Pseudo-False-Negative BMD Scan in a Woman with Osteoporosis on Calcium Supplementation

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Özet

Kalsiyum tedavisi alan osteoporotik bir olguda yalancı negatif BMD bulgusu
Kemik mineral dansitesi değerleri osteoporoz için en değerli bilgilerdir. Dual Enerji X-ray absorbsiyometri (DEXA) kemik mineral dansite değerlerini ölçmek için en yaygın olarak kullanılan yöntemdir. Tarama alanındaki artefaktlar yanlışlıkla yüksek kemik mineral dansitesi değerleri bulmamıza sebep olabilirler. Bu yüzden imajlar raporlar hazırlanırken kontrol edilmelidir. Biz kalsiyum tedavisi alan bir olgunun yalancı negatif olan DEXA çalışmasını sunduk.

Anahtar kelimeler: Kemik Mineral Dansitesi, Dual Enerji X-ray Absorbsiyometri, Osteoporoz, Artefakt.

Abstract

Bone Mineral Density (BMD) values are accepted as the best data for osteoporosis. Dual-energy X-ray absorptiometry (DEXA) is widely used for measurement of bone mineral density. The artifacts on the scan areas may cause falsely high BMD values. Therefore the images should be checked visually before the report preparation. We presented a falsely abnormal BMD scan in a woman with osteoporosis on calcium supplementation.

Keywords: Bone mineral density, Dual Energy X-ray Absorptiometry, Osteoporosis, Artifacts.

Introduction

Bone Mineral Density (BMD) values are accepted as the best data to predict the fracture risk of femoral neck and lumbar vertebras caused by osteoporosis (1). Dual energy X-ray absorptiometry (DEXA) scanner is the most widely used device to measure BMD values with its high resolution and low radiation exposure(2). Because the specificity of the values measured is not high enough, always a questionnaire including questions related to the patient's history, medication etc. should be applied to the patients and all the images should be checked visually before the report preparation. The artifacts on the scan areas, especially soft tissue lesions and bony destructions or degenerations, may cause falsely high or low local BMD values and average values (3-7). In this article an example of this situation related to the calcium supplement and solution is presented below.

Case

A 73-year-old woman referred for evaluation of osteoporosis. BMD scans of the spine and hip were obtained using the DEXA method. (Norland XR-46 densitometer). The spine images showed marked diffusely increased density in the right abdominal region. It was superimposed partly on the second and third lumbar vertebra on the anteroposterior spine image and seemed to cause a false increase in BMD. Our investigations have disclosed that the patients have supplemented with calcium. Plain X-ray picture showed the diffusely increased density in right abdominal region. After the patient had an enema, in the next day, a repeat BMD scan of the spine was performed. The diffusely increased density in right abdominal region disappeared spontaneously, and BMD values of L2-L4 vertebrae were decreased. (Fig. 1) T-Score: -3.81 and Z-Score: -1.60 was in first BMD scan, whereas, T-Score: -4.09 and Z-Score: -1.85 was in later BMD scan. Therefore, if images are not interpreted visually, falsely high values of BMD are obtained for the L2-L4 vertebrae.

Discussion

Despite the widespread use of DEXA scanning of the spine and femur, the accuracy of this technique is limited by the variable composition of the soft tissue adjacent to bone. A careful visual interpretation of DEXA images is valuable to exclude known artifacts such as vertebral crush fracture(1), degenerative changes(3), metal artifacts(4,5,7) and, calcification of soft tissue(6).

Our case shows that the BMD of the spine are falsely high values due to calcium intake and, review of the scan image is essential to avoid falsely elevated BMD values in the evaluation of osteoporosis. Also, we suggest that pre and post enema DEXA studies should be planned in population with calcium supplementation.

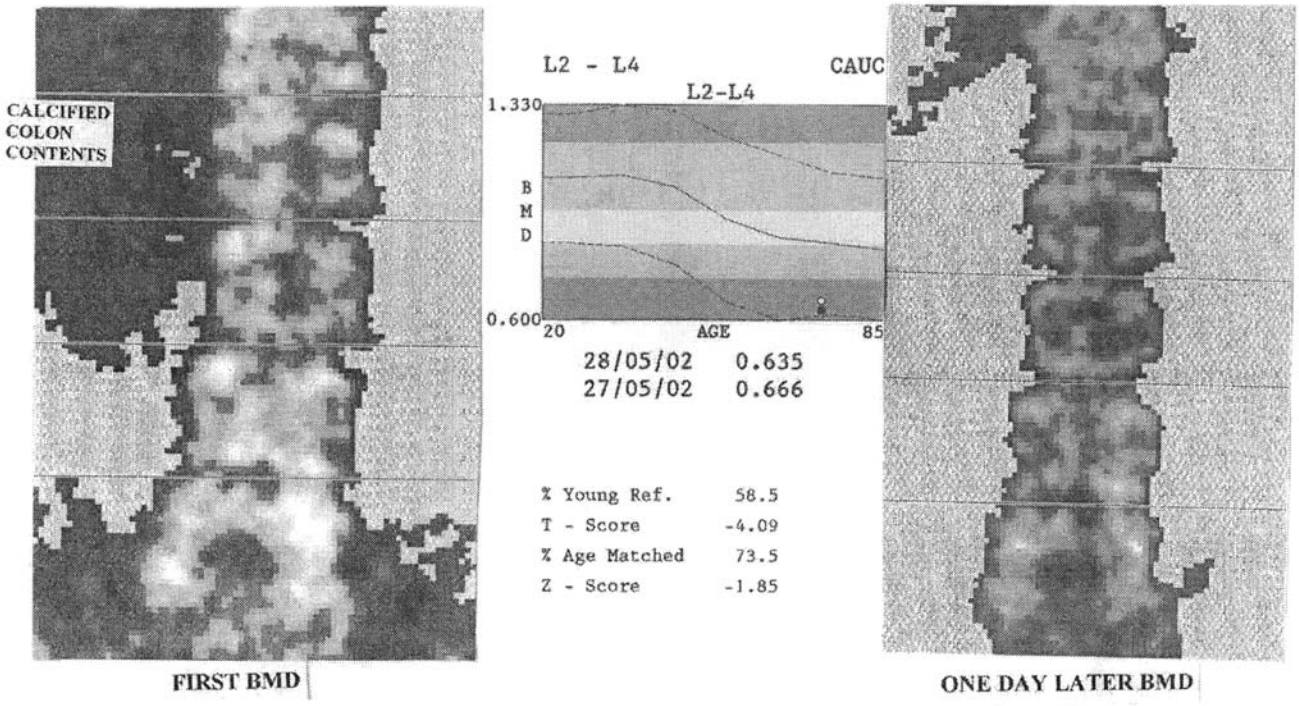

Fig. 1 : DEXA scans of the lumbar spine in the patient

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