 6).

DISSCUSSION

Isolated fractures of the greater trochanter are uncommon. They may be considered as sprains or contusions. In two of six cases, presented as cases 1 and 2, the patients were initially examined by a physician but the diagnosis of fractures of the greater trochanter was not identified until two or three months later because the proper roentgenograms were not obtained.

Isolated fractures of the greater trochanter are classified either as true fractuers, which occur solely in adults, or as epiphyseal separations which are found in the adolescent population (Merlino and Nixon 1969).

Armstrong (1970) reported that traumatic epiphyseal separations of the greater trochanter in adolescents are more frequently encountered than true fractures in adults.

However, there were no adolescents in our cases as in those of Merlino and Nixon, (1969).

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.

The controversy regarding which mechanism is responsible for most of the isolated trochanteric fractures in adults is not settled in the literature. In our study, four of the six cases were due to direct trauma, the most vulnerable part of the greater trochanter is its lip and upper portion, which protrudes in a somewhat hook-like fashion over the posterior superior 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 in the muscular violence-induced avulsion-type fractures, some displacement does occur and always in the same direction-upward, backward and inward. In our study minimally or non-displaced cases were identified.

Both Merlino and Nixon (1969) and Milch (1939) believed that displacement of the trochanteric fracture was secondary to the short external rotaters and not the abductors.

In isolated fractures of the greater trochanter, the patient experiences pain and has difficulty 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 way of differential diagnosis, the most common considerations are transcervical fracture of the femur, contusion of the greater trochanter, femoral head dislocation and peritrochanteric bursitis. These can only be resolved by X-ray and the diagnosis is most often missed by a failure to obtain roentgenograms at the time of injury. When minimally displaced or non-displaced trochanteric fractuers are suspected, a tomogram may reveal fracture lines more accurately, as in case 4.

Roentgenographically, the involved area is always that part which projects upward and backward from its line of junction with the femoral neck and the direction of displacement of the separated fragment, if displaced, is usually upward, inward and backward.

Treatment of fractures of the greater trochanter has been controversial. In the adult fractuer, in which only part of the trochanter is fractured, the remaining intact fibers of the gluteus medius usually prevent wide separation of the fracture fragment. Three types of treatment have been proposed.

The first employs wide abduction of the limb to oppose the displaced fragment with 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 (Ratzan 1958, Armstrong 1907).

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. (Armstrong 1907, Watson-Jones 1956) Merlino and Nixon (1969) reserved open reduction and internal fixation for those infrequent cases in which there is marked separation or soft tissue interposition.

The third method of treatment consists of bed rest with or without traction until the acute symptoms subside (usually ten to fourteen 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 is usually complete in four to six weeks from the date of injury.

Because of the very good prognosis with this particular fract most authors advocate the third method as the treatment of choice. Four of our cases were terated in this manner and the results have all been satisfactory.

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