

Epidemiological study of proximal femoral fractures in tertiary-level institute

Chirag D Patel¹, Manoj N Gamit¹, Sagar Jaiswal¹, Pokhraj P Suthar², Dhaval J Dave³

¹Department of Orthopedics, SSG Hospital, Medical College, Vadodara, Gujarat, India.

²Department of Radiology, SSG Hospital, Medical College, Vadodara, Gujarat, India.

³Department of Medicine, SSG Hospital, Medical College, Vadodara, Gujarat, India.

Correspondence to: Chirag D Patel, E-mail: drchirag28@hotmail.com

Received April 23, 2015. Accepted May 26, 2015

Abstract

Background: Aging is a natural process, which no one can defy. As the population continues to age, the number of proximal femoral fractures will increase exponentially. Proximal femoral fractures in younger individuals occur as a result of high-energy injuries, such as motor vehicle accidents or falls from a height. Ninety percent of the proximal femoral fractures in elderly people result from a simple fall.

Objective: To evaluate the proximal femoral fractures in the population based on epidemiology.

Materials and Methods: This study included 50 patients with proximal femoral fractures from April 2013 to May 2014 at the Department of Orthopedics, Sir Sayajirao General Hospital, Vadodara, Gujarat, India. All the displaced proximal femoral fractures in adults were evaluated after getting consent. First, demographic data such as age, sex, occupation, side of trauma, mode of injury, associated injury, and associated medical illness were recorded. All the displaced proximal femoral fractures in adults were classified according to AO classification.

Result: In our study, patients aged between 21 and 80 years were included. About 78% of patients were male subjects, as they were more prone to injury owing to manual labor, driving, and working at heights. Left-side involvement was seen in 62% of patients, whereas right-side was involved in 38% of patients. According to the AO classification, the types A-II, A-III, and A-I fractures were observed in 54%, 30%, and 16% of patients, respectively.


Conclusion: Proximal femoral fractures are common among middle-age group (mean age, 52.5 years), predominantly in male subjects (78%). The most common mechanism of injury was fall while walking (50%). Proximal femoral fractures were common with high-velocity trauma. According to the AO classification, the types A-II, A-III, and A-I fracture configurations were observed in 54%, 30%, and 16% of patients, respectively. The type of proximal femoral fracture and the age of patients significantly affect the outcome.

KEY WORDS: Proximal femoral fractures, epidemiological factors, orthopedics

Introduction

Aging is a natural process, which no one can defy. As the population continues to age, the number of proximal femoral

fractures will increase exponentially. In spite of the availability of better facilities in patient care and surgical methods, proximal femoral fractures cause a considerable amount of health-care expenditure and, hence, chiefly impose their effect on economic and social aspects. A majority of proximal femoral fractures occur in the older age groups. Women outnumber men by a ratio of 3:1.^[1] Proximal femoral fractures in younger individuals occur as a result of a high-energy injury, such as motor vehicle accident or fall from height. Ninety percentage of the proximal femoral fractures in elderly people result from a simple fall. The conservative mode of management has its own inherent risks of increased medical complications, morbidity and mortality in elderly age group, and psychological,

Access this article online	
Website: http://www.ijmsph.com	Quick Response Code:
DOI: 10.5455/ijmsph.2015.23042015340	

International Journal of Medical Science and Public Health Online 2015. © 2015 Chirag D Patel. This is an Open Access article distributed under the terms of the Creative Commons Attribution 4.0 International License (<http://creativecommons.org/licenses/by/4.0/>), allowing third parties to copy and redistribute the material in any medium or format and to remix, transform, and build upon the material for any purpose, even commercially, provided the original work is properly cited and states its license.

economic, and social losses in cases of young patients with prolonged confinement in bed. Moreover, there are high chances of malunion with this method. The operative mode of management should be simple and safe, obtain adequate reduction and fracture fixation, hence the stability, and provide early mobilization.

Materials and Methods

This study included 50 patients with proximal femoral fractures from April 2013 to May 2014 at the Department of Orthopedics, Sir Sayajirao General Hospital, Vadodara, Gujarat, India.

The study was ethically approved by the Ethical and Scientific Committee of the Sir Sayajirao General Hospital. All the displaced proximal femoral fractures in the adults were evaluated after getting consent. First, demographic data such as age, sex, occupation, side of trauma, mode of injury, associated injury, and associated medical illness were recorded. All displaced proximal femoral fractures in the adults were classified according to AO classification.

Patients between the age group of 21 and 80 years were included in the study and divided with 10-year interval.

AO Classification (1980)

Muller et al., in 1980–1987, proposed the AO classification that provides prognostic information and attempts to be descriptive about what can be done with present-day fixation techniques.^[2] These fractures are divided into three groups.

A1: Simple (2-fragment) Pertrochanteric Area Fractures

- A1.1 Fractures along the intertrochanteric line
- A1.2 Fractures through the greater trochanter
- A1.3 Fractures below the lesser trochanter

A2: Multifragmentary Pertrochanteric Fractures

- A2.1 With one intermediate fragment (lesser trochanter detachment)
- A2.2 With two intermediate fragments
- A2.3 With more than two intermediate fragments

A3: Intertrochanteric Fractures

- A3.1 Simple and oblique
- A3.2 Simple and transverse
- A3.3 With a medial fragment

Pregnant women, children (age <20 years), and patients with pathological fractures were excluded from the study.

Result

This study included 50 patients with proximal femoral fractures from April 2013 to May 2014 at the Department of Orthopedics, Sir Sayajirao General Hospital, Vadodara.

In our study, patients aged between 21 and 80 years were included, but the majority of the patients (48%) were aged

from 41–60 years, as they were more prone to trauma owing to daily activity [Table 1].

About 78% patients were male subjects, as they were more prone to injury owing to manual labor, driving, and working at heights [Table 2]. On the basis of occupation, the subjects were divided as laborers (78%), housewives (12%), drivers (6%), and teachers (4%) [Table 3].

Left-side involvement was seen in 62% of patients, whereas right-side was involved in 38% of patients. In our study, left side was more affected than the right side. As mentioned in Figure 1, in our study, a fall while walking (50%) was the major mode of injury in patients because of old age and poor balance while walking, followed by vehicular accidents (38%) and falls from height (12%). About 50% patients showed high-energy trauma (motor vehicular accidents and falls from the height) and 50% patients low-energy trauma (falls while walking).

As mentioned in Figure 2, according to the AO classification, the types A-II, A-III, and A-I fracture configurations were observed in 54%, 30%, and 16% of patients, respectively. Associated injury was present in 22% of the patients in total of which 8% patient presented Colles fracture and head injury [Table 4]. Hypertension (12%) was found to be the most common associated medical condition in our study [Table 5].

Table 1: Age distribution of patients

Age (years)	Patients	Percentage
21–30	8	16
31–40	5	10
41–50	10	20
51–60	14	28
61–70	8	16
70–80	5	10
Total	50	100

Table 2: Sex distribution of patients

Sex	Patients	Percentage
Male subjects	39	78
Female subjects	11	22
Total	50	100

Table 3: Occupations of the patients

Occupation	Patients	Percentage
Laborer	39	78
Housewife	6	12
Driver	3	6
Teacher	2	4
Total	50	100

Table 4: Associated injury with proximal femur fractures

Injury	Patients	Percentage
Colles fracture	4	8
Fracture of sup-inf pubic rami	1	2
Fracture of calcaneum	1	2
Head injury	4	8
Fracture of shaft femur	1	2
Total	11	22

Table 5: Diseases associated with the proximal femoral fractures

Associated disorders	Patients	Percentage
Hypertension	6	12
Diabetes mellitus	4	8
Bronchial asthma	1	2
Tuberculosis	1	2
Total	12	24

Table 6: Comparison between the studies of Tyllianakis et al. and our study

	Study of Tyllianakis et al.	Our study
Age distribution (years)	29–93	23–80
Mean age	72	52.5
Sex		
Male subjects	17	39
Female subjects	28	11
Mode of injury (%)		
Low energy	67	50
High energy	33	50
Fracture type		
A-I	–	8
A-II	21	27
A-III	24	15

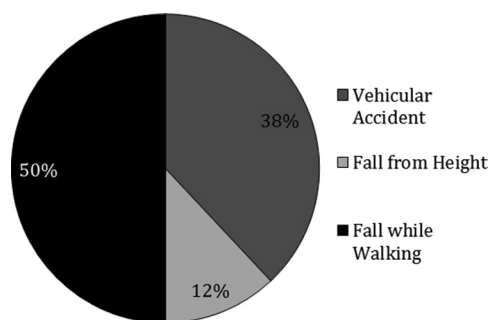


Figure 1: Graphical presentation of the mode of injury.

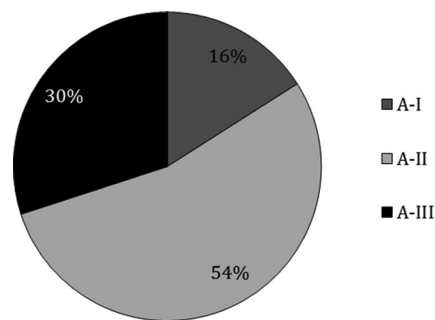


Figure 2: Graphical presentation of the type of fractures according to the AO classification

Discussion

Proximal femoral fractures constitute one of the major indoor admissions. Biomechanically, there is a high stress concentration in trochanteric region and high degree of comminution makes reduction and fixation of such fractures a difficulty, which in turn is responsible for the high incidence of complications in the treatment of these fractures.^[3] The etiology of the trochanteric fractures is the combination of increased bone fragility of the trochanteric area of the femur associated with the decreased muscle tone of the muscles in the area secondary to the aging process.^[4] The combination of increased fragility of the bone and a traumatic event such as motor vehicle accident or a fall may result in either a direct impact or generation of a force transmitted through the leg to the trochanteric area. When such forces are greater than the strength of the bone in the trochanteric area, a fracture occurs.^[5] Proximal femoral fractures are considered an operative challenge because of the age factor,^[6] high stress concentration,^[7] high degree of comminution making reduction and fixation difficult,^[6] increased duration and magnitude of surgery, increased loss of blood, long period of immobilization, and increasing morbidity affecting the patient socially, economically, and psychologically. In these cases, sometimes fracture union is not at all a problem, but the final aim is to restore a stable, anatomical reduction of trochanter to attain the pretrauma biomechanics around hip joint with early active pain-free mobilization of the joints of the involved extremity and the patients returning to their normal environment at the earliest.

Intertrochanteric fractures are those occurring along a line joining the greater and lesser trochanter. Subtrochanteric fractures are those occurring between lesser trochanteric and a 5 cm distally (isthmus). Pertrochanteric fractures are seen as independent entities or as extension of intertrochanteric fractures. Trivial trauma in elderly patients, high-velocity injury in young patients, and pathological disease of bones are considered as mechanisms of injury.

This study was an attempt to evaluate 50 cases of proximal femoral fracture taking into consideration demographical parameters from April 2013 to May 2014. In the series of 45

patients undertaken by Tyllianakis et al., the age distribution was 29–93 years with an average age of 72 years. In our study, the age varied from 21 to 80 years with an average age of 52.5 years. The older age group sustained low-velocity injury, whereas the younger age group sustained high-velocity injury [Table 6].

In the study by Tyllianakis et al.,^[9] there were 17 male and 28 female patients. In our study, there were 39 male and 11 female patients. As men are working outdoor and involved in working at heights, driving, and heavy labor, it makes them more susceptible to vehicular accidents. We got excellent results in both the sexes, and gender was not a major determinant of final outcome [Table 6]. In the study done by Tyllianakis et al.,^[9] majority of patients showed history of falls at home (67%) in the older age group and rest showed high-velocity trauma. In our study, majority of patients revealed falls while walking (50%), usually leading to low-velocity trochanteric fractures. Vehicular accidents occurred in 38% of patients with high-velocity injuries producing subtrochanteric extension in youngsters [Table 6]. According to the study done by Tyllianakis et al.,^[9] 21 patients showed type A-II fracture and 24 patients showed type A-III fracture, according to the AO classification. In our study, 27 patients presented with A-II type, 15 patients with A-III, and 8 patients with A-I type fractures [Table 6].

Conclusion

This study presented an epidemiological study of proximal femoral fractures in 50 cases from April 2013 to May 2014. This injury is common among the middle age group (mean age, 52.5 years), predominantly in male subjects (78%). The most common mechanism of injury was fall while walking (50%). Proximal femoral fractures were common with high-velocity trauma. According to the AO classification, the types A-II, A-III, and A-I fractures were observed in 54%, 30%, and 16% of patients, respectively. The type of proximal femoral fracture and the age of patients significantly affect the outcome.

References

1. Cornwall R, Gilbert MS, Koval KJ, Strauss E, Siu AL. Functional outcomes and mortality vary among different types of hip fractures: a function of patient characteristics. *Clin Orthop Relat Res* 2004;(425):64–71.
2. Endo Y, Aharonoff GB, Zuckerman JD, Egol KA, Koval KJ. Gender differences in patients with hip fracture: a greater risk of morbidity and mortality in men. *J Orthop Trauma* 2005;19(1):29–35.
3. Gautier E, Ganz K, Krügel N, Gill T, Ganz R. Anatomy of the medial femoral circumflex artery and its surgical implications. *J Bone Joint Surg Br* 2000;82(5):679–83.
4. Gdalevich M, Cohen D, Yosef D, Tauber C. Morbidity and mortality after hip fracture: the impact of operative delay. *Arch Orthop Trauma Surg* 2004;124(5):334–40.
5. Haentjens P, Autier P, Boonen S. Clinical risk factors for hip fracture in elderly women: a case-control study. *J Orthop Trauma* 2002;16(6):379–85.
6. Harrison T, Robinson P, Cook A, Parker MJ. Factors affecting the incidence of deep wound infection after hip fracture surgery. *J Bone Joint Surg Br* 2012;94(2):237–40.
7. Southwell-Keely JP, Russo RR, March L, Cumming R, Cameron I, Brnabic AJ. Antibiotic prophylaxis in hip fracture surgery: a meta-analysis. *Clin Orthop Relat Res* 2004;(419):179–84.
8. Su H, Aharonoff GB, Zuckerman JD, Egol KA, Koval KJ. The relation between discharge hemoglobin and outcome after hip fracture. *Am J Orthop* 2004;33(11):576–80.
9. Tyllianakis M, Panagopoulos A, Papadopoulos A, Papisimos S, Mousafiris K. Treatment of extracapsular hip fractures with the proximal femoral nail (PFN): long term results in 45 patients. *Acta Orthop Belg* 2004;70(5):444–54.

How to cite this article: Patel CD, Gamit MN, Jaiswal S, Suthar PP, Dave DJ. Epidemiological study of proximal femoral fractures in tertiary-level institute. *Int J Med Sci Public Health* 2015;4:1666-1669

Source of Support: Nil, **Conflict of Interest:** None declared.