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Brief communication

Diagnosing vertebral fractures: missed opportunities

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ABSTRACT

Vertebral fractures are the single most common type of osteoporotic fracture. Postmenopausal women are at increased risk for osteoporotic vertebral fractures compared with women of childbearing age. Vertebral fractures are associated with an increase in morbidity, mortality, and high risk of a subsequent vertebral fracture, regardless of bone mineral density. Despite the common occurrence and serious consequences of vertebral fractures, they are often unrecognized or misdiagnosed by radiologists. Moreover, vertebral fractures may be described by variable terminology that can confuse rather than enlighten referring physicians. We conducted a survey of spine X-ray reports from a group of postmenopausal women screened for participation in a study of osteoporosis at Centro de Pesquisa Clínica do Brasil. A descriptive analysis evaluated the variability of reports in 7 patients. Four independent general radiologists issued reports assessing vertebral fractures through a blinded analysis. The objective of this study was to evaluate for consistency in these reports. The analysis found marked variability in the diagnosis of vertebral fractures and the terminology used to describe them. In community medical practices, such variability could lead to differences in the management of patients with osteoporosis, with the potential for undertreatment or overtreatment depending on clinical circumstances. Accurate and unambiguous reporting of vertebral fractures is likely to be associated with improved clinical outcomes.

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Diagnóstico de fraturas vertebrais: oportunidades perdidas

Palavras-chave:
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RESUMO

As fraturas vertebrais são o tipo mais comum de fratura osteoporótica. As mulheres na pós-menopausa têm um risco aumentado de fraturas vertebrais osteoporóticas em comparação com as mulheres em idade fértil. As fraturas vertebrais estão associadas a um aumento na morbidade e mortalidade e à elevação do risco de fratura vertebral subsequente, independentemente da densidade mineral óssea. Apesar da ocorrência comum e das graves consequências das fraturas vertebrais, elas muitas vezes passam despercebidas ou são erroneamente diagnosticadas pelos radiologistas. Além disso, as fraturas vertebrais podem ser descritas com uma terminologia variável, que pode confundir em vez de esclarecer o médico solicitante. Foi feito um levantamento dos laudos das radiografias de coluna vertebral de um grupo de mulheres na pós-menopausa selecionadas para participar de um estudo de osteoporose no Centro de Pesquisa Clínica do Brasil. A análise descritiva avaliou a variabilidade dos laudos em sete pacientes. Quatro radiologistas gerais independentes emitiram laudos de avaliação das fraturas vertebrais por meio de uma análise cega. O objetivo deste estudo foi avaliar a consistência desses laudos. A análise descobriu uma acentuada variabilidade no diagnóstico das fraturas vertebrais e na terminologia usada para descrevê-las. Na prática clínica da comunidade, essa variabilidade poderia levar a diferenças no tratamento de pacientes com osteoporose, com o potencial de subtratamento ou tratamento exagerado, a depender das circunstâncias clínicas. Laudos precisos e inequívocos de fraturas vertebrais são susceptíveis de estar associados a melhores desfechos clínicos.

Introduction

According to the National Osteoporosis Foundation, 44 million people in the United States have osteoporosis or osteopenia.[1] It is estimated that osteoporosis affects about 200 million women worldwide, with occurrence of an osteoporotic fracture every 3 s and a vertebral fracture every 22 s.[1,2] The annual incidence of osteoporotic fractures in the United States is higher than the combined incidence of heart attack, stroke and breast cancer. The prevalence of vertebral fractures in Caucasians over 50 years old is 20–25%, and in Latin American is 12%.[1,3] Still, people at 50 years, present a major risk of osteoporotic fracture: 46–53% in women and 21–22% in men; vertebral fracture in radiography: 27% in women and men 11%; and clinical vertebral fracture.[4] Peri- and postmenopausal women with a prevalent vertebral fracture have a two to five-fold increased risk of a subsequent vertebral fracture compared to women without a prevalent vertebral fracture, regardless of bone mineral density.[5] In addition, the presence of a vertebral fracture increases the mortality rate and the chances of new fractures.[6,7] However, failure to identify vertebral fractures on radiographic studies is a common problem worldwide, with some reports of an overall rate of 34% for missed diagnoses, leading to under-treatment and poor clinical outcomes, including back pain, loss of independence, and reduced quality of life.[6,8] We therefore undertook an investigation to evaluate consistency and divergence of reports of spine radiographs in a group of postmenopausal women diagnosed with osteoporosis.

Materials and methods

Spine radiographs were performed in 7 women participating in a study of osteoporosis at Centro de Pesquisa Clínica do Brasil. The purpose of these X-rays was to evaluate for prevalent spine fracture. Digitized spine images (posterior-anterior and lateral views) were sent to 4 general radiologists, each of whom was aware of the purpose of the X-rays, for blinded independent interpretations. The reports were then compared for consistency of terminology and diagnosis of vertebral fractures.

Results

The interpretation of each radiologist for diagnosis and description of vertebral fractures is provided in the Table 1.

Discussion

Osteoporosis is an osteometabolic disease that leads to low bone mineral density, bone microarchitectural deterioration of bone, and skeletal fragility, predisposing an individual to fractures with minimal trauma.[9,10] Postmenopausal women with osteoporosis have increased risk of vertebral fracture caused by bone fragility compared with women of childbearing age, as well as previous vertebral fractures increase the mortality rate associated with future fractures, highlighting the importance of early radiographic diagnosis of vertebral fractures.[1,6,11] Currently, the best way to confirm the presence

Table 1 – Radiology reports of spine X-rays by 4 radiologists in 7 women with osteoporosis. This shows marked variability in the identification and description of vertebral fractures.

	Report 1	Report 2	Report 3	Report 4
Patient 1	Slight reduction of the heights of vertebral bodies.	Anterior wedging of T5.	Mild fractures at L2 and L3. Moreover, moderate reduction of the height of the thoracic vertebral bodies, more pronounced at T5.	Fracture/Crush fracture in T5 vertebral body, and less evident in L3.
Patient 2	Absence of fractures.	Discreet anterior wedging of T11 depression of the upper plateau.	Biconcave insufficiency vertebral body fractures in several thoracic vertebras. Anterior mild wedging in T11.	Fracture/wedging of vertebral bodies of T10, T11, T13 and T14.
Patient 3	Absence of fractures.	Absence of fractures.	Biconcave aspect of vertebral bodies of thoracic and upper lumbar vertebra, mainly in T11 and T12. No significant vertebral collapse.	Absence of fractures.
Patient 4	Absence of fractures.	Absence of fractures.	Absence of fractures.	Absence of fractures.
Patient 5	Absence of fractures.	Absence of fractures.	Absence of fractures.	Absence of fractures.
Patient 6	Absence of fractures.	Discrete wedging of L2 vertebral body	Absence of fractures.	Diminished height of the vertebral body of L2.
Patient 7	Wedging of the L4 vertebral body around 15%.	Anterior wedging of T11 and T12. Superior plateau fracture of L4	Discreet anterior wedging L4.	Discrete fracture/wedging in the upper plateau of L4.

of vertebral fracture is through spine X-rays, ideally followed by evaluation and appropriate therapy to reduce the risk of future fractures. Effective therapies are widely available and can reduce the occurrence of future vertebral fractures by 30% to 70%. However, in spite of vertebral fractures being quite common and associated with decreased quality of life and increased mortality, they are often unreported or misdiagnosed by radiologists.[1,12]

In a recent retrospective study of 934 women age 60 years and older, there was radiographic evidence of moderate or severe vertebral fractures in 132 (14%), but only 50% of the radiological reports mentioned these fractures.[6] In another study of 2000 postmenopausal women with osteoporosis, the accuracy of spine X-ray interpretations was assessed by comparing the results of local radiographic reports with a radiographic central laboratory.[8] This study showed false-negative rates between 27 and 45 percent for diagnosing vertebral fractures.[8] In addition, when a vertebral deformity was identified, ambiguous terminology was often used in the reports, leading to potential confusion in diagnosing vertebral fractures.[6,8] Despite the small number of patients, our results are similar to the international literature.[13] This is the first study addressing missed opportunities for diagnosing vertebral fractures in Brazil.

Conclusion

This study shows great variability in the identification and description of vertebral fractures in postmenopausal women with osteoporosis. Clinicians who rely on accurate reporting by radiologists may in turn manage their patients differently depending on which report is received. When a vertebral fracture is not recognized or when a description of a vertebral deformity is not clear, then decisions for evaluating and treating patients may be incorrect. Improvement in the accuracy and consistency of reporting vertebral fractures is likely to improve patient care.

Conflicts of interest

The authors declare no conflicts of interest.

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