

Epidemiology of Fracture of Hip (Proximal Femoral Fractures) In Rural Population in Gurgaon in Northern India

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Abstract: Fractures of hip pose significant liability on health care service providers due to being one of the foremost reasons of illness and death in the senior residents. This study aims to report the epidemiology of fractures of hip at a rural teaching institute situated in Gurgaon in Northern India. A retroactive study was performed on patients admitted with fractures of hip (proximal femoral fractures) during the period 2015-2017 in the Department of Orthopedics, Faculty of Medicine and Health Sciences, Budhera, Gurgaon, a district of Northern India. Case records including x-rays of patients were studied for age, sex, mode of injury, additional diseases, fracture type and existence of osteoporosis. There were total 844 admissions of patients with fractures of hip during the 2015-2017 periods. Males were 389 while 455 were females. Forty six percent patients belonged to the 60-75 years age group, while the average age was 58.1 years. Trivial injuries such as sheer fall in aged patients, were accountable for >80% of fractures with existence of substantial osteoporosis (Singh's index grade 3). There was overall 1.3% death rate in the hospital. Inter-trochanteric fractures were most common (55.4%) followed by femoral neck (33.8%) and sub trochanteric (10.8%). A substantial number of patients were having various concomitant medical diseases and were regular smokers. Fractures of hip are posing an alarming health related problem due to improved long life. The prevalence of these fractures will drop following various precautionary actions if taken for osteoporosis and sheer falls.

Keywords: Epidemiology, Hip Fractures, Proximal femur, Osteoporosis.

INTRODUCTION

Elderly persons, usually having concomitant osteoporosis constitute foremost health related problems because of fragile fractures occurring commonly at the hip joint (proximal femoral fractures), vertebra and distal end radius caused by sheer fall injuries. Fractures of hip adds together to ill health and even death in the aged persons[1]. With improved life expectancy and suburbanization, the number of hip fractures is anticipated to surge as per epidemiological reports[2]. Prevalence of fractures of hip is projected to double to 2.6 million by 2025 and to 6.25 million by 2050. The Asian countries would count for over half of fractures of hip by the end of 2050[3]. There is a global terrestrial difference in the occurrence of fractures of hip[4, 5] The utmost fracture of hip rates are reported in Northern Europe and the USA and least in Latin

America and Africa. Asian nations such as Kuwait, Iran, China and Hong Kong show intermediary rates of fracture of hip[6-8]. Variance in latitude, hereditary or cultural factors along with ecological factors, could be the cause of this difference[9]. Even though improvements under taken in preventing and treating these injuries, fractures of hip pose grave difficulties for both the policy making personnel for health and health establishments. Fractures of hip will show enhanced rates with improved life expectancy posing to amplified illness, reduced living status, prospective menace of more falling injury and consequent fractures[10]. Because of huge financial expenditures associated for treating these fractures comprising the costs on surgery, nursing care, rehabilitation and debility management, numerous measures for prevention of fractures of hip, have been evolved[11].

Fractures of hip in aged persons are largely happening due to fragile bones because of associated osteoporosis coupled to sheer fall injuries, while in younger persons, fractures generally take place because of high velocity injuries for example road traffic mishaps and falling injuries from height. Innumerable reported causes liable for fractures of hip comprise higher age group, women, certain civilizations, smokers, liquor consumption habit, osteoporosis, long term use of steroids, less exposure to sun light and some leisure undertakings[12, 13]. Even though India achieving the second leading emergent economy and second biggest inhabited nation globally, only a small number of publications are available related to osteoporosis. According to rough assessments around 25 million individuals were having osteoporosis in India in 2001[14]. Vitamin D insufficiency, a causative element to osteoporosis, is extensively also prevailing in the wide-ranging inhabitants of India and 80% of patients in India having fracture of hip are lacking in vitamin D[15]. Only a small number of reports have been published analyzing epidemiologically the fractures of hip even when India is the second biggest populated nation globally[16-18].

Our study aimed to report the epidemiology of fractures of hip in Gurgaon, a district of Haryana, situated in Northern India.

METHODS

This retroactive reviewing study was undertaken in the Department of Orthopedics, Faculty of Medicine and Health Sciences, Budhera, Gurgaon, Haryana. Out of 21 districts in Haryana, Gurgaon is the fourth most populous district with an area of 1258 km² and a population of 15,14,432 (2011 census)[19]. Ours hospital, located in countryside area, is the lone ultimate care skill center accessible for the rural individuals of Gurgaon district. As this is the only foremost orthopedic hospital in countryside Gurgaon, it is likely that patient having fracture of hip come to this hospital for management. But there is still a likelihood that patients having fractures of hip never reached here for their suffering at all or were managed at certain other hospital with orthopedic treatment facility. The department of Orthopedics at Faculty of Medicine and Health Sciences is a committed postgraduate department having 72 beds indoor capacity. Faculty of Medicine and Health Sciences is equipped with a computerized Medical Records Department section (MRD). This retroactive reviewing study was done on patients with fractures of hip who got admission in the Orthopedics department of Faculty of Medicine and Health Sciences, Budhera, Gurgaon from January 2015 to December 2017. Ethical clearance was taken from the College Research Committee. Fractures of femoral neck, inter-trochanteric and sub trochanteric area were included in the study. The central registering (CR) records of the patients hospitalized during the period 2015-2017 having above mentioned fracture diagnostic

features were acquired from the central record keeping section. Then with the help of CR statistics, case records along with x-rays of all patients were recovered from the department. Cross checking of hospital admission records of that duration was also performed to avoid missing of any patient. Different constraints comprising age, gender, residential location, time interval since injury, injury causative factor, additional diseases, time period before surgery after hospitalization, surgery records etc. were studied in the case record files. Grade of osteoporosis was documented after studying x-rays using Singh's index[20]. SPSS software was used to do statistical scrutiny of the facts. As our chief aim was to report epidemiology of fracture of hip at an institute of ultimate level repute, patients of all ages and also including fractures occurring because of some concomitant pathology, were included in our study.

RESULTS

About 5,111 patients were admitted in the Department of Orthopedics during the period 2015-2017, at Faculty of Medicine and Health Sciences, Budhera, Gurgaon. Among these admissions, 844 patients were having hip fractures and they satisfied our inclusion criteria. They included 389 males (46.1%) and 455 females (53.9%) (Table1). The patients' mean age was 58.1 years with a range of 5-92 years. Majority of patients with fractures of hip were between 60-75 years (n=388, 46.0%) and lowest number were seen in patients aged <20 years (n=55, 6.5%) (Table2). In persons aged >60 years, the leading cause of injury was not high velocity injuries such as road side accidents and fall from height but actually the low energy injury such as fall from standing position (in >85% of patients). High velocity injuries for example road traffic accidents and fall from height were accountable for only 10% of fractures of this age group.

While in persons <60 years, high velocity injuries such as road traffic accidents or fall from height constituted the foremost cause of fracture in most (>90%). Many of the elderly patients >65 years old, visited local quacks initially for treatment in our study while mostly reported to hospital at an average of 10 days after injury. From admission to surgery in operated cases, the mean interval was 6.3 days (4.1 days in patients <60 years old and 13.2 days in patients >60 years old. In patients <60 years old, there were two deaths, while 9 deaths were among >60 years old. So the overall death rate during hospital stay was 1.3% (n=11). According to type of fracture of hip, inter-trochanteric fractures were highest in number (n=468, 55.4%), followed by neck fractures (n=285, 33.8%) and sub trochanteric fractures (n=91, 10.8%) (Table3). Most patients were <60 years old (n=67, 73.6%) in the sub trochanteric fracture group, and were caused by high velocity injury. Pathological fractures (osteoporosis excluded) were nearly 2.3% (n=19). These were having mostly lytic lesions in proximal femur due to either

primary or secondary malignancies. In 6% of patients >60 years old, there was history of prior hip fracture in the same or opposite limb. Smoking in the form of cigarettes, bidis, hukka and chewing tobacco was observed in 82% of male and 48% of female patients. There was history of regular alcohol consumption in 45% of patients. Table 4 and 5 illustrate various types of fractures and diseases which were detected in addition to fractures of hip. Various neurological diseases including Parkinsonism, previous stroke attack, dementia, age related reduced vision etc. played leading

role as causative factors for the sheer fall and consequent fracture in patients aged >60 years (48.1%). Singh's criteria was used to grade the type of osteoporosis in >50 years old patients. Grade 3 type osteoporosis, indicating as definitive osteoporosis was found to be the maximum shared form in femoral neck and inter trochanteric region fractures. Sub trochanteric fractures usually had grade 5 type osteoporosis. These injuries were managed according to normal customary procedures centered on patient's age, fracture category and fracture site.

Table-1: Distribution of patients as per Sex

Sex	Number of patients (%)
Males	389 (46.1)
Females	455 (53.9)

Table-2: Distribution of patients as per Age group

Age (years)	Number of patients (%)
<20	55 (6.5)
20-40	213 (25.2)
40-60	120 (14.2)
60-75	388 (46.0)
>75	68 (8.1)

Table-3: Distribution as per type of Hip fracture

Fracture anatomy	Number of patients (%)
Inter-trochanteric	468 (55.4)
Neck of femur	285 (33.8)
Sub trochanteric	91 (10.8)

Table-4: Concomitant injuries

Fracture location	Number of patients (%)
Fractures of distal end radius	53 (6.3)
Fractures of Spine	31 (3.7)
Fractures of Long bone	16 (1.9)
Other injuries	55 (6.5)

Table-5: Concomitant diseases

Disease	Number of patients (%)
Heart diseases including previous attack of Myocardial Infarction, Hypertension, Heart failure etc.	245 (29.0)
Diabetes	221 (26.2)
Neurological diseases including Dementia, Old stroke, Parkinsonism etc.	212 (25.1)
Age related Reduced vision	194 (23)
Hypothyroidism	12.1

DISCUSSION

Osteoporosis induced fractures of hip are accountable for a foremost cause of disability and illness in the elderly people resulting increased health spending and disability adjusted life years. Since India is witnessing increasing life expectancy which has gone from 67.4 to 72.6 years, this will result increased number of hip fractures in coming years, putting a enormous liability on India's health resources. Among

young individuals, the hip fractures are infrequent. They constitute only 2% in patients below 50 years of age [21]. This occurrence rate rises with age, and above 50 years is 2 fold increases for each succeeding decade, and is 2-3 times greater in females than in males [22, 23]. The bone mineral density starts falling with increasing age particularly in postmenopausal women due to loss of protective effect of Estrogen on bone mineralization [24]. Eighty percent of hip fractures

occur in women and 90% in people older than 50 years [25]. Patients aged 85 years old and more are 10 to 15 times more expected to have a fracture of hip than are patients 60 years old, with female patients accounting for 80% of hip fractures [26]. In our study fractures of hip were more commonly seen in females (53.9%) than in males. This could be explained by more common osteoporosis in females than in males. While Bishnoi in a recent study, reported males preponderance of fractures of hip which may be due to common osteoporosis problem in males also in Indian population because of lack of awareness about bone health, nutritional factors, smoking, low physical inactivity [18]. Wong from Singapore reviewed hip fracture prevalence among different races and found average age in Indians to be 58 years as compared to 63 years in Chinese people [27]. Similarly Nordin reported earlier onset of osteoporosis in Indian men in a study, who found maximum prevalence in age groups 30-39 years (25%) and 50-70- years (25%) as compared to Finnish men in which 56% of hip fractures happened in 70-90 years group [28]. Our results (25.2%) of hip fracture prevalence in age group of 40-60 years were comparable to Bishnoi who demonstrated 24.84% prevalence of hip fracture in age group of 40-60 years, probably due to low peak bone mass formed during adolescence as a result of low vitamin D and dietary calcium intake [18].

Various studies have reported on the different factors leading to falls and subsequent fractures in the elderly [29]. Simple low energy falls constitute for 95% of fractures of hip [30]. Most fracture of hip is caused by stumbling and tripping indoors at a level ground. Widely held fractures in elderly in the present study, were also caused by falls from standing height with direct impact on hip. Neurological impairment, weakened vision, poor balance, multiple drug therapy are a number of factors in elderly people which are usually responsible to falls. High prevalence of additional diseases including diabetes, high blood pressure, neurological impairment and weakened vision, significantly contributed to the falls and fractures in aged persons in our study. Early surgical intervention was prevented by these risk factors thereby leading to the increased sickness and death in fractures of hip. Rehabilitating physiotherapy by doing early mobilization after surgery in hip fractures, play a significant role in returning to pre-morbid functions.

Ahuja *et al.* in a reviewing study of risk factors and epidemiological profile of hip fractures in 41 patients concluded that simple measures like high friction bathroom tiles, bedside and wall side railings, trochanteric hip pads, adequate lighting play a significant role in reducing hip fractures [31]. Dhanwal *et al.* described the first fracture of hip prevalence study from Rohtak district of India and found it to be same as

of other Asian countries like china, Iran and South Korea [16]. Incidence rates in our study were not reported as it is very likely that all patients with hip fractures will not visit our hospital for the treatment.

Osteoporosis in our study was categorized according to Singh's grading index on hip x-rays [20]. Being retroactive analysis of epidemiological factors, DEXA scanning was not considered as impartial check for measuring osteoporosis. Most of the fractures of hip (about 74%) in elderly were having Singh's grade 3 pattern of trabecular pattern in proximal femur indicating significant osteoporosis [20]. It implies that the most of the hip fractures can be prevented by taking proper precautions and treatment for osteoporosis. Regular intake of Calcium and Vitamin D supplements, doing regular weight bearing and strengthening exercises, having regular eye checkups and taking proper treatment on weakening of vision in the older adults should be stimulated.

CONCLUSION

The increasingly aging Indian population will have to cope up and face the challenge of growing number of femoral neck fractures causing huge burden of costs on healthcare services for treating these fractures. Fractures of hip in inference as a whole, pose a grave situation in the elderly population responsible for a high mortality and morbidity rate following fractures of hip in the elderly. Osteoporosis is the leading cause of these injuries. So by advocating and propagating different measures to prevent the development of osteoporosis, the occurrence of these fractures and thus cost of burden of treatment of these injuries on health service providers, can be reduced at least to some extent.

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