ORIGINAL RESEARCH

Prevalence of Osteoporosis and Vertebral Fractures in Postmenopausal Females: A Cross-Sectional Study

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ABSTRACT
The primary objective of this study was to ascertain the prevalence of vertebral fractures among postmenopausal Indian women. The study involved the assessment of chest radiographs from a consecutive cohort of Indian women aged over 50 years who presented at a tertiary care Indian Hospital. Among the 456 radiographs that were meticulously analyzed, it was revealed that a substantial portion of patients displayed vertebral fractures. The average age of the women included in the study was determined to be 66.9 years, with a standard deviation of 7.8 years. Notably, a mere 12.3% of the women who exhibited vertebral fractures were found to be under antiresorptive therapy, a treatment strategy employed for managing osteoporosis. These findings underscore the potential underdiagnosis of vertebral fractures in radiological reports and the relatively low utilization of antiresorptive therapy in affected individuals.
Key words: Postmenopause, Spinal Fractures, Radiography, Osteoporosis, Female.

Introduction

Osteoporosis, characterized by a silent deterioration of bone quantity and quality leading to heightened susceptibility to fragility fractures, presents a significant health concern. These fractures not only contribute to increased morbidity but also escalate mortality rates in both females and males. The gravity of the issue is evident from estimates of hip, wrist and vertebral fractures [1,2]. Notably, Melton's study revealed that osteoporosis afflicts approximately 30% of postmenopausal white women in the USA, of whom 25% suffer from vertebral fractures [3]. The impact of these fractures on quality of life cannot be understated, as they introduce complications aligned with aging, thereby exacerbating both morbidity and mortality [4,5]. The economic repercussions are significant, as highlighted by the substantial expenditure directed more towards addressing the complications stemming from osteoporosis rather than the condition itself [6].

Curiously, despite vertebral fractures being emblematic of osteoporosis [7], their identification and subsequent management are frequently delayed until a visible limb fracture occurs. Disconcertingly, available literature highlights the overlooking of these fractures by healthcare practitioners [8–10], with even more cases going unnoticed by radiologists [11-13]. To date, there is an absence of significant number of reports that detail the prevalence of vertebral fractures in India. Thus, the current study was conceived and conducted with the objective of gauging the hospital-based prevalence of vertebral fractures among postmenopausal Indian women.

Materials & Methods

The study involved a retrospective analysis of chest radiographs performed on female patients aged 50 years and above. The inclusion criteria encompassed patients who had undergone standard posterior–anterior and lateral chest radiography for various reasons. For analysis, radiographs from 511 patients were independently examined by two radiologists. Subsequently, the radiographs were collectively reviewed by the principal author. Out of these, 14 radiographs were deemed inadequate for evaluation and were consequently excluded. Medical records of the remaining patients, who lacked a history of prior spinal trauma, were reviewed. Among these, a total of 41 patients were excluded due to reasons such as malignant disease (12 patients), connective tissue disease (7 patients), and steroid use (22 patients).

The focus was then placed on the remaining 456 radiographs to identify the presence of vertebral fractures using the semi-quantitative technique outlined by Genant et al. [14]. Radiographs were categorized as normal (score of 0), mild (score of 1), moderate (score of 2), or severe (score of 3) fractures. Mild fractures were characterized by a 25% reduction in the overall height of the vertebra, moderate fractures by more than 50% reduction, and severe fractures by a complete vertebra collapse.

Demographic data, including age, basic blood tests, diagnosis, and medical treatment information, were extracted from the patients' medical charts. The collected data were subsequently entered into a database and analyzed using SPSS version 21. Statistical analysis utilized 95% confidence intervals (95% CI), with significance set at $P < 0.05$.

Results

A total of 92 (20%) patients were identified to have 115 vertebral fractures. The age-related information and results of blood tests are outlined in Table 1. The mean age of the individuals with vertebral fractures was recorded as 66.9 years (standard deviation 7.8), with an age range spanning from 51 to 92 years. The distribution of vertebral fractures with respect to different age groups is presented in Table 2. Majority fractures were found within the age group ranging from 61 to 70 years.

Table1: Clinical and Demographic details of postmenopausal females.

Parameter	Mean ± SD
Age (in years)	66.9 ± 7.8
Haemoglobin (gm/dL)	11.7 ± 2.3
ESR (mm/hr)	58.7 ± 32.8
S. Albumin (gm/dL)	4.02 ± 0.61
S. Calcium (mg/dL)	9.7 ± 0.6
Phosphorus (mg/dL)	3.2 ± 0.8
Fasting blood sugar (mg/dL)	132.5 ± 47.9
Alkaline phosphatase (I/U)	98.3 ± 47.8

Table2: Vertebral fractures in postmenopausal females according to age

Age	No. of patients	Single Fracture	Multiple Fractures
< 51 years	1	1	0
51–60 years	14	13	1
61–70 years	41	41	0
71–80 years	28	12	16
> 80 years	8	2	6

In Figure 1, the depiction is presented, outlining the precise locations and numerical incidence of fractures. Notably, the 9th, 10th, and 12th thoracic vertebrae emerge as the predominant sites of affliction within the observed cases.

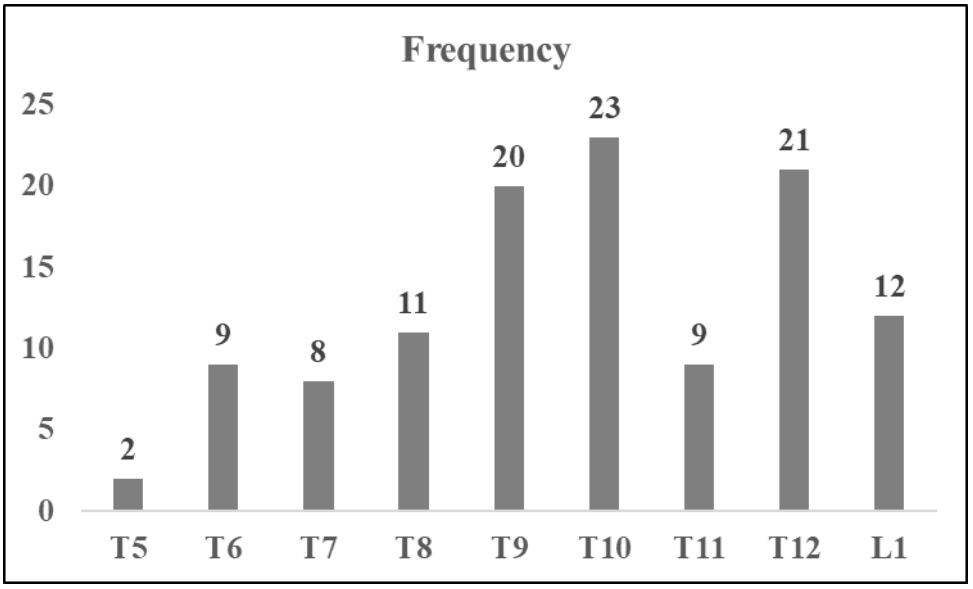

Figure 1: Vertebral site of fracture in postmenopausal women

Discussion

This investigation unveiled a discernible prevalence of vertebral fractures among women aged over 50 years, accounting for 20% of this demographic. However, this revelation prompts concern over two distinct aspects: firstly, merely 20.17% of radiographs exhibited explicit identification of vertebral fractures within the radiologist's report; and secondly, a meager 12.3% of women afflicted with vertebral fractures received appropriate osteoporosis treatment.

Comparative analysis demonstrates that Grazio et al. reported a notably lower prevalence of vertebral fractures at 9.7% within an urban setting [15]. In contrast, studies from Europe and America have positioned this statistic within a broader range of 16%–25% [3,16–18].

The underdiagnosis of vertebral fractures in the context of plain radiography has long been a subject of discourse. Notably, Delmas et al. indicated that a significant portion of fractures—45.2% in North America, 46.5% in Latin America, and 29.5% in Europe/South America/Australia—go unnoticed [11]. In concordance with these findings, this study observed that a substantial 79.83% of reported radiographs failed to duly identify fractures, focusing primarily on chest soft tissue rather than encompassing skeletal structures. This divergence could potentially stem from variances in radiologist experience levels, lack of specialized training in vertebral fracture diagnosis via routine chest radiographs, and the challenge of quantitatively assessing films intended for emergency room patients.

Timely identification of osteoporosis-related vertebral fractures remains pivotal, as the risks associated with secondary fractures within a year and heightened susceptibility to hip fractures increase manifold [19, 20]. Notably, this escalation prompts heightened morbidity, mortality, and a host of complications, including persistent back pain, kyphotic deformities, and gradual debilitation. Alas, chronic pain may inadvertently foster a cycle of increased osteoporosis, underscoring the urgency of accurate diagnosis and adequate intervention.

Another salient concern arising from this study pertains to the mere 12.3% of patients receiving osteoporosis treatment, indicating a glaring oversight in addressing this affliction among those already bearing osteoporosis-related vertebral fractures.

It is imperative to acknowledge the limitations inherent in this retrospective study. Notably, the evaluation of chest radiographs among emergency room attendees might inadvertently skew findings, as certain instances of chest pain could indeed stem from osteoporosis-related vertebral fractures. Furthermore, the radiologists' primary focus on vertebral fractures, rather than on chest soft tissues, may introduce a potential bias.

Conclusion

This Study serves as a poignant reminder of the deficiencies within our current healthcare framework. While the prevalence of vertebral fractures mirrors figures documented in select Western counterparts, the study underscores a need for proactive responses to the osteoporosis challenge. Notably, it unveils delays in diagnosis and treatment, coupled with the absence of a comprehensive plan to educate staff on routine vertebral fracture identification. As the

population ages, it becomes paramount to exercise judicious allocation of available resources for early osteoporosis diagnosis, appropriate treatment, and an increased emphasis on lifestyle modifications. Encouraging sun exposure, consumption of Vitamin-D-enriched foods, and participation in weight-bearing exercises are pivotal steps towards reducing fracture incidence within the populace.

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