

DEMOGRAPHIC AND CLINICAL ANALYSIS OF FRACTURE NECK OF FEMURManoj Kumar Gudluru¹, Naresh Eamani²¹Assistant Professor, Department of Orthopaedics, Mahatma Gandhi Medical College and Research Foundation, Pondicherry, Tamil Nadu.²Assistant Professor, Department of Orthopaedics, Sri Venkateswara Institute of Medical Sciences, Tirupathi, Andhra Pradesh.**ABSTRACT****BACKGROUND**

Longest bone of human body is femur, which by itself forms the skeleton of the thigh. It is composed of body, upper extremity and lower extremity. The upper extremity is made up of a head, a neck and two shafts called 'the greater' and 'the lesser' trochanter. Surgical neck of femur connects upper extremity to body.

Fracture neck of femur occurs commonly in elderly age group and females, typically occurs due to low-energy trivial falls and may be associated with osteoporosis.^{1,2,3,4} The prevalence of fracture neck of femur doubles after the fifth decade of life. The incidence of fracture neck of femur has increased in recent decades.^{5,6}

This fracture remains even today a challenge, as far as treatment and results are concerned. There are certain anatomical features peculiar to this fracture, which need consideration. Femoral neck fractures usually are entirely intracapsular, and common to all intracapsular fractures, the synovial fluid bathing the fracture may interfere with the healing process, because the femoral neck has essentially no periosteal layer, all healing must be endosteal. Angiogenic inhibitory factors in synovial fluid also can inhibit fracture repair. These factors, along with the precarious blood supply to the femoral head, make healing unpredictable and results in frequent non-unions. Because of the anatomical configuration of the bone and action of various groups of muscles, this fracture is subjected to a very high degree of shearing strain. Because of these factors, a displaced fracture neck of femur doesn't unite, unless it is reduced and internally fixed. Even undisplaced fractures can get displaced and go in to non-union.

This study is done to evaluate the demographic details, types of fractures and injuries leading to fracture neck of femur.

MATERIALS AND METHODS

Twenty-five patients admitted in department of orthopaedics and traumatology of Dr. Pinnamaneni Siddhartha Institute of Medical Sciences and Research Foundation were screened and enrolled for this study. This study was conducted from May 2010 to October 2012.

Detailed history and clinical examination were conducted. Patients satisfying inclusion and exclusion criteria were enrolled. Fracture neck of femur was confirmed by radiological evaluation. All the data was presented in numbers and percentages.

RESULTS

In our study, 52% were between 40-60 yrs. age group and 48% were from 60-70 yrs. Age group. Females were 56% and 44% were males in this study. Left side fracture neck of femur (60%) was more common than the right side (40%). Fracture neck of femur due to a trivial fall was observed in 40% of cases and 60% was due to road traffic accident. Fracture neck of femur type II occurred in 4%, type III in 44% and type IV in 48% of patients.

CONCLUSION

This study concludes that fracture neck of femur is commonly observed in elderly patients and females were affected more than the males due to low bone density. Left side fracture neck of femur was more common. Type III and type IV fracture neck of femur contributed in majority of patients.

KEYWORDS

Fracture Neck of Femur, Age, Sex, Trauma, Road Traffic Accident.

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**BACKGROUND**

Longest bone of human body is femur, which by itself forms the skeleton of the thigh. It is composed of body, upper extremity and lower extremity. The upper extremity is made up of a head, a neck and two shafts called 'the greater' and 'the lesser' trochanter. Surgical neck of femur connects upper extremity to body. The femoral neck is a strong pyramidal process of bone, which is flattened from before backward and which connects the head to the rest of the bone. The weight of body is transmitted from the pelvis to the free inferior limb through femoral neck. The direction of

the conveyed forces requires a high resistance on behalf of the neck, which explains its extremely complex trabecular architecture, formed by a system of grooves.

The trabecular system starts weakening and the medullary cavity continuing in the upper extremity after the age of 50. Fracture neck of femur occurs commonly in elderly age group and females, typically occurs due to low-energy trivial falls and may be associated with osteoporosis.^{1,2,3,4} The prevalence of fracture neck of femur doubles after the fifth decade of life. The incidence of fractured neck of femur has increased in recent decades.^{5,6}

This fracture remains even today an unsolved, as far as treatment and results are concerned. There are certain anatomical features peculiar to this fracture which needs consideration. Femoral neck fractures usually are entirely intracapsular, and common to all intracapsular fractures, the synovial fluid bathing the fracture may interfere with the healing process because the femoral neck has essentially no periosteal layer, all healing must be endosteal. Angiogenic inhibitory factors in synovial fluid also can inhibit fracture repair. These factors, along with the precarious blood supply to the femoral head, make healing unpredictable and frequent non-unions. Because of the anatomical configuration of the bone and action of various groups of muscle, this fracture is subjected to a very high degree of shearing strain. Because of these factors, a displaced fracture neck of femur doesn't unite unless it is reduced and internally fixed. Even undisplaced fracture can get displaced and go on to non-union. This is one fracture where proximal fragment can be totally excised and replaced by prosthesis or even whole hip joint can be replaced restoring good function in shortest possible time. This procedure is often adopted as an easy way out of difficult solution.

In a Meta-analysis of 106 reports of displaced femoral neck fractures by Lu-Yao et al 1994, non-union occurred in a cumulative 23% to 37% of fractures within a 95% confidence interval.⁷

Garden believed that the various types of femoral neck fractures represent different stages of the same displacing movement. In his classification, the direction of medial or compression trabeculae rising superiorly into the weight-bearing dome of the femoral head is used to indicate the rotation of the fracture in the anteroposterior x-ray.

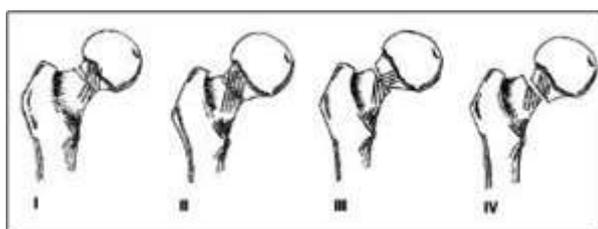


Figure 1. Garden's Classification of Fracture Neck of Femur

In 1st Stage, the fracture is incomplete with the head tilted in posterolateral direction and it is an impacted fracture. In 2nd stage, the fracture is complete, but there is no displacement. In 3rd stage the fractures are complete and partially displaced. Fracture fragments are completely

displaced, and the trabeculae realign in line of the acetabulum in 4th stage.

In a study by PA Frandsen et al 1980,⁸ multiple observers could completely agree on the Garden classification of femoral neck fractures in only 22% of cases. The distinction between displaced and undisplaced fractures (stages I & II versus stages III & IV) was much more consistent and was thought by many to be the only reliable distinction.

In elderly, fracture of femoral neck is one of the most common injuries and always a great challenge to orthopaedic surgeons.^{9,10} High rate of complications such as non-union and avascular necrosis are the poor outcomes of the patient treated with open reduction and internal fixation. Current choices for treating these fractures for orthopaedic surgeons in elderly are unipolar hemiarthroplasty, bipolar hemiarthroplasty and total hip arthroplasty.

Aims and Objectives

This study is done to understand the demographic details, types of fractures, and injuries causing fracture neck of femur.

MATERIALS AND METHODS

Twenty-five patients admitted in department of orthopaedics and traumatology of Dr. Pinnamaneni Siddhartha Institute of Medical Sciences and Research Foundation were selected for this study. This study was conducted from May 2010 to October 2012.

Detailed history and clinical examination was conducted. Inclusion criteria are adult patients past their 18th birthday and patients presenting with a fractured neck of femur. Exclusion criteria are patients aged 17 or under and patients who have multiple injuries or have other conditions which needs immediate treatment. Fracture neck of femur was confirmed by radiologic evaluation. All the data was presented in numbers and percentages.

RESULTS

A total of twenty-five fracture neck of femur cases were screened and enrolled by department of orthopaedics and traumatology of Dr. Pinnamaneni Siddhartha Institute of Medical Sciences and Research Foundation during period May 2010 to October 2012. The following observation was made in the study.

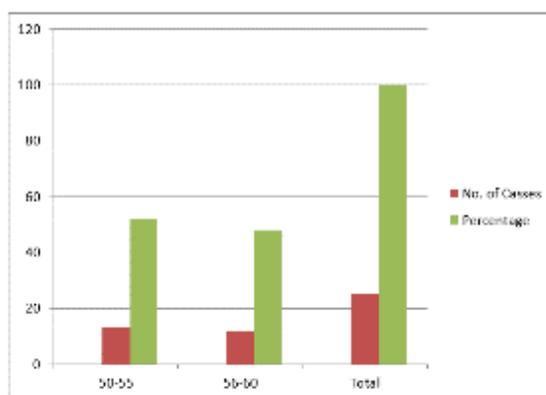


Figure 2. Age Distribution of Fracture Neck of Femur Cases

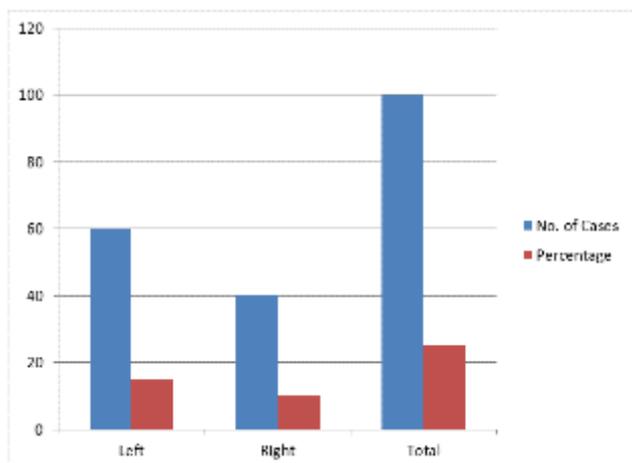


Figure 3. Incidence of Fracture Neck of Femur Cases in a Particular Side of Lower Limb

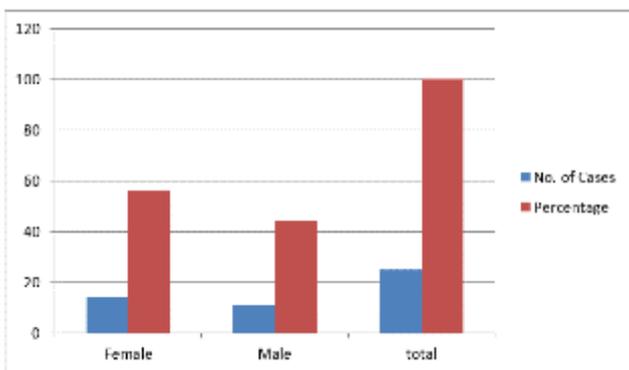


Figure 4. Sex Distribution of Fracture Neck of Femur Cases

Types of Fracture	No. of Cases	% of Cases
Type III	2	8
Type III	11	44
Type IV	12	48
Total	25	100

Table 1. Types of Fracture Neck of Femur

Type of Injury	No. of Cases	% of Cases
RTA	15	60%
Trivial Fall	10	40%
Total	25	100%

Table 2. Types of Injuries Leading to Fracture Neck of Femur



Figure 5. X-Ray Showing Garden Type IV Intracapsular Fracture Neck of Left Femur



Figure 6. X-Ray Showing Garden Type IV Intracapsular Fracture Neck of Left Femur



Figure 7. X-Ray Showing Garden Type IV Intracapsular Fracture Neck of Right Femur

DISCUSSION

In our study, we had screened and enrolled twenty-five cases of fracture neck of femur after satisfying inclusion and exclusion criteria. The study was conducted over a period of 2 years in Department of Orthopaedics, Dr. Pinnamaneni Siddhartha Institute of Medical Sciences and Research Foundation.

In our study, 52% were between 40-60 years and 48% were from 60-70 years of age. This shows that fracture neck of femur is common in elderly age group in our study. These results regarding age distribution are comparable to studies by Parker MJ et al 1992,² Keene GS 1993³ and UK national statistics.⁴

The higher female to male ratio in the general population is due to lower bone density in females compared to men. As age increased, bone density decreased in females compared to men, hence fracture neck of femur is commonly observed in elderly and female population⁵. In our study, we observed 56% were females and 44% were males. Results regarding sex distribution is comparable to studies by Parker MJ et al 1992,² Keene GS 1993³ and UK national statistics.⁴

In our study left sided fracture neck of femur (60%) was more common than the right side (40%). This data is comparable to other standard studies.

In our study, fracture neck of femur due to a trivial trauma like tripping or slipping is observed in 40% of cases.

This is common occurrence in elderly population, where poor vision and lack of neuromuscular coordination is a problem. In the present time, there is decrease in number of injuries due to fall and there are better treatment options for these aetiologies. In our study, 60% of fracture occurred due to road traffic accident.

The pattern of hip fracture and the risk of social deterioration are primarily determined by the age of the patient. In our study, type II fractures occurred in 4%, type III in 44% and type IV in 48% of patients. These results are comparable to other standard studies.^{11,12,13}

CONCLUSION

This study concludes that fracture neck of femur is commonly observed in elderly age group. Females are more affected due to low bone density. Left side fracture neck of femur was more common. Type III and type IV fracture neck of femur were seen in majority of patients.

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