

Interesting image

Incidental Detection of a Femoral Neck Fracture Through Visual Analysis of a Dual-Energy X-ray Absorptiometry Scan Image

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Abstract

This case report describes the incidental detection of a significant pathology through careful visual inspection of a Dual-Energy X-ray Absorptiometry (DXA) scan rather than relying solely on bone mineral density measurements. An 88-year-old woman presented with right buttock and thigh pain accompanied by severe swelling. Although her symptoms were clinically suspected to be related to lumbar spine disease, only lumbar radiography and a DXA examination were requested without direct hip imaging. During the DXA examination, a femoral neck fracture of the right hip was incidentally identified on the acquired scan image. The attending radiologic technologist promptly recognized the abnormal finding and immediately communicated it to the orthopedic team through the Picture Archiving and Communication System. This case demonstrates that DXA images can serve as a valuable screening tool beyond bone mineral density assessment by compensating for potential diagnostic oversight and highlights the importance of meticulous image observation and proactive communication by radiologic technologists.

Keywords: Dual-energy X-ray Absorptiometry, Femoral Neck Fracture, Radiologic Technologist



Fig. 1. The patient in this case was an 88-year-old woman with a history of left total hip arthroplasty. She presented with right buttock and thigh pain accompanied by marked swelling. However, the clinician initially attributed her symptoms to lumbar spine disease and ordered lumbar radiography and Dual-Energy X-ray Absorptiometry (DXA) examination without direct radiographic evaluation of the hip. To avoid measurement artifacts caused by the left hip prosthesis, a DXA scan of the right proximal femur was performed (A). During real-time image acquisition, the attending radiologic technologist carefully reviewed the scan image and identified a distinct fracture line in the right femoral neck (A, arrow). Comparison with a previous DXA examination (B) performed in 2019 confirmed the absence of any fracture findings at that time, indicating that the lesion was newly developed. After identifying the right femoral neck fracture on the DXA scan image, the orthopedic team promptly informed a hip specialist, and the patient was admitted for surgical treatment. Subsequently, an anteroposterior pelvis radiograph (Pelvis AP) was obtained, which clearly confirmed the presence of the right femoral neck fracture (C).

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Dual-Energy X-ray Absorptiometry (DXA) is widely recognized as the standard method for diagnosing osteoporosis and assessing fracture risk. However, in routine clinical practice, attention is often focused primarily on quantitative parameters such as the T-score, while the scan images acquired during the examination may receive limited attention. Previous studies have demonstrated that DXA scan images may reveal clinically significant abnormalities beyond osteoporosis assessment. Seo et al. reported the incidental detection of bone metastases, masses, and cystic lesions through careful visual analysis of DXA images [1-4]. Similarly, Rossi et al. reported incidental findings in 15.8% of DXA examinations, while Powrie and Ismail and Ahlman et al. described atypical femoral fractures identified on DXA images [5,6]. These findings collectively suggest that DXA images possess diagnostic value beyond bone mineral density measurement and should be carefully reviewed during routine examinations. These findings suggest that DXA imaging possesses additional diagnostic value beyond bone mineral density assessment.

In addition to image acquisition, the development of image interpretation skills among radiologic technologists may contribute to the early recognition of clinically significant abnormalities and improved patient care [7].

The patient in this case was an 88-year-old woman with a history of left total hip arthroplasty who presented with right buttock and thigh pain accompanied by marked swelling. The clinician initially attributed her symptoms to lumbar spine disease and ordered lumbar radiography and a Dual-Energy X-ray Absorptiometry (DXA) examination (GE, Lunar iDXA, USA) without direct radiographic evaluation of the hip. During the examination, the attending radiologic technologist identified findings suggestive of a right femoral neck fracture on the DXA image of the right femur and confirmed that it represented a newly developed lesion through comparison with a previous DXA study. The patient was subsequently evaluated by the orthopedic team, and additional imaging studies confirmed the right femoral neck fracture. She was then admitted for surgical treatment.

Recognizing the clinical significance of this finding, the radiologic technologist immediately documented the abnormality through the Picture Archiving and Communication System and directly notified the orthopedic team. This prompt communication facilitated further evaluation and timely management of the patient.

This case illustrates that DXA images should not be regarded merely as supplementary images for generating bone mineral density values. Rather, they may serve as an important screening tool capable of identifying clinically significant abnormalities that could otherwise be overlooked. In elderly patients, incidental findings such as fractures, neoplastic lesions, or metastatic disease may be visualized on DXA scans, emphasizing the need for careful image review during every examination.

In conclusion, radiologic technologists play an important role not only in image acquisition but also in recognizing unexpected abnormalities and communicating critical findings to clinicians in a timely manner. Continuous attention to DXA scan images and thorough visual assessment can contribute substantially to the early detection of significant pathologies and improved patient care.

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