

## Original Research Article

# Clinical profile of patients with intertrochanteric fractures of hip attending tertiary care hospital

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### ABSTRACT

**Background:** The hip joint is ball and socket joint. In weight bearing the pressure forces are transmitted to the head and neck of the femur at an angle of 165 degrees to 170 degrees regardless of position of pelvis. The plane of the force coincides with strongly developed trabeculae that lie in the medial portion of the femoral neck and extend upwards through the supero-medial aspect of the femoral head. These trabeculae are in line with similar pressure trabeculae that start at acetabulum and run upwards and medial to sacro-iliac joint.

**Methods:** After the patient with intertrochanteric fracture was admitted to our hospital, all the necessary clinical details were recorded in the proforma prepared for this study. After the completion of the hospital treatment patients were discharged and called for follow-up to outpatient department at regular intervals (6 weeks, 12 weeks, 6 months, 12 months) for clinical and radiological evaluation.

**Results:** The most common age group was in the range of 60 to 70 yrs. Most common mode of injury was trivial fall in this series. 56% of the patients having type II BOYD and GRIFFIN fracture.

**Conclusions:** Most common mode of injury in young patients is the road traffic accident while most common mode of injury in older patients is the simple fall (domestic fall).

**Keywords:** Hip Joint, Intertrochanteric fractures, Simple fall

### INTRODUCTION

The femur is the longest and strongest bone of the body and like all long bones consists of a shaft and two ends. It articulates at its upper end with the hip bone and at its lower end with both the patella and the tibia. The upper end of the femur comprises a head, a neck, a greater and a lesser trochanter.<sup>1</sup>

The head of the femur is rather more than half a 'sphere' and is directed upwards, medially and slightly anteriorly. The neck is about 5 cm long, connects the shaft, it is a stout bar of bone, roughly pyramidal in shape and flattened anteriorly. The long axis of the neck makes an angle of about 120-130 degrees with the long axis of the

shaft and is termed the neck shaft angle. This arrangement allows greater mobility at the hip joint and enables the lower limb to swing clear of the pelvis.<sup>2</sup>

The angle of anteversion is formed between the transverse axis of femoral neck to the trans condylar axis of femur in a coronal plane. It is about 15-25°.

The hip joint is ball and socket joint. In weight bearing the pressure forces are transmitted to the head and neck of the femur at an angle of 165 degrees to 170 degrees regardless of position of pelvis. The plane of the force coincides with strongly developed trabeculae that lie in the medial portion of the femoral neck and extend upwards through the supero-medial aspect of the femoral

head. These trabeculae are in line with similar pressure trabeculae that start at acetabulum and run upwards and medial to sacro-iliac joint. The reacting forces normally run perpendicular to cartilaginous epiphyseal plate.<sup>3</sup>

When a patient stands on both legs the static force passing through each of the hip is half of or less than one-third of total body weight. When the patient stands on one leg the pressure exerted on the femoral head is the sum of the force of abductor lever arm and the weight of the body. Each force is related to the relative length of the levers and the two forces are counter balancing. If the abductor lever arm is longer (i.e. the laterally placed insertion of the abductors) the ratio between the levers is less and less abduction force is needed to maintain balance and thus less pressure on femoral head.<sup>4</sup>

Normal activities subject proximal femoral region with bending, torsional, axial forces. Because of peculiar shape of this region is loaded eccentrically. These loads are resisted by large dimension, greater peripheral substance and large cortical surface of greater trochanter.

Fractures of the proximal femur occur by one of the three mechanisms.<sup>5</sup>

- 1) In the elderly, these fractures are usually due to low energy trauma, typically, a minor fall. Spiral fractures generally result perhaps with butterfly comminution.
- 2) The second mechanism is that of the trivial trauma, with fracture through a defect in the proximal femur due to osteoporosis, osteomalacia, neoplasia, most commonly metastatic carcinoma. Such pathological sub trochanteric fractures require assessment and management of the neoplastic process as well as of the fracture.
- 3) The third mechanism is high energy trauma, motor vehicle accident or fall from significant height. Comminution, soft tissue damage including possible open wound and presence of associated injuries are typical concerns.

Thus the objective of the study was to know Clinical profile of patients with Intertrochanteric Fractures of Hip attending tertiary care hospital.

## METHODS

It was a prospective study of patients admitted with intertrochanteric fracture in Medici Institute of Medical Sciences in department of Orthopaedics who underwent surgical treatment with intramedullary hip screw between November 2014 to April 2016 with a minimum follow up period of 6 months & with the maximum follow up period of 1 year.

Sample size was 50 patients.

## Inclusion criteria

Inclusion criteria were patients above 18 years of age; sex: both the gender; all intertrochanteric fractures treated with intramedullary hip screw; intertrochanteric fracture with subtrochanteric extension; pathological fractures; open/ compound fractures.

## Exclusion criteria

Exclusion criteria were age <18 years (before the closure of physeal plate); medical contraindication to surgery as per ASA.

After the patient with intertrochanteric fracture was admitted to our hospital, all the necessary clinical details were recorded in the proforma prepared for this study. After the completion of the hospital treatment patients were discharged and called for follow-up to outpatient department at regular intervals (6 weeks, 12 weeks, 6 months, 12 months) for clinical and radiological evaluation. The patients were followed up till fracture union & yearly once from then-on.

## Statistical tests

Mean, standard deviation and percentages were used to depict the data.

## RESULTS

The most common age group was in the range of 60 to 70 yrs. 64% of the total patients were males in this series. Most common mode of injury was trivial fall in this series. Right side is involved in 55% of the patients.

**Table 1: Age distribution.**

Age in years	No of patients (n=50)	% of patients
30-40	3	6
40-50	9	18
50-60	9	18
60-70	15	30
>70	14	28

**Table 2: Sex distribution.**

Sex	No of patients (n=50)	% of patients
Male	32	64
Female	18	36

**Table 3: Mode of injury.**

Mode of injury	No of patients (n=50)	% of patients
Trivial	34	68
Road traffic accidents	16	32

**Table 4: Side of injury.**

Side involved	No. of patients (n=50)	% of patients
<b>Right</b>	28	56
<b>Left</b>	22	44

**Table 5: Type of fracture.**

Type of fracture	No. of patients (n=50)	% of patients
<b>Type I</b>	8	16
<b>Type II</b>	28	56
<b>Type III</b>	9	18
<b>Type IV</b>	5	10

Intertrochanteric fractures are classified according to Boyd and Griffin classification. 56% of the patients having type II Boyd and Griffin fracture (Table 5).

## DISCUSSION

The most common age group involved in this study was 60–70 years. This implies the fact that patients of these age groups are prone for low energy trauma like domestic fall.<sup>6</sup> In a study of Gallagher et al, an eight-fold increase in trochanteric fractures in men over 80 years and women over 50 years of age.<sup>7</sup>

The hip joint is ball and socket joint. In weight bearing the pressure forces are transmitted to the head and neck of the femur at an angle of 165 degrees to 170 degrees regardless of position of pelvis. The plane of the force coincides with strongly developed trabeculae that lie in the medial portion of the femoral neck and extend upwards through the supero-medial aspect of the femoral head. These trabeculae are in line with similar pressure trabeculae that start at acetabulum and run upwards and medial to sacro-iliac joint. The reacting forces normally run perpendicular to cartilaginous epiphyseal plate.

A study by Cleveland et al showed that there are higher incidences of multiple fractures, as of the same or opposite side, which may occur at different occasions.<sup>8</sup> When a patient stands on both legs the static force passing through each of the hip is half of or less than one-third of total body weight. When the patient stands on one leg the pressure exerted on the femoral head is the sum of the force of abductor lever arm and the weight of the body. Each force is related to the relative length of the levers and the two forces are counter balancing. If the abductor lever arm is longer (i.e. the laterally placed insertion of the abductors) the ratio between the levers is less and less abduction force is needed to maintain balance and thus less pressure on femoral head.

Normal activities subject proximal femoral region with bending, torsional, axial forces. Because of peculiar shape of this region is loaded eccentrically. These loads

are resisted by large dimension, greater peripheral substance and large cortical surface of Greater trochanter.

In our study the average age of the patients is 59.82 years as the young individuals less than 50 years are 12 involved in the road traffic accidents.

Among our study subjects, males were more affected compared to females. Amongst them majority belongs to 50-60 years age group, while young patients were from 30-40 years of age group. Most of the females were in the age group of 50-60 years. The ratio of males to female in the present study was 1.7:1. As the present study was conducted in a rural population, the majority of the patients in the study were males as they are engaged in activities like agriculture, driving of motor vehicles and are more likely to be involved or prone to accidents/ fall.

According to Cleveland et al study, females were more affected and reasons could be that Females have slightly wider pelvis with a tendency to having coxa vara and they are usually less active and are more prone to senile osteoporosis.<sup>8</sup>

Trivial trauma was the most common cause of fracture among 60–70 years of age group whereas RTA was the most common cause for fractures among 30–40 years of age group. In the cases treated by IMHS there were 34 cases (68%) due to trivial trauma while there were 16 cases (32%) due to Road traffic accident (RTA).

Inadequate protective reflexes, to reduce energy of fall below a certain critical threshold. Inadequate local shock absorbers e.g. muscle and fat around hip. inadequate bone strength at the hip on account of osteoporosis or osteomalacia may be the reasons.

Hip fractures in young adults were observed to result most often with high energy trauma such as motor vehicular accidents or a fall from height.

Young patients with intertrochanteric or subtrochanteric fractures sustained trauma either as a result of road traffic accident, there by reflecting the requirement of high velocity trauma to cause fracture in the young. According to study done by Horn & Wang, mechanism of injury is not direct but due to failure of Stress resisting forces during sudden bending or twisting. A direct blow on the lateral side of thigh would result in contusion, comminution on the lateral surface of the greater trochanter and cause valgus deformity.<sup>9</sup>

In cadaveric femora, the femora classed as poorly mineralized broke more under dynamically applied loads as compared to well mineralized bone. They produced a fracture with a swinging pendulum, simulating a direct blow over the greater trochanter as per the study done by Spears and Owens.<sup>10</sup>

## CONCLUSION

There was a male preponderance in our patients. A male to female ratio was about 1.7:1. There were 32 males (64%) and 18 females (36%). The male predominance in our study is attributed to active lifestyle of males and majority of mode of Injury was simple fall (domestic fall) followed by road traffic accident (RTA).

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