PREVALENCE OF OSTEOPOROSIS IN SUB-URBAN POPULATION OF CHENNAI USING QUS (QUANTITATIVE ULTRASOUND) OF CALCANEUM -A CROSS SECTIONAL STUDY

Rheumatology

Dr S.Balameena*	Associate Professor in Department of Rheumatology in Kilpauk Medical College, Chennai. *Corresponding Author
Dr R Agavendra	D.M Residents in Department of Rheumatokogy in Madras Medical College,Chennai.
Dr Karthikeyan	D.M Residents in Department of Rheumatokogy in Madras Medical College,Chennai.
Dr Sujatha	D.M Residents in Department of Rheumatokogy in Madras Medical College,Chennai.
Dr Sabarish	D.M Residents in Department of Rheumatokogy in Madras Medical College,Chennai.
Dr Balakrishnan	D.M Residents in Department of Rheumatokogy in Madras Medical College,Chennai.

ABSTRACT

Background: Burden of Osteoporosis and its related fractures are enormous and growing public health concern. Worldwide, an estimated 200 million adults suffer from osteoporosis. Vertebral and non-vertebral fractures are the most clinically relevant osteoporotic fracture because they are expensive to treat and have severe consequences for middle aged and elderly population.(1 ,2) The purpose of our study was to assess calcaneal ultrasound score as a screening test for osteoporosis.

Material and Methods: Fifty patients above the age of 40 years who attended a health checkup camp conducted by our institute in a suburban population base of Chennai,Tamilnadu was subjected for noninvasive QUS of calcaneum bone as a screening test for osteoporosis. They were divided into different age groups ,co-morbid conditions noted and BMD scores from QUS was assessed.

Statistical method were used with SPSS Version   .It was a cross sectional descriptive study.

Results: A total of 50 patients underwent QUS of calcaneum bone in our study , all of them above the age of 40 years. 33(66%) of them were females and 17(34%) were males. Eight patients(16%) had T score < -2.5 out of which   1 was male. 26 patients(52%) had T scores in the osteopenic range (-1>Tscore>-2.5).16 patients(32%) had T scores in the normal range. 40 % of patients had associated osteoarthritis and four patients had diabetes. 2 patients who underwent screening had past history of nontraumatic fractures.

Conclusion: QUS of calcaneum is a good screening tool for assessing bone density in our country since its cost effective and can be used in various screening camps. The machine is portable and can be used with minimal training making it easier for the primary caregiver. It has reasonably good sensitivity and fair specificity when using T score of -2.5 as the cut off point.

However DEXA is the gold standard for treatment and followup of patients with osteoporosis.

KEYWORDS

QUS quantitative ultrasound, osteoporosis,BMD

INTRODUCTION:

Osteoporosis is defined as a progressive, systemic, skeletal disease characterized by low bone mass and microarchitectural deterioration of bone tissues with a consequent increase in bone fragility and susceptibility to fracture.(1) India with a population of 133.8 crores people is the second most populated country in the world with approximately 255 thousand , population over 50 years of age.(2) In 2017,sources estimate that 50 million people in India are either osteoporotic or have low bone mass. Studies indicate that osteoporosis and osteopenia or low bone mass may occur at a relatively younger age in Indian population.

Studies have shown that bone loss starts from the age of 30-40 years in both men and women. In women it has been postulated that menopause is followed by an immediate decrease in bone mass and density within a year and progress to first 4years. Various risk factors for osteoporosis are cigarette smoking, low BMI, previous history of fracture , intake of medications like steroids(GIOP glucocorticoid induced osteoporosis), anticonvulsants,gonadal harmones deficiency in males, rheumatologic disorders, malignancy associated and relative Vitamin D deficiency ,etc.(3)

After 50 yrs of age exponential rise of non vertebral fractures in 40% of women seen globally and 13% experience 1 or more new fractures in their life time In US 500000 vertebral fracture and 250000 wrist and hip fractures seen annually.

WHO has categorised BMD (bone mineral density) By DEXA dual energy xray absorbptionometry) scores as T scores and Z scores , T scores compared to the test in healthy adults ,Z scores compared to the test in peer age and sex matched ,respectively.(4 , 5), 0 to -1   normal but to be on follow up with FRAX   score, -1 to -2.5   osteopenia necessary steps to be taken for building up bone mass, -2.5 to –3.5 severe osteoporosis   liability to unprovoked fractures. Dual energy X-ray absorptiometry(DEXA) has been established as the reference gold standard technique for measuring BMD. However, inaccessibility and high cost factor of DEXA makes it unavailable to majority of Indians,

resulting in very little population based studies in India. Quantitative ultrasound(QUS) of calcaneum is easy to perform and cheaper than DEXA and prior studies have shown a rough correlation and agreement between the two(6 , 7)

The purpose of our study was to assess calcaneal ultrasound score as a screening test for osteoporosis.

MATERIALAND METHODS:

Fifty patients above the age of 40 years who attended a health checkup camp conducted by our institute in a suburban population base of Chennai,Tamilnadu underwent QUS of calcaneus as a screening test for osteoporosis. They were divided into different age groups ,co-morbid conditions noted and BMD scores was assessed.

Statistical method were used with SPSS Version   .It was a cross sectional descriptive study.

RESULTS:

A total of 50 patients underwent QUS of calcaneum in our study all of them above the age of 40 years. 33(66%) of them were females and 17(34%) were males. Eight patients(16%) had T score < -2.5 out of which   1 was male. 26 patients(52%) had T scores in the osteopenic range (-1>Tscore>-2.5).16 patients(32%) had T scores in the normal range. 40 % of patients had associated osteoarthritis and four patients had diabetes. Only 2 patients who underwent screening had past history of nontraumatic fractures.

BMD values	No. of patients
>-1	16
-1to -2.5	26
<-2.5	8

Age group	No. of patients
40-50	26
51-60	16
61-70	8

Comorbidities	Number of patients (Percentage)
Osteoarthritis	25 (50%)
a) Osteopenic	20
b) Osteoporotic	5
Diabetes Mellites	4
Previous history of fracture	1
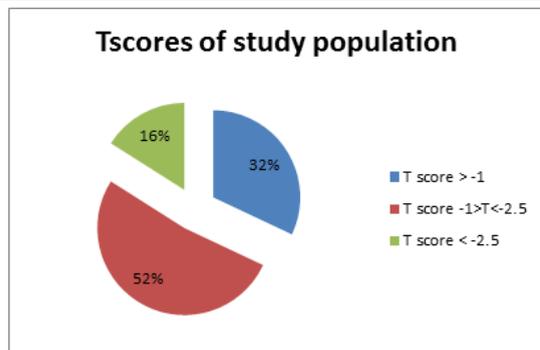
DISCUSSION:

Our study was conducted in a sub-urban population of a metropolitan city in south India with a sample size of 50 patients. Predominant age group of the study population was 40-50 years with half the number being osteopenic. Majority in the group had osteoarthritis and two-thirds in the study population were females. QUS ultrasound of calcaneum was performed using a portable machine and study took only few seconds for analysis. The ease of performing the test in terms of time consumption and its portability makes it a ideal screening tool in population based studies. Its co-relation with DEXA has been studied in previous studies, however it was a limitation in our study.

Ashwin Karthini,Sunivas Radar et al in their study found that substantial female population had osteopenia and osteoporosis after age 45 yrs when they used US calcaneum for a hospital based study.

Jothijose chithi et al in their study quoted that 51% of men had osteopenia above 50 years , whereas women from age 35 to 55 yrs were osteopenic 54%.

In a comparative study of DEXA and QUS calcaneum by Harouver A , Indiraniarora R ,hip DEXA correlated well with calcaneum QUS in identifying oeteoporosis of hip along with h/o fracture in women and concluded that QUS is a reasonable screening test .

CONCLUSION:

QUS of calcaneus is a good screening tool for assessing bonemineral density in developing country like India as it is cost effective and can be used in various screening camps. The machine is portable and can be used with minimal training making it easier for the primary caregiver. It has reasonably good sensitivity and fair specificity when using T score of -2.5 as the cut off point.However DEXA is the gold standard for treatment and followup of patients with osteoporosis.

Limitation : This was a small cohort and study needs to be compared to DEXA for more significant findings.

REFERENCES

1. Preliminary screening of osteoporosis and osteopenia in middle aged urban women from H yderabad using QUS -Ashwin kasthuri, Srinivas Radhe Shyam et al online Issn 2320-6012
2. Epidemiology ,etiology and diagnosis of osteoporosis AMJ Obstret.Gynacol 2006:194 52 11
3. An etismate of world wide prevalence mortality and disability of hip fracture .Jonell o Kanis JA osTeopor. In t 2004 15: 897 902
4. Bone densitometry applications and limitations Syedz khan A J. Obstret Gynacol 2002 24 476 84
5. Development of clinical assessment tool in identifying low bone mineral density and comparison of its usefulness to quantitative bone ultrasound Kung AV HoayRoss PD Bauer DC Reginster JY osteopor.Int 2005 16: 849 55
6. quantitative ultrasound for the diagnosis of osteoporosis roof Moher A Backmann R Mohr C Ramer FW Schimdt C Heller m et al 2004 176: 610-7
7. Prevalenvce of osteopenia and osteoporosis in orthopaedic outpatients in southern india Journal of Clinical and Diagnostic Research 2018 march 223
8. Prevalence of osteoporosis in apparently healthy adults above 40 yrs in pune city ind, J of Endocrinology and Metabolism Nidh S Kadam Shash A Chinikar Anuradha Khadikar 2018 Jan, feb 2211 : 67 73
9. Calcaneueal ultrasound as a screening tool for osteoporosis Icelandic Hardasona Indarson OS Siquardasson G 2001 Nov 57 1 :881- 6