Original Research Article

Osteoporosis in postmenopausal women - A major cause of concern

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Abstract

Background: Osteoporosis is a metabolic disorder of the bones that is characterized by decreased bone density which predisposes to increased fracture risk. The disease can exist undiagnosed for a long time as it produces no distinct symptoms. **Aim:** To assess osteoporosis in postmenopausal women. **Materials and Method:** This is a prospective study conducted on Post menopausal women. Women who had undergone hysterectomy or who were on hormone replacement therapy or calcium or vitamin D preparations were excluded from the study. The participants underwent BMD measurement by Achilles Ultrasound bone densitometer. The results of BMD were analysed on the basis of T-Scores. **Results:** Of the 90 patients that were included in the study 42.2 % (n=38) were in the age group of 45-55years. In almost 50% of patients the duration of menopause was 6-10 years. Out of the 90 patients 10% (n=9) were normal, 44.4% (n=40) were osteopenic, 33.3% (n=30) were osteoporotic and 12.2% (n=11) were severely osteoporotic. Backache was the commonest presenting symptom in the study population. **Conclusions:** Quantitative ultrasound (QUS) is a rapid and in-expensive method of measuring bone density. In our study 90% of the postmenopausal women had subnormal T scores. We recommend regular BMD measurements in postmenopausal subjects for early diagnosis and treatment of osteoporosis in this vulnerable group.

Keywords: Bone mineral density, osteoporosis, postmenopausal, quantitative ultrasound.

Introduction

Osteoporosis is a metabolic disorder of the bones that is characterized by decreased bone density which predisposes to increased fracture risk[1,2]. The disease can exist undiagnosed for a long time as it produces no distinct symptoms and is detected when a fracture has already occurred. Hence it is also known as a "silent epidemic". It is estimated that 28 million Americans suffer from bone loss and of these 10 million have established osteoporosis[3]. A woman left untreated has a 50% chance of suffering from a osteoporotic fracture[4]. Johnell in a study on the socio economic burden of fractures states that the cost of hip fractures imposes a significant economic burden on society. The projected cost of hip fractures in the year 2050 is $131.5 billion[5]. Thus it is of utmost importance to detect the disease early and treat it. Fracture risk increases significantly with age and the incidence rises after the menopause. The United States preventive services task force (USPSTF) found good evidence that the risk for osteoporosis and fracture increases with age and other factors, that bone density measurements accurately predict the risk for fractures in the short-term, and that treating asymptomatic women with osteoporosis reduces their risk for fracture. The USPSTF concludes that the benefits of screening and treatment are of at least moderate magnitude for women at increased risk by virtue of age or presence of other risk factors[6]. Osteoporosis is most commonly diagnosed using bone densitometry. The T-score is the number of standard deviations the bone mineral density (BMD) is below or above the mean of a young control group.

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It is used to diagnose osteoporosis. The Z-scores compare the BMD with the age and sex matched controls. Osteoporosis is defined as a T-score equal to or less than -2.5, any T-score above this but below -1.0 is labeled osteopenia. (Table 1)

Table 1: WHO criteria for assessing disease severity

Diagnostic Classification	T-Score
Normal	>- 1.0
Osteopenia	-1.0 to 2.5
Osteoporosis	<=-2.5
Severe Osteoporosis	<-2.5 with Fracture

Various techniques are available to measure bone density, but to date dual energy X-ray absorptiometry (DXA) scan is the best predictor. Many studies have evaluated the role of quantitative ultrasonographic (QUS) measurement of BMD at the heel[7,8]. Several other radiologic methods that measure BMD at peripheral sites are single photon absorptiometry, quantitative computed tomography, single energy X-ray absorptiometry, and peripheral quantitative computed tomography[9].

The risk factors for osteoporosis are advancing age, menopause whether natural or surgical, white or Asian ethnicity, history of fracture, family history of osteoporotic fracture, history of falls, low levels of physical activity, smoking, excessive use of caffeine or alcohol, low calcium or vitamin D intake and various medications.

The present study was undertaken for assessment of osteoporosis in a cross section of postmenopausal women.

Materials and method

This prospective, descriptive, study was conducted at Department of Gynaecology and Department of Orthopedics, at Netaji Subhas Medical College and Hospital and Patna Medical College and Hospital, Patna, Bihar. The study was approved by the institutional

research and ethical committee. The study was conducted between July 2020 and April 2021. An informed and written consent was taken from the participating subjects prior to the commencement of the study.

Women who had attained menopause were included in the study. Women who had undergone hysterectomy or who were on hormone replacement therapy or were taking calcium or vitamin D preparations were excluded from the study. All the participants were subjected to BMD measurements by the Achilles Ultrasound bone densitometer. Quantitative ultrasound (QUS) is an easy and inexpensive modality to measure BMD. The parameters measured are speed of sound (SOS) and broadband ultrasound attenuation (BUA) at the os calcis. BMD was assessed as stiffness index. The results of BMD were analysed on the basis of T-Scores and were represented in the form of a graph. T-score is the number of standard deviations above or below the mean for a healthy 20 year old adult of the same sex and ethnicity as the patient.

The area of the graph labeled green shows the stiffness value of young adults and is considered normal. The area shaded light green shows T score 1 standard deviation (SD) below the normal. The yellow region of the graph depicts T-score is 1-3 SD below the young healthy adult. The red portion represents values > 3SD lesser than the normal.

Data was collected regarding the age, duration of menopause, socio economic status, symptoms suggestive of low BMD.

Results

Of the 90 patients that were included in the study 42.2 % (n=38) were in the age group of 45-55years (Table 2).

Table 2: Age Distribution of Study Group

Age Group (in years)	Number	Percentage
45-55	38	42.3
56-65	25	27.7
67-75	12	13.3
76-85	11	12.2
>85	1	4.5
TOTAL	90	100

In almost 50% of patients the duration of menopause was 6-10 years (Table 3).

Table 3: Distribution of patients according to the duration of menopause

Duration (in years)	Number	Percentage
1-5	17	18.8
6-10	46	51.2
>10	27	30.0
TOTAL	90	100

Of the 90 patients 10% (n=9) were normal, 44.4% (n=40) were osteopenic, 33.3% (n=30) were osteoporotic and 12.2% (n=11) were severely osteoporotic. Backache was the commonest presenting symptom in the study population. It was largely seen in osteopenic and osteoporotic females. Polyarthralgia was seen in 26.6% (n=24) patients. Kyphosis was seen in 10% of cases (Table 4)

Table 4: Distribution of patients according to the presenting symptoms.

Symptom	Number	Percentage
Backache	57	63.3
Polyarthralgia	24	26.6
Kyphosis	9	10.0
TOTAL	90	100

Discussion

Osteoporosis is a metabolic bone disorder characterized by deceased bone density and deterioration in micro architectural framework of bone leading to fragility fractures[10]. With the increase in the geriatric population worldwide osteoporosis is the commonest bone problem of the elderly. Due to this demographic change it is estimated that the risk of hip fractures will increase approximately up to 6 folds till 2050[11]. The magnitude of the problem is such that a women's lifetime risk of hip fracture is equal to the combined risk of breast, uterine and ovarian malignancy[12]. Risk for osteoporosis increases with age. Hui et al conducted a study on 521 women and found that increasing age was predictive of increased fracture risk[13]. A patients risk for fracture increases with age even at the same BMD or T Score[14]. In a study by Siris et al, concluded that Low BMD in younger postmenopausal women 50-64 years of age showed a 1-year relative risk of fracture similar to that found in women ≥65 years of age[15]. In our study also, of the 40 patients who were osteoporotic majority were more than 55 years old. Osteoporosis typically produces no or subtle symptoms and at times the first manifestation of the disease is a low impact fracture Back pain is a major symptom and signifies vertebral compression fractures. Approximately 50% of women over 65 years have spinal compression fractures leading to back pain[16]. In our study backache was the commonest symptom and was present in 63.3%of the patients.

Bone density measured at the femoral neck by DXA is the best predictor of hip fracture. QUS is an inexpensive method of assessing bone quality, while QUS measurements do not correlate well with DXA measurements a T score in the osteoporotic range on either test is associated with a high probability of hip fracture. Hans et al conducted a prospective study to assess the value of BMD measurements by ultrasound in predicting the risk for hip fracture and concluded that the os calcis ultrasound measurements were able to predict the risk of hip fracture in elderly women[17].

Conclusion

QUS uses high frequency sound waves to measure bone density. It is cheap, radiation free and quick method of measuring bone density and is a good screening procedure. The result of the study shows that 90 % of the postmenopausal women had subnormal T sores. We recommend screening of postmenopausal women to identify osteoporosis in order to provide appropriate therapy to decrease the risk of fracture.

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