

## ORIGINAL RESEARCH

**Relative Incidence of Fracture Neck of Femur and Intertrochanteric Fractures in Elderly Men and Women- A Cross Sectional Study****<sup>1</sup>Dr. Ramachandra N. Badami, <sup>2</sup>Dr. Naveen P.R, <sup>3</sup>Dr. Narayan Naik, <sup>4</sup>Dr. Chaitanya P.R.***<sup>1</sup>Assistant Professor, Department of Orthopaedics, Shimoga Institute of Medical Sciences, Shivamogga, Karnataka, India.**<sup>2</sup>Associate Professor, Department of Orthopaedics, Shimoga Institute of Medical Sciences, Shivamogga, Karnataka, India.**<sup>3</sup>Assistant Professor, Department of Orthopaedics, Shimoga Institute of Medical Sciences, Shivamogga, Karnataka, India.**<sup>4</sup>Professor, Department of Orthopaedics, Shimoga Institute of Medical Sciences, Shivamogga, Karnataka, India.***Corresponding Author:Dr. Ramachandra N. Badami**

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**ABSTRACT**

**Background:** With the rapidly aging population, number of hip fractures is expected to increase over next decades. With increasing age risk of intertrochanteric fractures is more than neck of femur fractures. Current study aims at deriving the relative incidence of intertrochanteric fracture and fracture neck of femur in men and women above 60 years.

**Materials& Methods;** This is a cross-sectional study of one hundred patients above the age of 60 years with Intertrochanteric fractures and fracture neck of femur. The patients were divided into 3 groups based on age. Detailed examination of the patients was done to note the age, gender, nature and diagnosis of the fracture.

**Results:** Logistic regression analysis showed significant interaction, the relative proportion of the two types of hip fracture changing with age in a different manner in the two genders.

**Discussion:** We found small but significant increase in subcapital fractures with aging in men. In women the proportion of intertrochanteric fractures rises from 24% in the youngest group to almost 52% in the oldest group, while in men it falls from 59% to 42%.

**Conclusion:** We found increasing incidence of intertrochanteric fractures in women, but men showed an increase in the incidence of fracture neck of femur with increasing age.

**Keywords:** Hip fracture, Elderly, Intertrochanteric fracture

**INTRODUCTION**

Hip fractures are regarded as the most common severe type of fall-related injury among older adults and the most serious of the osteoporotic fractures because of their high morbidity, mortality and impairment in quality of life <sup>[1,2]</sup>.

Hip fracture is arguably the costliest fracture; thus, a reliable estimate of their present and likely future incidence, in both sexes, is important to help project the costs and resources needed to manage this problem. With the rapidly aging population, the absolute number of hip fractures is expected to increase significantly over the next few decades. Indeed, it has been estimated that the total number of hip fractures worldwide will increase to 2.6 million by the year 2025 and to 4.5 million by the year 2050.<sup>[3]</sup> Many studies have grouped hip fractures as a homogeneous condition, though there are two major anatomic types: intracapsular fractures (cervical or subcapital hip fractures) of the femoral neck and extracapsular hip fractures of the intertrochanteric region (peritrochanteric fractures).<sup>[4]</sup> As the two major sites have a dissimilar composition of bone, the trochanteric region having a greater proportion of trabecular bone<sup>[5]</sup>, it has been suggested that the etiology of each fracture may in fact differ and investigating hip fractures as a single entity may obscure risk factors and occurrence patterns. Literature finds that femoral neck fractures are largely predicted by BMD and poor functional ability while aging and poor health status predispose to intertrochanteric fractures. Literature and research has shown that advancing age is more strongly associated with risk of intertrochanteric fractures than subcapital fractures.<sup>[6,7,8,9,10]</sup> Whereas, evidence for other such differences between the fracture populations remains largely unexplored in the literature. The current study aims at deriving the

relative incidence of intertrochanteric fracture and fracture neck of femur in men and women above 60 years of age at our institution.

**MATERIALS AND METHODS:** This is a cross sectional study conducted at our institution after taking the institutional ethics committee approval. Informed consent was taken from all patients. Study was conducted at Mcgann District teaching district hospital attached to Shimoga institute of medical sciences. One hundred patients above the age of 60 years admitted at our institution from January 2017 to January 2019 with Intertrochanteric fractures and fracture neck of femur were included in the study. Cases with pathological fractures, high velocity injuries with associated life-threatening injuries, fractures in less than 60 years of age, those fractures with subtrochanteric extension were excluded from the study. Participation in the study did not have any bearing on the eventual management of the fractures. Intertrochanteric fractures were classified based on Boyd & Griffith classification; fracture neck of femur was classified based on anatomical classification. The patients were divided into 3 groups based on age. Group-1: Age 60-70 years, Group-2: Age 71-80 years, Group-3: Age above 80 years.

They were divided into: 34 patients in group-1, 34 patients in group-2 and 32 patients in group-3 with equal number of male and female patients. A detailed examination of the patients was done to note the age, gender, nature and diagnosis of the fracture. The data was then statistically analyzed to see if there is any statistically significant difference in the pattern of incidence between the two with respect to age and gender.

**Statistical analysis:** Associations between age, gender and fracture type were explored. Analysis of the proportion of hip fracture types across the age groups and across gender was conducted using the Chi-Square method in SAS. This was followed by logistic regression to test for a significant interaction between age and gender on the likelihood of sustaining one fracture type compared to the other.

**RESULTS:** For all patients, age and fracture type were significantly related, with the proportion of intertrochanteric fractures increasing from 41.5 to 50 percent across age groups ( $p = 0.007$ ). Logistic regression analysis showed a significant interaction ( $p < 0.001$ ), the relative proportion of the two types of hip fracture changing with age in a different manner in the two genders. In women the proportion of the hip fractures which occurred at the intertrochanteric site rises significantly with age across the three age groups ( $p < .001$ ) [Table:1], whereas the proportion of intertrochanteric hip fractures among men decreases with age ( $p = .025$ ).

Group	Inter-trochanteric fracture	Fracture neck of femur
Group-1 (17 Patients)	6	11
Group-2 (17 patients)	9	8
Group-3 (16 Patients)	14	2

**Table: 1 Comparison of hip fractures in females**

The mean age of women with intertrochanteric fractures is significantly older than those with subcapital fractures ( $83.9 \pm 8.03$  SD vs.  $81.1 \pm 9.23$  SD;  $p < .001$ ) whereas men with intertrochanteric fractures are younger than men with subcapital fractures ( $77.5 \pm 11.02$  SD vs.  $79.3 \pm 9.99$  SD;  $p = .05$ ) [Table:2].

Group	Inter-trochanteric fracture	Fracture neck of femur
Group-1 (17 Patients)	13	4
Group-2 (17 patients)	10	7
Group-3 (16 Patients)	4	12

**Table: 2 Comparison of hip fractures in males**

## DISCUSSION

Our data are consistent with those of Karagas et al. and Tanner et al. [6,11] in showing a rise in the proportion of intertrochanteric fractures in women with increasing age, but not in men. In another study, Bjorgul et al. [12] found an increasing tendency to intertrochanteric fractures relative to subcapital fractures in women with increasing age, but no pattern in men. In the present study we found a small but significant increase in subcapital fractures with aging in men. In women the proportion of intertrochanteric fractures rises from 24% in the youngest group to almost 52% in the oldest group, while in men it falls from 59% to 42%. Why the situation should be different for men and women is obscure and the change across the different ages is perplexing. Although there is evidence that the loss of trabecular and cortical bone with age may differ between men and women, the significance of this is unclear [13] but the rising proportion of intertrochanteric fractures in women may reflect greater trabecular bone loss with age in

women. Hip fractures are common and costly in terms of system expense and personal loss of independence. They represent a complex phenomenon, much more than the simple loss of bone mass with age. Equally important and perhaps even more so with increasing age, is the tendency to fall and to fall in a different way<sup>[14]</sup>. The fall onto the greater trochanter is a phenomenon of old age. While it has been shown that the lateral fall onto the greater trochanter is particularly difficult to protect oneself during<sup>[15-17]</sup>, the loss of multitasking ability and distraction by other activities that characterizes the oldest population members makes both preventing the fall and protecting oneself from injury even more difficult<sup>[18]</sup>. It appears that a fall onto the greater trochanter may generate enough force to break any hip<sup>[19]</sup>. It is also likely that the size of the target zone within which a strike will generate enough force to break the hip, increases as the fragility of the bone increases. It is known that the patients who suffer an intertrochanteric fracture have more osteoporosis, as shown by lower bone mineral density and more vertebral fractures<sup>[9,20]</sup>. It can be postulated that the fall onto the greater trochanter will produce a fracture of the intertrochanter site if the bones are fragile. The intertrochanteric region seems to absorb the force rather like the crumple zone of a car, and prevents the force being passed along to the neck of the femur. However, if the trabecular bone is strong, the force may be transferred to the neck of the femur which may then fracture. The greater loss of bone in women than in men may dispose the former to more intertrochanteric fractures with age. In addition, femoral neck length, greater in men, may be relevant as it tends to be associated with an increased risk of subcapital fracture, but this is not likely to change with age<sup>[21,22]</sup>. With increasing age, the fall becomes more common and fracturing may be more a reflection of the falling rather than thin bones, although the rising proportion of intertrochanteric fractures speaks to the rising prevalence of osteoporosis, at least in women. It is likely that falling dictates the prevalence of hip fracture, while the bone strength dictates who is more likely to fracture and the nature of the fracture that occurs.

## CONCLUSION

The relative incidence of intertrochanteric fracture and fracture neck of femur in men and women above 60 years varies significantly. We found an increasing incidence of intertrochanteric fractures in women as compared to fracture neck of femur, but men showed an increase in the incidence of fracture neck of femur as compared to the intertrochanteric fractures with increasing age.

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