

# Proximal Femoral Fractures: A Cross-Sectional Study in Lahore

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## SUMMARY

*A cross sectional study of 490 patients with proximal femoral fractures was done. These were analyzed for age distribution of different fracture types, sex ratio and left:right incidence. Most of the fractures were found to be occurring during the 7th decade. Intertrochanteric fracture was commonest (52.7%). A male predominance (1.4:1) was found which is in contrast with the developed countries. It was also found that the left side was affected more than the right side, but no apparent reason could be attributed to this.*

## INTRODUCTION

**P**roximal femoral fractures are an important medical and social problem because of their high incidence in elderly persons. Review of literature reveals a progressive increase in the incidence of proximal femur fractures over the years<sup>1</sup>. Studies have shown that the number of hip fractures has tripled in the United States between the years 1965 and 1981, and some studies predict another three fold increase in the incidence in the next two decades. Present data from the United States shows that 250,000 hip fractures occur annually resulting in health care costs of over one billion dollars, Melton et al.<sup>1</sup> observed that 30% of hospital admissions and 50% of hospital stays were owing to this disorder. These fractures are also associated with substantial morbidity and mortality; approximately 15% to 20% of patients die as a result of the fractures. Co-morbidities include the patients age and pre-operative physical and mental status.

No study is available from Pakistan. We have analyzed a cross section of patient's presenting with hip fractures. Patients were analyzed for age, type, sex and side involved and compared with incidence with studies available from developed countries.

The purpose of this study was:

- to compare the incidence of hip fractures reported at Shaikh Zayed Hospital Lahore, with studies from other countries.

- to analyse data on hip fractures by age, sex, type of fracture and side affected.

## PATIENTS AND METHODS

This was a cross-sectional study conducted on all patients with proximal femoral fractures admitted in the Orthopedic Unit during four years (January 1992 to December 1995). Total sample size consisted of 490 cases. These cases were divided into three main categories on the basis of type of fracture and review of their files:

- Fractures of the neck of the femur.
- Intertrochanteric fractures.
- Subtrochanteric fractures.

For each category frequencies were determined by age, sex, and the side affected.

## RESULTS

During the four year period, 490 cases of proximal femoral fractures were reported at SZH. Of these 288 (58.8%) were males and 202 (41.2%) were females (Fig. 1). Thus the sex ratio was 1.4:1 which was statistically significant. By category of fractures 258 (52.7%) were intertrochanteric, 179 (36.5%) were of the femoral neck and 53 (10.8%) were subtrochanteric (Fig. 1).

## Proximal Femoral Fractures

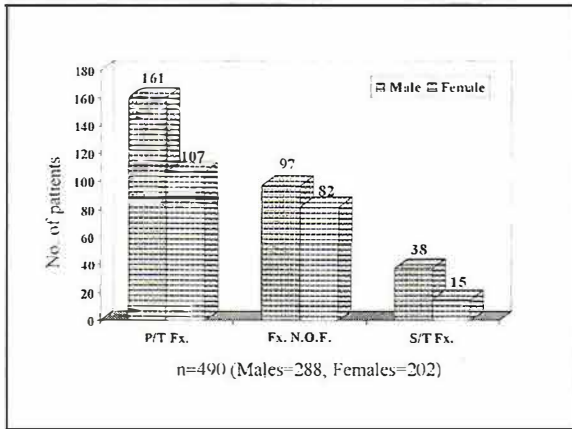


Fig. 1: Proximal femoral fractures (total male:female distribution).

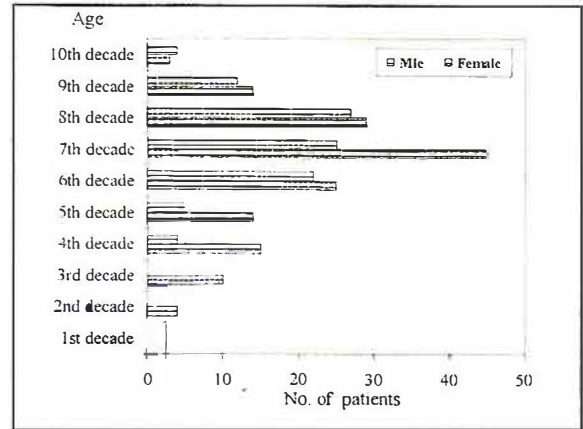


Fig. 2: Fracture neck of femur.

### Femoral neck fractures

#### i) Sex distribution

Out of 179 femoral neck fractures, 97 were males (54.2%) as compared to 82 (45.8%) females. Hence the male female ratio was 1.2:1. The sex difference was found to be statistically significant (Fig. 2).

#### ii) Age distribution

a) **Males:** The youngest patient was 10 yrs of age and the senior most member was of 94 yrs. The maximal incidence was seen in the seventh decade, having 43 patients (41.7%) (Fig. 2).

b) **Females:** The youngest patient was 13 years of age and sustained the fracture due to a road traffic accident, while the oldest was 93 yrs old, in whom the fracture was caused by a domestic fall. The maximal incidence was noted in the seventh decade, having 28 patients (22.9%) (Fig. 2).

#### iii) Side affected

Among fractures of the neck of the femur in both sexes of all age groups, the left side was affected the most. Amongst females it was 47 out of 82 (57.3%) cases and in males it was 55 out of 97 (56.7%).

### Intertrochanteric fractures

#### i) Sex distribution

Out of the 258 intertrochanteric fractures, 151 (58.5%) were males and 107 (41.5%) were females. Thus our male-female ratio in intertrochanteric fractures was 1.4:1, which was statistically significant (Fig. 3).

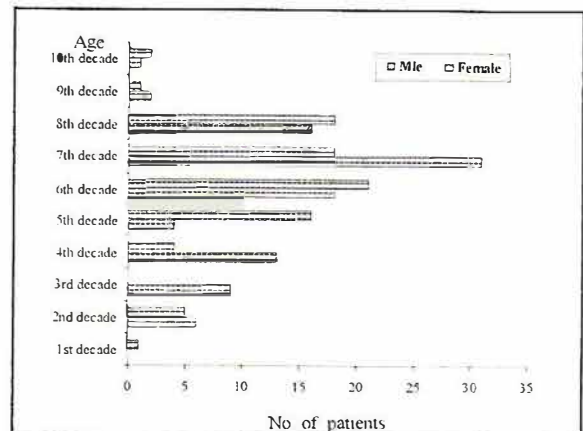


Fig. 3: Pertrochanteric femoral fracture.

- ii) **Age distribution**
- a) **Males:** Maximal incidence was recorded during the seventh decade, where 31 patients were recorded (46.8%). The youngest being at the age of 15 while the oldest was 98 years old (Fig. 3).
- b) **Females:** The youngest patient recorded was 5 years old while the oldest being 94 years of age. In females the maximal incidence was noted during the sixth decade. This group included 21 patients i.e. 22.4% (Fig. 3).
- iii) **Side affected**  
Among the intertrochanteric fractures of the proximal femur, a left sided preponderance was noted in both males and females. 83 (55%) males and 59 (55%) females incurred fractures to the left side, showing a higher incidence of left sided fractures. However, the difference was not found statistically significant.

**Subtrochanteric fractures**

- i) **Sex distribution**  
There were 53 patients, 38 (72%) were males and 15 (28%) females; male-female ratio was 2.5:1. The difference was statistically significant (Fig. 4).



Fig. 4: Subtrochanteric femoral fracture.

- ii) **Age distribution**
- a) **Males:** 33 out of 38 (87%) were below 60 years

with a spike of 15 cases (39%) in the below 40 years age group (Fig. 4). With the peak incidence during the fourth decade.

- b) **Females:** In a total of 15 subtrochanteric fractures 12 (80%) were found below 60 years, with the highest cases i.e 8 falling in the below 21 age group (Figure 4). Thus in contrast to our data on femoral neck fractures and intertrochanteric fractures, the majority of cases were reported below 60 years of age.

- iii) **Side affected**  
In these fractures the right side was found to be affected most as compared to the left side. We do not think that it was significant as the sample size was very small.

**DISCUSSION**

Population based studies on the incidence of proximal femoral fractures in men and women of different age groups have been reported for many Western countries. The literature search showed that such data pertaining to our region is conspicuously lacking. The present study reveals that the trends in the incidence of proximal femoral fractures in our region do not follow the trends shown as those in the West.

The increased proportion of proximal femoral fractures in the elderly, and a greater incidence in women is mostly attributed to osteoporosis. In a study conducted in Italy, the ratio of men to women with hip fractures was 1:3.8<sup>2</sup>, whereas the ratio in Sweden in various studies was 1:3.6: and 1:3.4. Similarly, Diez et al.<sup>3</sup> found a female predominance of 1:2 in the Mediterranean region and were of the opinion that osteoporosis is the major determinant for these fractures. Rasmussen also showed that sex ratio women:men was 2.94 and the median age rose from 78 to 80 years<sup>4</sup>.

The present study shows a male to female ratio of 1.4:1, a definite male predominance. Interestingly, such a trend is not found in the developed societies i.e. the United States and Europe.

In a Swedish study in 1987, Hedlund et al.<sup>5</sup> reported a higher incidence of proximal femur fractures in men in certain areas of Sweden. However the overall sex ratio was 1:1.7, with a female predominance. The male population in certain areas of Sweden (e.g. Stockholm) consume



much higher quantities of alcohol than other areas like Malmö. Because alcoholism is a known risk factor for fractures, this may be a significant factor in explaining the sub-geographical differences. Comparable reasons for our population require substantiation. Presumably, the male member in our society has a higher exposure to the risks in environment (e.g. trauma), hence the greater incidence of proximal femur fractures.

Exposure to the environment may not be the only possible determinant for the greater incidence of proximal femoral fractures in men in our study population. Other factors such as decreased mobility of the elderly, concurrent medical conditions and vitamin D deficient diets leading to osteomalacia or mixed patterns of osteoporosis and osteomalacia may be attributable to the higher incidence of proximal femoral fractures in men. Females in the present study were 41.2%, which by no means is insignificant. This can be attributed to a large population of elderly women in whom bone fragility and/or other pathologic conditions lead to falls indoors, as women do not have as high an exposure to the environment as do males in our society. In comparison to the West however, the incidence in women was lower. Due to cultural and social trends in our society, women are for almost any medical and surgical disorder referred to quacks or those practicing alternative medicine for treatment. This may be the cause of under-reporting of proximal femoral fractures in women.

Our study showed a higher proportion of proximal femoral fractures occurring in the post-menopausal age group. High incidence of such fractures in elderly women may be interpreted as an effect of continuously decreasing bone mass throughout life. This factor affects women in particular because of their lower bone mass in young adulthood. In the elderly, poor diet combined with inactivity and an already decreased bone mineral content due to age-related hormonal changes is considered to lead to a sharp rise in proximal femoral fractures.

In the west, most proximal femoral fractures in men and women tend to occur after 65 years of age, with the highest incidence being between 70-89 years of age. Sosa et al.<sup>6</sup> found that the age mean of the patients was  $77.1 \pm 10.9$  years. In that study (n=209 male n=55, female n=154) male female percentages were 26.3% and 73%, respectively. Quint found that the most commonly observed

fracture in the high age group (mean = 81.4 years) was that of subcapital femoral neck<sup>7</sup>. Chevalley found that for intertrochanteric fractures, the average was 79 years<sup>8</sup>. Our study showed most proximal femoral fractures occurring between 45 to 65 years with a peak incidence for both pertroch and neck of femur during the 7th decade. According to Hedlund et al.<sup>5</sup> in men the incidence of intertrochanteric fractures did not differ significantly from the incidence of femoral neck fractures up to 75 years of age. Above 75 years, there was a preponderance of femoral neck fractures. In women, neck fractures dominated over intertrochanteric fractures in all age groups except the very old. Predominance of femoral neck fractures was most pronounced in the sixth decade of life. By the age of 90, both femoral neck and intertrochanteric fractures had equal incidence rates<sup>9</sup>. In our study the incidence of intertrochanteric fractures in males was higher than females till the age of 55 years after which the incidence in females predominates. The pattern in fractures of the neck of the femur was different however with a clear female preponderance over males in all age groups. Both show a peak during the 7th decade.

The reasons for fractures occurring at a later age in Western countries than in ours may be attributed to a better diet with calcium supplements and vitamin D preparations from an early age, hormonal replacement therapy in women at menopause, greater exposure to U.V light and overall better living conditions as a whole.

Subtrochanteric fractures occurring at an earlier age group i.e below 60 years is attributed to the etiology of these fractures. Subtrochanteric fractures are usually the result of high velocity trauma, hence the younger population is more affected. The results are comparable to Western data, as our study reported 10.8% subtrochanteric fractures whereas review of the literature shows that the incidence varies from 8 to 20%<sup>10</sup>.

Our study shows that in fractures of the neck and intertrochanteric region of the femur, the left side was affected more. Rudolph also analyzed two hundred cases of proximal femoral fracture for left:right ratio. It was found that there were 134 left sided and 66 right sided fractures. No apparent reason was noted<sup>11</sup>. One hypothesis may be that as the majority of our population is right handed, adequate balance, cushioning and support by the right hand during a fall or minor trauma may

prevent ipsilateral proximal femur fractures. Having observed this, it indeed would be interesting to study the incidence of distal radial fractures and correlate them with the findings of this study. In striking contrast, in our sample of subtrochanteric fractures, the right side is affected more. However we feel our sample size was not large enough for this finding to be of any significance.

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