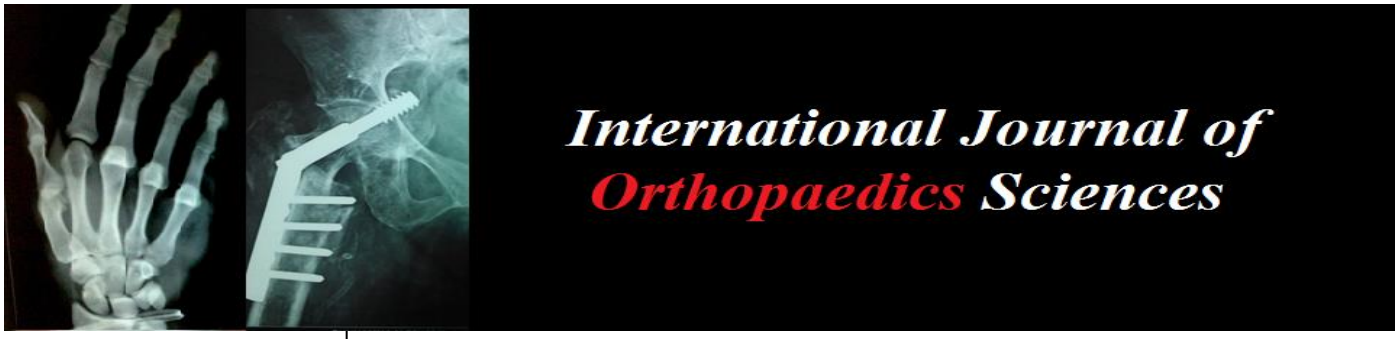

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Analysis of etiological factors and preventive measures of second hip fractures in Chittoor district Andhra Pradesh: Retrospective study

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Abstract
Background: Fractures around hip are important public health problems affecting the osteoporotic older individuals all over the world. The industrialization & urbanization with increased life expectancy are leading to lack of attention towards elder population living in developing countries. A second hip fracture can occur in elderly patients who already suffered initial hip fracture.
Aims and Objectives: The purpose of this analysis is to study the etiological factors for 1st and 2nd hip fractures and the preventive measures to be advocated.
Methods-Source for this study: From 2018 to 2023, during this five years period we verified our hospital medical records and patients with hip fractures are studied. We found that total 665 hip fractures are admitted in our teaching hospital which is catering Orthopaedic treatment facilities for 8 lacks population in our area. Among these, second hip fractures are 105 cases-15.7%. The females are 80 and Males are 25. The average age of first hip fractures is 55-65 yrs and second hip fractures is 60-80 years. We studied the proper case history to note the various etiological factors for first and second hip fractures.
Results: The average time of interval from 1st hip fractures to 2nd hip fractures is 36 months. The etiological factors observed are, old age with Osteoporosis, Neurological diseases causing frequent falls, Alziemers disease with senile dementia, Parkinsons' disease and visual problems with reduced depth perception.
Conclusion: The chances of second hip fractures are substantial due to old age, diminished functional status, inadequate rehabilitation and family support after the first hip fractures. The surgical methods like replacement arthroplasty done for first hip fracture will allow the patients early mobilization. The internal fixations like DHS, Cannulated screws and proximal femoral nailing are associated with prolonged non-weight bearing and recovery phase. These patients are ending up in secondary osteoarthritis and resultant pain further affects the quality of life and functional capabilities. These findings were demonstrated in our series of cases that most of our total patients, 15.7% have one or other form of internal fixation for the first hip fractures.
Advice: Early mobilization, weight bearing and osteoporotic therapy must be initiated to all the patients admitted with first hip fractures and continued throughout life to prevent second hip fracture.

Keywords: Osteoporosis, second hip fractures, preventive measures

Introduction
Hip fractures have been recognized as most serious consequence of elderly patients with osteoporosis. The complications are chronic pain, disability, diminished quality of life and premature death.
The osteoporotic hip fractures are growing problem in Asian countries like India due to increased life expectancy. Published studies [12, 19, 20] over the last few decades have demonstrated that by 2030 more than 50% of all osteoporotic fractures will occur in Asian countries because three quarters of world's population lives in Asia. India is the largest populous country in the world; about 80% 0f hip fractures are due to osteoporosis, malnutrition, sedentary life and Vitamin-D deficiency. The genetic and environmental factors also play a role in etiology of hip fractures.

A second hip fracture reportedly occurs in 2-10% of elderly patients who have already suffered an initial hip fracture [14, 18, 21, 22, 23]. The risk factors for first hip fractures have been well established in previous studies [17, 18]. Many authors have attempted to define the possible risk factors for second hip fractures and found osteoporosis and co-morbidities suggested to be primary factors. In addition, compared with the first hip fractures second hip fractures are associated with high rates of post operative complications and socioeconomic burden [24, 25]. Therefore a better understanding of the possible risk factors for second hip fractures is important for preventing such cases in the elderly [19].

The risk factors associated with initial hip fractures in post-menopausal women are fall, Dementia with advanced age, loss of weight or height, maternal history of hip fractures after 50 yrs of age, Use of benzodiazepines and poor visual acuity. In males smoking, alcohol abuse, steroid intake, low sunlight exposure and deficient recreational activities are possible risk factors. However the risk factors for second hip fracture may differ from these, because these persons must be able to survive the stress of an initial hip fracture to be at risk for a second hip fracture. These are Dementia, Parkinsons' disease, H/o falls, osteomalacia and institutionalization are associated with increased risk of second hip fractures in men and women [8, 11, 13, 15]. Calcium intake in the form of millets is traditional and important protective factor in delaying the development of severe degree of osteoporosis in South India. Estrogen use, regular walking and normal visual acuity are protective of second hip fracture.

Materials and Methods

Our study analysis include patients attended our out-patient orthopaedic department from 2018 to 2023. We verified all the records of the patients during these 5 years. The total number of hip fractures admitted are 665 persons of 18,73,000 population in chittoor district Andhra Pradesh India. Among these the second hip fractures are 105 persons-15.7%. The various etiological factors and risk factors, problems faced by patients during first hip post treatment period are recorded.

The exclusion criteria are pathological fractures, high energy fractures, concomitant bilateral hip fractures and fractures secondary to malignancy and metabolic bone disease. The age, sex and type of fracture, Singh's index [27, 31], duration from first hip fracture to surgery, length of hospitalization are recorded. The presence of co morbidities includes malignancy, renal failure, neurological, cardiac, pulmonary and endocrinological conditions are examined. The assessment of BMD-Bone Mineral Density is gold standard method to assess the grading of osteoporosis. We did not measure the BMD for our patients due to non-availability of the machine locally.

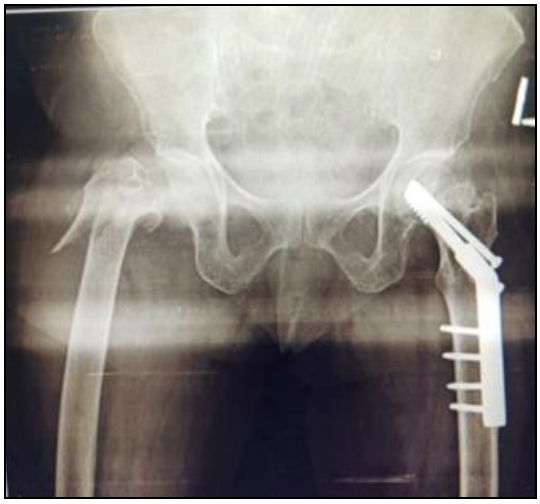

Fig 1: A female 76 years Right IT fracture with left DHS fixation done 5 years ago

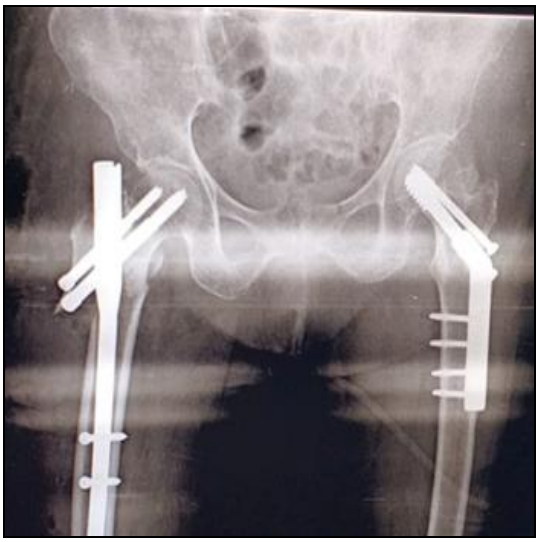

Fig 1a: Right PFN fixation done for patient (2)

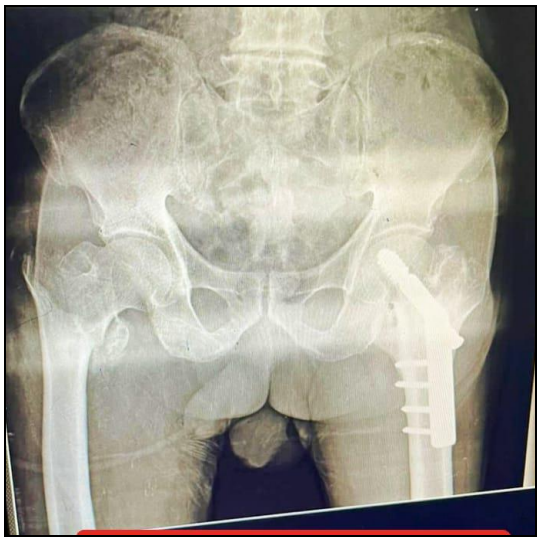

Fig 2: A male of 68 years of right IT fracture with left DHS fixation done 8 years ago

Fig 2a: Right PFN fixation done for patient (3)

Fig 3a: Right PFN fixation done for patient (4)

Fig 3: A male patient 68 years Right IT fracture with left DHS fixation done 3 years ago

Fig 4: A male patient 77 years left IT fracture with right hemiarthroplasty done 4 years ago

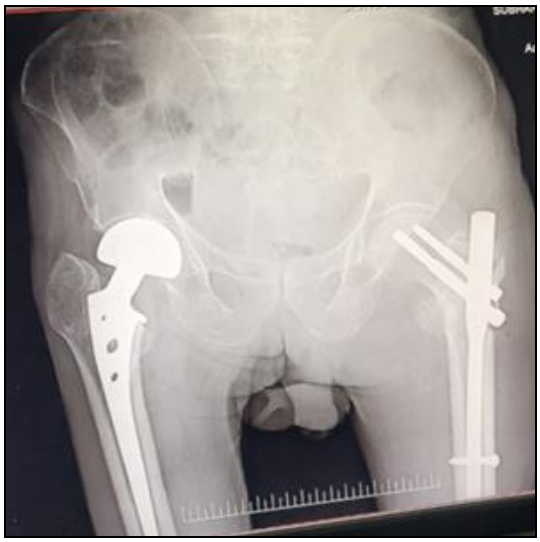

Fig 4a: Left PFN fixation done for patient (1)

Baseline Patient characteristics for the Study of recurrent HIP fractures

Table 1: Socio-demographic Chart

Sex	Women	Men
Age-years	50-60: 20% 60-70: 30% >70: 50%	50-60:10% 60-70:30% >70:60%
Co-morbidities	Diabetes: 55%, Hypertension:44% Dementia:12%	Diabetes: 50%, hypertension:58% Dementia:8%
H/O, Maternal Fracture	H/O any Fracture after the age of 50 yrs	H/O any Fracture after the age of 50 yrs
Medications Use	Anti-Diabetic:48% Anti-Hypertensive:35% NSAIDS:30% Anxiolytics:18%	Anti-Diabetic: 36% Anti-Hypertensive: 40% NSAIDS: 38% Anxiolytics: 5%
Personal habits	Tobacco chewing:40%	Alcohol: 40%, smoking: 30% tobacco chewing: 28%
Functional activities: Rosow- Breslui Scale and Katz scale	Highly functional: 60% Moderately Functional: 30% Low Functional: 10%	Highly functional: 50% Moderately Functional: 30% Low Functional: 20%

Results

During our 5 yrs retrospective study, total 665 hip fractures were admitted. Second hip fractures are 105 i.e., 15.7%. Males were 25, Females were 80. The average age of persons of first hip fractures was 55-65 yrs, and average age of persons with second hip fracture 60-80 yrs. The average mean time of duration from injury to time of surgery is 6 days. The duration of hospitalization is from 15-28 days, Mean: 21 days. The etiological factors are evaluated in these patients. 4 patients died during admission for second hip fracture treatment due to existing co-morbidities. Older age was associated with an increased risk of second hip fractures after adjusting for sex, Low BMI, and high functional status were also associated with increased risk of second hip fractures in the age and sex adjust analysis. For every 5 yrs of advancing age at the time of first hip fractures the hazard ratio for second hip fractures was 1.5%. High functioning persons have more than twice the risk for second hip fractures compared with moderate functioning persons. The sex, falls, stroke, BMI, dementia, 4year weight change and old-age home residence were not associated with the risk of second hip fracture in the age and sex associated models.

We observed that a substantial number of persons who fractures their hip experienced a second hip fracture on the opposite side within 5 yrs. Many of the second hip fractures occurred more than 1 yr following an initial hip fracture as per previous studies [8, 9, 11, 12, 14, 15]. Our study found that only about 2.5% of persons with first hip fractures went on to develop second hip fractures within 1 year. The mortality rate after second hip fracture or first hip fracture have been assessed during our study and found to be as 10.5% (11). When these patients were admitted in the hospital and died during evaluation and preparing for surgery of second hip fractures is recorded.

Discussion

Our goal is to identify clinical characteristics at the time of initial hip fractures that might be helpful in predicting a second hip fracture. The functional status was measured by observing the modified KATZ [5] activities of daily living like ability to eat, dress, bathe, and transfer independently. The other things were 3 items-ROSOW-BRASLAU SCALE [10], ability to perform heavy house hold works, climbing stairs, walk for one-half to one kilometer independently. All the patients are assessed whether living a high functional status, moderate functional status, low functional status. We observed an increase in incidence of fall related fractures in very high and very low functioning persons and a low incidence of fractures in moderate functional status.

The incidence increases with poor socio-economic status, reduced winter lighting and water fluorination. High physical activity fractures occur most commonly in winter season due to altered neuromuscular co-ordination and vitamin-D deficiency. With changing demographic profile of Indian population, we are going to witness a sharp rise in hip fractures over the three decades. Therefore there is an urgent need for epidemiological studies from India to allow administrators to plan the policies for prevention of hip fractures in elderly population. Inclusion of independent predictors with or without hip BMD can predict men and women most likely to suffer hip fractures and these results confirm the validity of fracture prediction for up to a decade. There is an inadequate time between first and second hip fracture for clinicians to intervene in an effort to reduce the incidence of second hip fractures.

Conclusion

Treatment with vitamin-D is recommended for all the persons with hip fractures in an effort to improve the bone mineral density and to reduce the risk of fractures during falls. Clinicians should give special attention to age and functional status at the time of first hip fractures, when determining whether additional therapies are appropriate in an effort to reduce second hip fracture.

The introduction of prophylactic anti-Osteoporosis drugs, efforts for early mobilization, better identification of persons at high risk for cardiac complications and improved selection of patients with femoral neck fractures to receive Arthroplasty instead of internal fixation devices have lead to substantial increase in post-operative good outcomes [29, 30].

Conflict of Interest

Not available

Financial Support

Not available

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