



EPIDEMIOLOGICAL ANALYSIS OF HIP FRACTURES AT A TERTIARY CARE CENTER IN INDIAN POPULATION: A RETROSPECTIVE STUDY

Orthopaedics

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ABSTRACT

Introduction: Hip fractures in elderly have emerged as a leading cause of mortality and significant morbidity resulting in impairment of quality of life. With the increase in life expectancy in elderly Indian population, there has been an exponential rise in hip fractures. The objective of the study was to analyse epidemiological profile of hip fractures at a tertiary care teaching centre. **Material and Methods:** This was a retrospective hospital based study done in patients of hip fractures admitted in Department of orthopaedics at Raja Rajeswari Medical College and Hospital, Bangalore during the period from April 1, 2022 to March 31, 2023. Data regarding age, sex, nature of trauma, comorbidities, type of fracture, and presence of osteoporosis (Singh's index) was obtained from case files and radiographs of patients. **Results:** During the study period, 182 hip fracture patients were admitted, out of which majority (61.54%) were males belonging to the age group of 61-75 years. Also, 80.77% of the cases of hip fractures resulted due to falls. Grading of patients by Singh's criteria revealed that 68.02% patients belonged to Grade III suggesting definite osteoporosis. The various reported fracture types were intertrochanteric fractures (57.7%), femoral neck fractures (29.67%) and sub trochanteric fractures (12.63%). Smoking and associated comorbidities were also observed in significant number of cases. **Conclusion:** As the incidence of hip fractures is increasing at an alarming pace, it is emerging as a serious healthcare problem. Following proper measures for prevention and treatment osteoporosis and prevention of falls in elderly can effectively reduce prevalence of hip fractures

KEYWORDS

Hip fractures, Epidemiology, Osteoporosis

INTRODUCTION

Hip fractures have been identified as a serious health care concern responsible for increased dependency, morbidity and mortality in the geriatric population. The global incidence of hip fractures was found to be 1.3 million per year in 1990 and was estimated to reach 7 to 21 million by 2050. Highest prevalence has been reported in Northern Europe and USA, Asian countries being intermediate whereas Africa and Latin America account for the lowest. The reason behind this is mainly genetic, ethnic and environmental factors. In Indian population above 50 years of age, the incidence is estimated as 120 fractures per 100,000 persons. Moreover, in coming years, the incidence of hip fractures in India is predicted to rise with the increase in number of elderly population. The economic burden of hip fractures is also enormous. It is not only limited to cost of functional disability and increased death rate but also loss of independent functioning, cost of nursing care, rehabilitation care, reduced quality of life and requirement of surgeries.

The aetiology of hip fracture has multifactorial origin and includes various risk factors such as aging, gender, osteoporosis, physical activity, associated comorbidities, cigarette smoking, chronic alcoholism, vision problems, climatic variations, generalised weakness, disability or unsteady gait and cognitive impairment. Women are more prone to hip fractures than men and it affects them mainly above the age of 80.8 Most of the hip fractures in elderly are caused by fall. On the other hand, hip fractures in young population are often secondary to high energy trauma such as a substantial height or a road traffic accident (RTA). Several Indian studies have reported significant vitamin D deficiency among patients of hip fracture.

India is a large country with an average population of more than 1.3 billion, but epidemiology of hip fractures among Indian population has not been studied extensively till date. Therefore, for finding the current burden of hip fractures and its association with risk factors, this study was undertaken at a tertiary care teaching hospital in Bangalore.

MATERIAL AND METHODS

This retrospective hospital based study was performed in the Department of Orthopaedics, RajaRajeswari Medical College and Hospital, Bangalore, Karnataka. Approval of Institutional ethics committee was obtained prior to initiation of study. Informed consent was not obtained from patients because of the retrospective nature of study that involved collection of data from hospital records. The study sample comprised of all patients of hip fractures reporting to the orthopaedic department during 1 year from April 1, 2022 to March 31, 2023. Patients of either sex with fractures of femoral neck,

intertrochanteric or sub trochanteric area were included in the study. Central registration (CR) numbers of patients admitted with hip fractures during the above mentioned period were procured from the Medical Records Department (MRD). The CR numbers enabled us to retrieve patient case files along with the radiographs from MRD. Files with incomplete data were excluded. Case files of included patients were studied and relevant data pertaining to age, gender, mechanism and duration of trauma, associated comorbidities, interval between admission and surgery, history of prior hip fracture was recorded. Patients were also screened for history of smoking, tobacco or alcohol use. Further, assessment of Radiographs of each patient revealed type of fracture, presence of osteoporosis (Singh's index) and type of implant used. The recorded data was also cross verified with ward admission log books and operation theatre registers for authenticity. The data was compiled using Microsoft Excel and statistics were done using Statistical Package of Social Science (SPSS) version 29.

RESULTS

During the study period, about 6318 patients were admitted in the Department of orthopaedics at RajaRajeswari Medical College and Hospital, Bangalore. Out of these, 182 hip fracture patients were included in our study. The demographic details and clinical characteristics of included patients are described in Table 1. Majority of the patients were males (61.54%) that belonged to the age group of 61-75 years (45.6%). Patients below 20 years of age were the lowest (1.65%). History of prior hip fracture in the same or opposite limb was observed in only 17% patients. Table 1 also shows that most of the fractures resulted from fall accounting for 80.77%. The frequently reported pre-existing comorbidities were hypertension (58.8%), diabetes (52.74) and diminished vision (29.67%). Larger part of the study population (61.45%) had 2 or more comorbidities. Out of 182 patients, tobacco chewing or smoking including cigarette, hukka was reported in 53.8% patients which were mainly men. Also, 33.5% patients were regular alcohol drinkers.

As indicated in Table 2, the most common fracture type was intertrochanteric fractures were (57.7%) followed by femoral neck fractures (29.67%). Only 3.29% patients reported associated distal end radius fractures whereas 1.65 % patients suffered other long bone fractures of tibia-fibula, humerus and midshaft femur. However, other associated injuries like those of head, chest, abdomen, soft tissue and whole body bruises were observed in 20.32% patients. All the fractures were managed in accordance of standard treatment protocols. Greater than half of the patients (53.85%) were managed with proximal femoral nail. On the other hand, 29.67 % patients underwent bipolar hemiarthroplasty followed by usage of intramedullary interlocking

nailing in 12.64% patients. The surgery was done within in 2-3 days for most of the patients (73.63%).

As shown in Table 2, grading of osteoporosis was done for patients above 40 years of age on the basis of Singh's criteria. The grading revealed that in 68.02% patients, fractures were of Grade III pattern indicating definite osteoporosis.

Table 1: Demographic Details And Clinical Characteristics Of Patients With Hip Fractures

Characteristic		Number of patients (n=182) N (%)
Gender	Male	112 (61.54)
	Female	70 (38.46)
Age (in years)	< 20	3 (1.65)
	21- 40	7 (3.85)
	41-60	48 (26.4)
	61-75	83 (45.6)
	> 75	41 (22.5)
Associated comorbidities	None	19 (10.44)
	Hypertension	107 (58.8)
	Diabetes Mellitus	96 (52.74)
	Obesity	23 (12.64)
	Cardiac disorders	34 (18.68)
	Neurological diseases	6 (3.29)
	Diminished vision	54 (29.67)
Tobacco chewing or smoking		98 (53.8)
Alcohol consumption		61 (33.5)
Type of trauma	Fall	147 (80.77)
	Road Traffic Accidents (RTA)	35 (19.23)
History of prior hip fracture		17 (9.34)

Table 2: Presentation And Management Of Hip Fractures

Characteristic		Number of patients (n=182) N (%)
Type of fracture	Neck of femur fracture	54 (29.67)
	Intertrochanteric fracture	105 (57.7)
	Sub trochanteric fracture	23 (12.63)
Associated fractures	Distal end radius	6 (3.29)
	Spine fractures	0
	Other long bone fractures	3 (1.65)
	Other injuries	37 (20.32)
Type of implant used	Bipolar Hemiarthroplasty implant	54 (29.67)
	Proximal Femoral nail	98 (53.85)
	Intramedullary Interlocking nail	23 (12.64)
	Dynamic Hip screw	3 (1.65)
	Proximal Femoral nail + Trochanter stabilisation plate	4 (2.19)
Time interval between admission and surgery	≤ 1 day	4 (2.2)
	2-3 days	134 (73.63)
	4-5 days	44 (24.17)

Table 3: Grading Of Osteoporosis In Patients >40 Years Of Age

Characteristic		Number of patients (n= 172) N (%)
Osteoporosis (Singh's index)	Grade I	0
	Grade II	3 (1.74)
	Grade III	117 (68.02)
	Grade IV	28 (16.28)
	Grade V	7 (4.07)
	Grade VI	17 (9.9)

DISCUSSION

Hip fracture is an important socio-economic problem affecting elderly population across the globe. It not only results in increased health expenditure but also hampers quality of life significantly. As per 2011 census, Indian population above 50 years of age is nearly 170 million and this is suggestive of 0.2 million hip fractures per year. Various modifiable risk factors have been identified for hip fractures such as deficiency of vitamin D and calcium, low body mass index (BMD), osteoporosis, reduced physical activity and substance use. Age and female sex are non-modifiable risk factors significantly associated with hip fractures. With the advancing age, health of bones, muscles

and joints as well as BMD declines progressively. As a result, prevalence of hip fractures increases with age. The present study observed higher incidence of hip fractures in the age group of 61-75 years. Similarly in a retrospective study by Ahuja K et al, Indian population of age group of 60-69 years was found to be majorly affected by hip fractures. In contrast, a study conducted by Amarilla-Donoso FJ et al in Spanish people, the mean age was reported as 84.6 years (SD±6.1 years). Several epidemiological studies conducted in the past have reported higher incidence of hip fractures among older women which may be attributed to their faster muscle wasting mainly after menopause, sedentary lifestyle, inadequate nutrition and low BMD as compared to men.^{3,11,13} However, in our study, hip fractures were more prevalent in males. Similar findings were reported in a study by Bishnoi M et al.²

Elder people are highly prone to falls and fall related injuries. Over 90% of hip fractures in them are due to falls. In our study, majority of the hip fractures were due to falls and our findings are consistent with a study conducted by George J et al at a tertiary level trauma centre.¹¹ Numerous factors have been recognised resulting in falls in older people such as poor balance, visual problems, muscle loss, neurological conditions, polypharmacy, etc. Incidence of hip fractures are generally greater in patients with pre-existing medical issues or comorbidities. Apart from being a risk factor for higher mortality, they not only impact treatment but also cause several post-operative complications. In our study, considerably higher prevalence of comorbidities including hypertension, diabetes and diminished vision was observed which is in line with findings of other studies.²

Smoking and chronic alcohol consumption can interfere with bone remodelling leading to reduction in BMD, thus increasing susceptibility to fractures. In some previous studies, smoking and heavy alcohol consumption have been found to be associated with increased incidence of hip fractures. In present study, nearly half of the patients were active smokers or tobacco chewers which makes them susceptible to hip fractures. But the incidence of alcohol consumption was only 33.5%.

The study conducted by Ahuja K et al suggested that simple measures like bedside and wall side railings, trochanteric hip pads, high fraction tiles in rooms and bathrooms and adequate indoor lightening should be promoted to minimise incidence of hip fractures among elderly.¹²

Standard treatment guidelines for managing elder population with hip fractures include expedited admission to a treatment centre, surgery within 48 hours, early post-operative mobilization, pharmacotherapy for osteoporosis and education about fall prevention. In our study, majority of the patients (73.63%) were operated between 48-72 hours. The reasons for delay in surgery may be due to pre-existing comorbidities or requirement for intensive care unit for patient optimisation. In contrast, in a study conducted by Rath S et al in three public tertiary care hospitals in Delhi, only 30% of hip fracture patients underwent surgical management within 48 hours.

In the present study, grading of osteoporosis was done by employing hip radiographs using Singh's index. Dual-energy x-ray absorptiometry (DEXA) scan was not employed because of the retrospective nature of the study. Most of the cases were identified as Grade III which indicates lower BMD and definitive osteoporosis. Similar findings were reported in studies by Bishnoi M et al² and Unay K et al. This shows that incidence of hip fractures in geriatric population can be considerably decreased by proper precautions and treatment of osteoporosis.

Our study has various limitations. The major limitation is the retrospective nature of the study. A prospective study would have been more adequate in prediction of incidence of hip fractures. From the records, we could only collect data from the patients admitted in our centre. As such, it does not describe incidence rates since it is unlikely that all the patients with hip fractures visited our tertiary care hospital only during the study period. Moreover, the study sample was relatively small and the results cannot be generalised to whole Indian population. Hence, more studies should be carried from different parts of the country.

CONCLUSION

There is an alarming increase in incidence of hip fractures in geriatric population in India. As a result, it is sooner or later likely to become socio-economic burden for the country. Various risk factors such as

under nutrition, deficiency of calcium and vitamin D, low physical activity, smoking, alcohol consumption and lack of acceptance to hormone replacement therapy, etc. have been recognised among Indians. Emphasising education of society regarding prevention of osteoporosis along with measures to prevent falls in elderly will not only ensure incidence of hip fractures but also reduce economic burden due to cost of their treatment. Moreover, efficient postoperative rehabilitation programs should be followed for hip fracture patients to improve post-operative results and quality of life of patients.

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