

# Complete scintigraphic resolution of a bone metastasis after androgen-deprivation therapy

## Androjen-Deprivasyon tedavisi ile regrese olan kemik metastazının sintigrafik değerlendirmesi

Derya Çayır<sup>1</sup>, Mehmet Bozkurt<sup>1</sup>, Salih Sinan Gültekin<sup>1</sup>, Aynur Turan<sup>2</sup>

<sup>1</sup> University of Health Sciences, Dışkapı Yıldırım Beyazıt Training and Research Hospital, Nuclear Medicine Department, Ankara, Turkey

<sup>2</sup> University of Health Sciences Dışkapı Yıldırım Beyazıt Training and Research Hospital, Radiology Department, Ankara, Turkey

ORCID ID of the author(s)

DC: 0000-0002-7756-3210

MB: 0000-0002-8325-5249

SSG: 0000-0003-2458-3530

AT: 0000-0001-6654-3129

### Abstract

<sup>99m</sup>Tc-methylene diphosphonate (MDP) whole body bone scintigraphy is a frequently used imaging method for the evaluation of the bone metastases of prostate cancer. Nuclear medicine imaging modalities are very valuable in terms of functional assessment and treatment response assessment of the malign lesions that cannot be detected by anatomic imaging methods. However, it is known that some scintigraphic studies may have a relatively limited role in defining resolution and anatomical details of the lesion, compared to some radiological imaging modalities. Androgen-deprivation therapy (ADT) alone is rarely effective for the treatment of bone metastases, on that account combined systemic therapies are often preferred. Here we present a rare case of prostate cancer with radiologically undetectable bone metastasis evident on scintigraphy that has disappeared after 18 months of ADT.

**Keywords:** Whole body scan, Prostate cancer, Metastasis, Tomography

### Öz

<sup>99m</sup>Tc-metilen difosfonat (MDP) tüm vücut kemik sintigrafisi prostat kanserinin kemik metastazlarını değerlendirmede sıklıkla kullanılmaktadır. Anatomi görüntüleme yöntemleri ile saptanamayan malign lezyonların fonksiyonel olarak izlenebilmesi ve tedaviye yanıtının değerlendirilebilmesi açısından nükleer tıp tetkikleri çok değerlidir. Bununla birlikte sintigrafik yöntemlerin rezolüsyon ve anatomik detayları belirlemede bazı radyolojik tetkiklere göre sınırlı olabildiği bilinmektedir. Kemik metastazlarının tedavisinde sıklıkla kombine sistemik tedaviler tercih edilmekte olup, androjen-deprivasyon tedavisi (ADT) tek başına nadiren etkilidir. Burada bilgisayarlı tomografi ile saptanamayan, 18 ay ADT ile regrese olan kemik metastazlı nadir prostat kanserli bir olguyu sunuyoruz.

**Anahtar kelimeler:** Tüm vücut görüntüleme, Prostat kanseri, Metastaz, Tomografi

### Introduction

The most common indication of <sup>99m</sup>Tc-MDP bone scintigraphy is to detect osteoblastic bone metastases of various malignities. It is cost-effective, accessible, without known contraindications, and highly sensitive [1]. Since metabolic changes in bone show up earlier than anatomical changes, bone scintigraphy may detect bone pathologies sooner than anatomic imaging modalities [2]. We herein present a case with prostate cancer who had a radiologically undetectable bone metastasis evident on scintigraphy which disappeared after androgen-deprivation therapy (ADT).

Corresponding author / Sorumlu yazar:

Derya Çayır

Address / Adres: Sağlık Bilimleri Üniversitesi  
Dışkapı Yıldırım Beyazıt Eğitim ve Araştırma  
Hastanesi, Nükleer Tıp Bölümü, 06110, Ankara,  
Türkiye

e-Mail: drderyaors@hotmail.com

Informed Consent: The authors stated that the written consent was obtained from the patient presented with images in the study.

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## Case presentation

A 68 year-old male patient diagnosed with prostate adenocarcinoma (Gleason score 4 + 5) was admitted to our department. He presented with high serum prostate-specific antigen level [PSA): 43.17 ng/mL (N:0-4)].  $^{99m}\text{Tc}$ -MDP in whole-body bone scintigraphy and Single Photon Emission Computed Tomography (SPECT) imaging revealed a focal activity in the coccygeal area (Figure 1). Computed tomography (CT) was performed for accurate differential diagnosis of possible sacrum fractures. Trauma history was insistently questioned, no history of trauma was evident in anamnesis. There was no significant finding on CT, except for degenerative changes in the sacroiliac region (Figure 2). ADT was initiated after the diagnosis of sacral metastasis. After 18 months of treatment, serum PSA level decreased to 1.1 ng/mL, and the  $^{99m}\text{Tc}$ -MDP whole body bone scintigraphy revealed no lesions in the coccygeal area (Figure 3). A written informed consent was obtained from the patient.

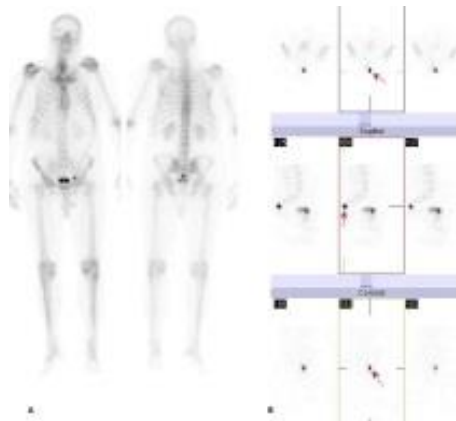


Figure 1:  $^{99m}\text{Tc}$ -MDP in whole-body bone scintigraphy (A) and Single Photon Emission Computed Tomography (SPECT) (B) imaging showed a focal activity in the coccygeal area (arrows)

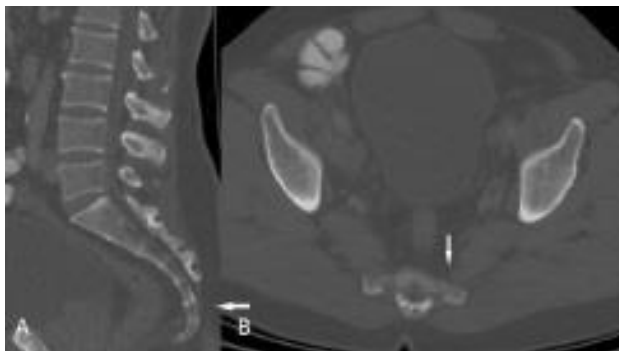


Figure 2: Computed tomography (CT) revealed no significant finding except degenerative changes in the sacroiliac region (A; sagittal plane, B; transaxial plane, arrows).



Figure 3:  $^{99m}\text{Tc}$ -MDP whole body bone scintigraphy revealed no lesion in the coccygeal area

## Discussion

Prostate cancer is the most common malignancy in elderly men [3]. Ordinarily, the skeletal system is the most frequent target of metastases in castration-resistant prostate cancer, with an estimate of involvement around 90% [4]. On account of suspected bone metastases, high PSA level is an important, widely available serum marker. A serum PSA level above 10 ng/ml, and/or a Gleason score above 8 should prompt investigation for bone metastases [5]. Radiologic imaging modalities, such as CT and magnetic resonance imaging (MRI) provide structural and anatomical details of the bone. Nevertheless, the results are more significant whenever the anatomical imaging methods and the functional evaluation tests are correlated. Surgical castration with subsequent androgen-deprivation therapy (ADT) has been favored for treatment of metastatic prostate cancer since the 1940s [6]. The treatment of bone metastases of prostate cancer includes bisphosphonates, radiotherapy, chemotherapy, hormone therapy, surgery, radionuclide therapy, immunotherapy, and palliative treatments [7]. Antiandrogen therapies (such as bicalutamide, flutamide, nilutamide, and enzalutamide) alone are mainly used in locally advanced prostate cancer, however, they are rarely effective for treating bone metastases of prostate cancer [8]. Our patient received bicalutamide 50 mg/day after the diagnosis of sacral metastasis. At the end of 18 months of treatment, his PSA levels had decreased, and bone scintigraphy showed no radioactivity uptake in the pelvic area, consistent with a complete resolution of the bone metastasis.

$^{99m}\text{Tc}$ -MDP whole body bone scintigraphy has advantages over other anatomical imaging modalities regarding the functional evaluation of new bone metastases and the progression or response assessment of previously diagnosed bone metastases in patients with prostate cancer. Therefore, in asymptomatic patients with prostate cancer and high serum PSA levels, bone scintigraphy might play a role in identifying metastatic lesions, despite normal findings on anatomic studies.

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