World Journal of Pharmaceutical Sciences
ISSN (Print): 2321-3310; ISSN (Online): 2321-3086
Published by Atom and Cell Publishers
Available online at: http://www.wjpsonline.org/
Original Article

Prevalence of Primary Post-Menopausal Osteoporosis in Indian Women

V Ramesh[1], C H Rama Babu[2*]

[1]Department of Orthopaedics, GEMS Hospital, Srikakulam, Andhra Pradesh, India
[2]Dept. of Obstetrics and Gynaecology, GEMS Hospital, Srikakulam, Andhra Pradesh, India

Received: 27-10-2015 / Revised: 29-11-2015 / Accepted: 20-12-2015

ABSTRACT

Osteoporosis is characterized by decrease in bone mineral density (mass/volume) of normally mineralized bone which makes it vulnerable to fragility fracture. Post-menopausal females are prone to osteoporosis due to deficiency of estrogen following menopause. Due to lack of literature regarding bone mineral density distribution at various sites of body in post-menopausal osteoporosis, we conducted a cross sectional study to evaluate the bone mineral density and the prevalence of primary postmenopausal osteoporosis at various sites. A total number of 397 post-menopausal females between age group of 45-75years were recruited initially in our study. Out of 397 patients, only 175 patients satisfied our inclusion criteria and exclusion criteria were taken in the final study. All patients underwent BMD measurement through DEXA scan. BMD was measured at lumbar Spine, both hips, both femur and left forearm. DEXA scan is interpreted in terms of T score as per World Health Organization (WHO) guidelines. The analysis was carried out by using statistical software. Total prevalence of osteoporosis was 37.8% and maximum prevalence of osteoporosis was observed at spine (34%) followed by hip (22%) than at forearm (19%) and minimum at the femur. There is high prevalence of post-menopausal osteoporosis among Indian females and females are unaware of it because of its silent presentation, we need to create awareness regarding osteoporosis so that morbidity and mortality related to its can be avoided.

Key Words: Postmenopausal Osteoporosis, Bone mineral density (BMD), Dual Energy X-ray Absorptiometry (DEXA)

INTRODUCTION

Osteoporosis is a systemic skeletal disorder characterized by low bone mass and micro-architectural deterioration of bone tissue, leading to enhanced bone fragility and a consequent increase in fracture risk. **(1)** Osteoporosis results in decrease in bone mineral density (mass/volume) of normally mineralized bone. This reduced bone density affects the mechanical strength makes bone more vulnerable to low impact fracture. Osteoporosis is classified into two types as Primary osteoporosis and Secondary osteoporosis. Primary osteoporosis is further divided into two types, Type I is Postmenopausal osteoporosis and Type II is age-related osteoporosis or senile osteoporosis. Secondary osteoporosis is due to various secondary causes like prolong steroid intake, hypercortisolism, hyperthyroidism, hyperparathyroidism, alcohol abuse, and prolong immobilization. **(2)** Post-menopausal osteoporosis is defined as "a (silent) skeletal disorder characterized by compromised bone strength predisposing to increased risk of fracture. **(3)** Estrogen is responsible for maintaining bone health in females. Postmenopausal osteoporosis occurs in females due to deficiency of estrogen as a result of menopause. Estrogen deficiency results in increase in osteoclast activity due to decrease in apoptosis rate of osteoclast cell and increase formation of osteoclast cell, ultimately results in increase bone loss in post-menopausal females. **(4)** There are only few Indian studies which show the determination of bone mineral density (BMD) through dual energy X-ray absorptiometry (DEXA), moreover at different sites of the body, data is really scarce. We performed a cross sectional study to evaluate the bone mineral density and the prevalence of primary postmenopausal osteoporosis at various sites.

MATERIALS AND METHODS

This study was conducted in the department of Orthopedics and department of Obstetrics and Gynecology. Informed consent was taken from each subject participating in this study. Total 397

***Corresponding Author Address:** Dr. C H Rama Babu, Dept. of Obstetrics and Gynaecology, GEMS Hospital, Srikakulam, Andhra Pradesh, India*

females between age group 45-75years were recruited. Females having natural menopause at least one year after the onset of menopause were enrolled. Patient suffering from chronic diseases like hepato-renal disorder, thyroidism, hyperparathyroidism, rheumatoid arthritis, malignancy were excluded from our study. Patients with a history of steroid intake or any other medication affecting bone turnover metabolism were also excluded. Out of 397 patients, only 175 patients, satisfying our inclusion criteria were included in the final study. All patients underwent BMD measurement through DEXA scan. BMD was measured at lumbar Spine, both hips, both femur and left forearm. DEXA scan is interpreted in terms of T score as per World Health Organisation (WHO) guidelines. [5]

Normal bone	T-score greater than -1
Osteopenia	T-score between -1 and -2.5
Osteoporosis	T-score less than -2.5

After BMD measurement, all patients were offered to fill a questionnaire pertaining their demographic variables, menstrual history, physical activity, exercise history and dietary intake.

Analysis: The results are presented in mean ± SD and percentage. The unpaired t-test was used to compare the mean BMD between with and without osteoporosis. The p-value<0.05 was considered significant. The analysis was carried out by using statistical software version.

RESULTS

Total 397 females with mean age 52.5 years underwent BMD testing with DEXA scan. Out of 397 subjects 74 were found to be osteoporotic (Table-1). Mean bone mineral density in 74 patients with osteoporosis at spine was 0.82±0.12,at left hip 0.70±0.10,at right hip0.72±0.11,at left femur 0.80±0.12,at right femur0.81±0.11 and at left forearm 0.63±0.12 and on comparing with non-osteoporotic patients(n=101) ,it was found to be significant at all sites (p value<.05)(Table-2).

Table-1: Total Prevalence of osteoporosis

Osteoporosis	No. (n=397)	%
With Osteoporosis	74	42.2
Without Osteoporosis	101	57.7

Table-2: Comparison of BMD

BMD	With Osteoporosis (Mean±SD)	Without Osteoporosis (Mean±SD)	p-value[1]
AP spine	0.82±0.12	1.09±0.13	0.0001*
Neck left	0.70±0.10	0.90±0.11	0.0001*
Neck right	0.72±0.11	0.92±0.11	0.0001*
Femur left	0.80±0.12	1.03±0.13	0.0001*
Femur right	0.81±0.11	1.04±0.13	0.0001*
Forearm left	0.63±0.12	0.82±0.07	0.0001*

[1]Unpaired t-test

Mean T score in 74 patients with osteoporosis at spine was -2.95±1.07,at left hip -2.37±0.74,at right hip -2.23±0.77,at left femur-1.87±2.71,at right femur -1.58±0.91 and at left forearm-2.83±1.42 and on comparing with non-osteoporotic patients(n=101) ,it was found to be significant at all sites (p value<.05)(Table-3). Prevalence of osteoporosis at spine was 33.8%,at left hip 21.3%,at right hip 22.7%,at left femur 15.1%,at right femur 15.1% and at left forearm 19.6%(Table-4). Overall prevalence of osteoporosis was 37.8%, when diagnosis of osteoporosis was made by considering any site in all the subjects.

Table-3 Comparison of T-scores

T-score	With Osteoporosis (Mean±SD)	Without Osteoporosis (Mean±SD)	p-value[1]
AP spine	-2.95±1.07	-0.65±1.08	0.0001*
Neck left	-2.37±0.74	-0.95±0.72	0.0001*
Neck right	-2.23±0.77	-0.81±0.82	0.0001*
Femur left	-1.87±2.71	0.20±1.02	0.0001*
Femur right	-1.58±0.91	0.30±1.07	0.0001*
Forearm left	-2.83±1.42	-0.76±0.83	0.0001*

[1]Unpaired t-test

Table-4 Prevalence of osteoporosis at various sites

Sites	Normal		Osteopenia		Osteoporosis	
	No.	%	No.	%	No.	%
Spine	87	38.7	62	27.6	76	33.8
Neck Left	85	37.8	92	40.9	48	21.3
Neck Right	81	36.0	93	41.3	51	22.7
Femur Left	148	65.8	43	19.1	34	15.1
Femur Right	149	66.2	42	18.7	34	15.1
Forearm left	101	44.9	80	35.6	44	19.6

DISCUSSION

Osteoporosis is a preventable disease, if diagnosed earlier than its catastrophic consequences can be avoided by taking adequate treatment. We carried out this cross-sectional study in cohort of post-menopausal females who do not have any prior symptoms related to bone-turn over metabolism. We found maximum prevalence of osteoporosis at spine followed by hip than at forearm and minimum at the femur. We observed detection of osteoporosis at spine is more sensitive than other sites, a similar observation was also made by Acharya et al [(6)] in his study, but he showed 18 % total prevalence of osteoporosis which was lower than our observation. However, Paul et al [(7)] reported high prevalence of osteoporosis in his study on post-menopausal women,he reported that the prevalence of osteoporosis was 48% at the lumbar spine and 17% at the femoral neck and 50% at any site in Indian postmenopausal women using DEXA scan. Dongoonkar et al [(8)] in his study on 55 post-menopausal females found that the prevalence of osteoporosis was 50% at the spine and 30% at the hip and overall prevalence was 60% using DEXA scan. Gopinath et al [(9)] observed 44.82% total prevalence of osteoporosis in post-menopausal female with natural menopause. All patients with osteoporosis should be treated with biphosphonates, nutritional supplementation with calcium, Vitamin D and exercises. [(10)] Biphosphonates are the main pharmacological agent use for treatment of osteoporosis. In our study, we treated most of our patients with weekly alendronate along with daily calcium, vitamin D supplementation and weight bearing exercises.

CONCLUSION

Osteoporosis is a major health problem and it requires greater attention because of its silent presentation and high prevalence, as we observed that in our cohort of post-menopausal females, more than one third females are suffering from osteoporosis, it will be much more if we would have included females having secondary osteoporosis. So the need is to create awareness, campaigns regarding osteoporosis in the general population in order to reduce morbidity and mortality associated with osteoporosis.

Conflict of Interest: None

REFERENCES

1. Consensus Development Conference V, 1993. Diagnosis, prophylaxis, and treatment of osteoporosis. Am J Med. 1994, 90: 646-650.
2. Glaser DL, Kaplan FS Osteoporosis. Definition and clinical presentation. Spine (Phila Pa 1976). 1997 Dec 15;22(24 Suppl):12S-16S.
3. Watts NB, Bilezikian JP, Camacho PM, Greenspan SL, Harris ST, Hodgson SF, Kleerekoper M, Luckey MM, McClung MR, Pollack RP, Petak SM; AACE Osteoporosis Task Force. American Association of Clinical Endocrinologists Medical Guidelines for Clinical Practice for the diagnosis and treatment of postmenopausal osteoporosis. Endocr Pract. 2010 Nov-Dec;16 Suppl 3:1-37.
4. Riggs BL. The mechanisms of estrogen regulation of bone resorption. J Clin Invest. 2000;106 (10):1203–1204.
5. Kanis JA. (1994). Assessment of fracture risk and its application to screening for postmenopausal osteoporosis: synopsis of a WHO report. WHO Study Group. Osteoporos Int., 4(6): 368-81.
6. Acharya S, Srivastava A, Sen IB. Osteoporosis in Indian women aged 40–60 years. Arch Osteoporos (2010) 5:83–89
7. Paul TV, Thomas N, Seshadri MS. (2008). Prevalence of osteoporosis in ambulatory postmenopausal women from a semiurban region in Southern India: relationship to calcium nutrition and vitamin D status. Endocrpract.2008;14:665-671
8. Deepti Dongoonkar,Rajeev Mehta,SA kolhapure.Prevalence of Osteoporosis in Indian women:A cross sectional,point prevalence detemination study.Obs and Gynae Today.April 2006;9(4):235-239
9. Gopinath VR, Johnson P, Kumar AP, Prathibha M, Subhashini AS, Menon G. Prevalence of Osteoporosis And Evaluation Of Its Risk Factors In Surgical And Natural Postmenopausal Women – A Pilot Study. Sri Ramachandra Journal of Medicine. 2010;3:9-13
10. Frederick T. Murphy, Alan J. Kivitz, Earl E. Postmenopausal Osteoporosis. J Am Osteopath Assoc October 2003;103; (6):6-11.