

PROFILE OF OSTEOPOROTIC FRACTURES

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Abstract

Introduction: Osteoporosis is a widespread global disorder characterized by decreased bone mass and altered bone architecture, resulting in increased fragility of the bone and an increased risk of fracture. The prevalence of osteoporosis is projected to rise dramatically in the future due to ageing of population. Leading to increased risk of fracture, osteoporosis is defined as a disorder of skeleton which is characterized by weak strength of bones according to National Institutes of Health Consensus Development Panel. According to the criteria laid by World Health Organization (WHO). There are various causes of osteoporosis which includes growing older with age, rheumatoid arthritis, lower body mass index, gender, premature ovarian failure, deficiency of vitamin D, alcohol abuse, poor consumption of calcium, medications. Osteoporosis sometimes may not be diagnosed until occurrence of fracture since it is a silent disease.

Material and Methods: The study group which comprised of cases was subjects with osteoporotic fractures above 45 years of age having any one or combination of fractions mentioned below: Thoraco-lumbar spine, distal radius, proximal femur, proximal humerus, mechanism of low-energy trauma. Patients with high-energy trauma or fractures, road side accidents and/or below 45 years of age were not included in this study. The control group comprised of subjects above 45 years of age suffering from osteoarthritis.

Results: Majority of females were observed in cases as well as controls in present studies with number of females in cases being 21 in cases while 18 in controls among 30 subjects belonging to each group. It is observed that among all fractures in cases which were included in present study, majority of fractures were proximal femur which accounted for 43% of total fractures followed by distal radius 30%, proximal humerus 20% and thoraco-lumbar spine 7%.

Conclusion: Compromised by strength of bone leading to an increased fracture risk, osteoporosis is a skeletal disorder. Older patients, females, patients with higher BMI and weighed more had a greater proportion of osteoporotic fractures.

Keywords: osteoporotic fractures, BMI, Vitamin D, alcohol abuse, calcium.

Introduction

Osteoporosis is a widespread global disorder which is characterized by reduction of bone mass and altered bone architecture, which is resulting in increased fragility of the bone and an increased risk of fracture. All over the globe osteoporosis is considered to be a public health problem. It has also been estimated that there occurs 9 million fractures every year due to osteoporosis which means one fracture about every 3-4 seconds¹⁻⁴.

Ageing of population is one of the reasons that prevalence of osteoporosis is projected to sharply increase in future years. Osteoporosis most commonly affects older men and women in their postmenopausal period. This health condition is a major concern of health care system due to its rising economic burden^{5,6}. Leading to increased risk of fracture, osteoporosis is defined as a disorder of skeleton which is characterized by weak strength of bones according to National Institutes of Health Consensus Development Panel. According to the criteria laid by World Health Organization (WHO), osteoporosis is defined as

bone mineral density which lies below 2.5 standard deviations from average. Vitamin D is a hormone which plays an important role in development of bones and their modeling. It also has effects on immune functionality and metabolic pathways which are associated or involved in process of healing of body⁷⁻⁹.

Osteoporosis is subdivided into two types viz. primary osteoporosis and secondary osteoporosis according to the National Institutes of Health Consensus Development Panel. Postmenopausal osteoporosis (type I) where as senile osteoporosis (type II) are included in primary osteoporosis and secondary osteoporosis having definable etiologic diseases like malabsorption, medication such as glucocorticoids, hyperparathyroidism. Females are more prone to osteoporosis. There are various causes of osteoporosis which includes growing older with age, rheumatoid arthritis, lower body mass index, gender, premature ovarian failure, deficiency of vitamin D, alcohol abuse, poor consumption of calcium, medications such as anticonvulsants, anticoagulants and glucocorticoids^{3,10-12}. Osteoporosis sometimes may not be

diagnosed until occurrence of fracture since it is a silent disease which develops gradually. This study was undertaken with an aim to evaluate the profile epidemiology of the persons affected with osteoporotic fractures which includes proximal humerus and femur fractures, thoraco lumbar-spine fracture and distal radius. Another objective was to indentify the factors potentially associated with osteoporosis in patients who are treated for osteoarthritis.

Material and Methods:

In this comparative case-control study in which 30 cases (osteoporotic fractures) and 30 controls (patients with osteoarthritis) were included. Subjects included in study were above 45 years of age. This study was conducted at Venkateshwara Institute of Medical Sciences, Gajraula, U.P.

Inclusion & exclusion criteria:

The study group which comprised of cases was subjects with osteoporotic fractures above 45 years of age having any one or combination of fractions mentioned below: Thoraco-lumbar spine, distal radius, proximal femur, proximal humerus, mechanism of low-energy trauma.

Patients with high-energy trauma or fractures, road side accidents and/or below 45 years of age were not included in this study.

The control group comprised of subjects above 45 years of age suffering from osteoarthritis.

An informed consent was obtained from all patients.

Data was entered in Microsoft Excel 2013 and analyzed using SPSS version 20. Statistical analysis was done by using descriptive statistics, chi-square test/fisher's exact test.

Results:

Table 1: Demographic data

| Classification | Cases (n = 30) | Controls (n = 30) |
|------------------------------------|------------------|---------------------|
| Male/Female | 9/21 | 12/18 |
| Age (in years)* | 65.2 ± 9.6 | 59.8 ± 8.4 |
| Weight (in kgs)* | 69.8 ± 10.8 | 66.7 ± 11.8 |
| BMI (kg/m ²)* | 28.1 ± 5.3 | 25.9 ± 3.2 |
| Previous fractures | 10(33.3%) | 5(16.7%) |
| Muscle weakness | 12(40%) | 11(36.7%) |
| Previous falls | 15(50%) | 8(26.7%) |
| Previous diagnosis of osteoporosis | 15(50%) | 9(30%) |
| Secondary osteoporosis | 3(10%) | 4(13.3%) |
| Rheumatoid arthritis | 2(6%) | 1(3.3%) |
| Supplementation of calcium | 9(30%) | 7(23.3%) |
| Medication for osteoporosis | 6(20%) | 8(26.7%) |
| Hypertension | 21(70%) | 14(46.7%) |

*: Represented as mean ± standard deviation.

Majority of females were observed in cases as well as controls in present studies with number of females in cases being 21 in cases while 18 in controls among 30 subjects belonging to each group. Average age of cases was observed to be 65.2 ± 9.6 whereas it was noted to be 59.8 ± 8.4 in controls. The average weight of cases was 69.8 ± 10.8 and that of controls was 66.7 ± 11.8. The BMI is recorded to be 28.1 ± 5.3 and 25.9 ± 3.2 in cases and controls respectively. There were 21 (70%) cases suffering from hypertension while 14 (46.7%) controls were diagnosed with hypertension. Previous falls and diagnosis of osteoporosis was same in cases i.e. 15(50%) while it was 8(26.7%) and 9(30%) in controls respectively. 2(6%) cases were observed to be associated with rheumatoid arthritis while 1(3.3%) in control group.

Table 2: Representation of fracture type among cases (osteoporotic fracture group)

| Type of fracture | Number | % |
|----------------------|-----------|-------------|
| Thoraco-lumbar spine | 2 | 7% |
| Distal Radius | 9 | 30% |
| Proximal humerus | 6 | 20% |
| Proximal femur | 13 | 43% |
| Total | 30 | 100% |

It is observed that among all fractures in cases which were included in present study, majority of fractures were proximal femur which accounted for 43% of total fractures followed by distal radius 30%, proximal humerus 20% and thoraco-lumbar spine 7%.

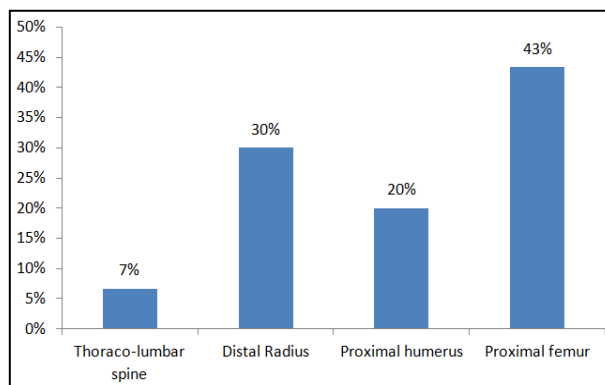


Figure 1: Graphical representation of fracture type

Discussion:

Osteoporosis is a disease which one of the silent diseases which gradually grows with age. It is complicated by fractures which commonly occur with no trauma or minimal trauma taking a huge toll on economy of nation. This disease can be diagnosed, prevented and treated before occurrence of fracture. It has been found that many patients are not receiving needed testing for diagnosis of osteoporosis and many are even getting appropriate

information about prevention of the disease despite the guide published by National Osteoporosis Foundation (NOF) which was first published in 1999 over 2 decades earlier. Cosman F et. al has made recommendations which are universal which includes diet that has adequate amounts of total intake of calcium, counseling on risk of osteoporosis, regular weight-training and muscle-strengthening exercise, advise on intake of vitamin D and avoidance of tobacco smoking and excessive alcohol intake. They have also proposed diagnostic assessment such as measuring height annually, testing of BMD, vertebral imaging, to check for secondary causes of the disease as well as bio-chemical markers of bone turnover⁸.

In present study it has been noted that more elderly patients had osteoporotic fractures with females proportion of patients being more in comparison to males, having lower BMI and less weight which is in agreement of findings in other studies^{13,14}. In this study majority of fractures were of proximal femur 43%. In a study it is reported that hip fractures are associated with 8% to 36% mortality in a year, mortality being more in males compared to females. Wright NC et. al in their study reported that more than 9.9 million Americans are suffering from osteoporosis whereas 43.1 million have low density of bones. In another study it was noted that one in five men will experience a fracture associated with osteoporosis while one in every two women will experience same throughout her lifetime¹⁵⁻¹⁷.

Conclusion:

Compromised by strength of bone leading to an increased fracture risk, osteoporosis is a skeletal disorder. Older patients, females, patients with higher BMI and weighed more had a greater proportion of osteoporotic fractures.

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