Interesting Image

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PET/CT Identifies Pubic Melorheostosis with High ^{68}Ga-PSMA Uptake in a Patient with Prostate Cancer

Prostat Kanserli Bir Hastada PET/BT ile Yüksek ^{68}Ga-PSMA Tutulumu Gösteren Meloreostozis Saptanması

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Abstract

Melorheostosis, a rare benign bone disorder marked by cortical thickening and irregular hyperostosis, typically affects peripheral bones but can also involve the axial skeleton. Though various molecular imaging radiotracers have been used to evaluate this condition, there are no previous reports of positive ^{68}Ga-prostate-specific membrane antigen positron emission tomography/computed tomography (^{68}Ga-PSMA PET/CT) findings in melorheostosis. This case presents a 70-year-old man with metastatic prostate cancer whose ^{68}Ga-PSMA PET/CT scan revealed intense ^{68}Ga-PSMA uptake in pubic melorheostosis seen on magnetic resonance imaging. The case highlights the possibility of ^{68}Ga-PSMA-avid melorheostosis and suggests ^{68}Ga-PSMA PET/CT may have a role in the evaluation of melorheostosis.

Keywords: Melorheostosis, ^{68}Ga-PSMA, diagnostic challenge, PET/CT, prostate cancer, false positive

Öz

Melorheostozis, kortikal kalınlaşma ve düzensiz hiperostozis ile karakterize nadir görülen benign bir kemik hastalığıdır. Genellikle periferik kemikleri etkiler, ancak aksiyal iskeleti de tutabilir. Bu hastalığın değerlendirilmesinde çeşitli moleküler görüntüleme radyofarmasötikleri kullanılmış olsa da, melorheostoziste pozitif ^{68}Ga-prostat spesifik membran antijeni pozitron emisyon tomografisi/bilgisayarlı tomografi (^{68}Ga-PSMA PET/BT) bulgularına dair daha önce herhangi bir bildirim bulunmamaktadır. Bu olguda, metastatik prostat kanseri olan 70 yaşındaki bir erkek hastada, manyetik rezonans görüntülemede saptanan pubik melorheostozis alanında ^{68}Ga-PSMA PET/BT incelemesinde yoğun ^{68}Ga-PSMA tutulumu gösterilmiştir. Bu olgu, ^{68}Ga-PSMA tutulumu gösteren melorheostozis olasılığını vurgulamakta ve ^{68}Ga-PSMA PET/BT'nin melorheostozisin değerlendirilmesinde rol oynayabileceğini düşündürmektedir.

Anahtar kelimeler: Melorheostozis, ^{68}Ga-PSMA, tanısal zorluk, PET/BT, prostat kanseri, yanlış pozitif

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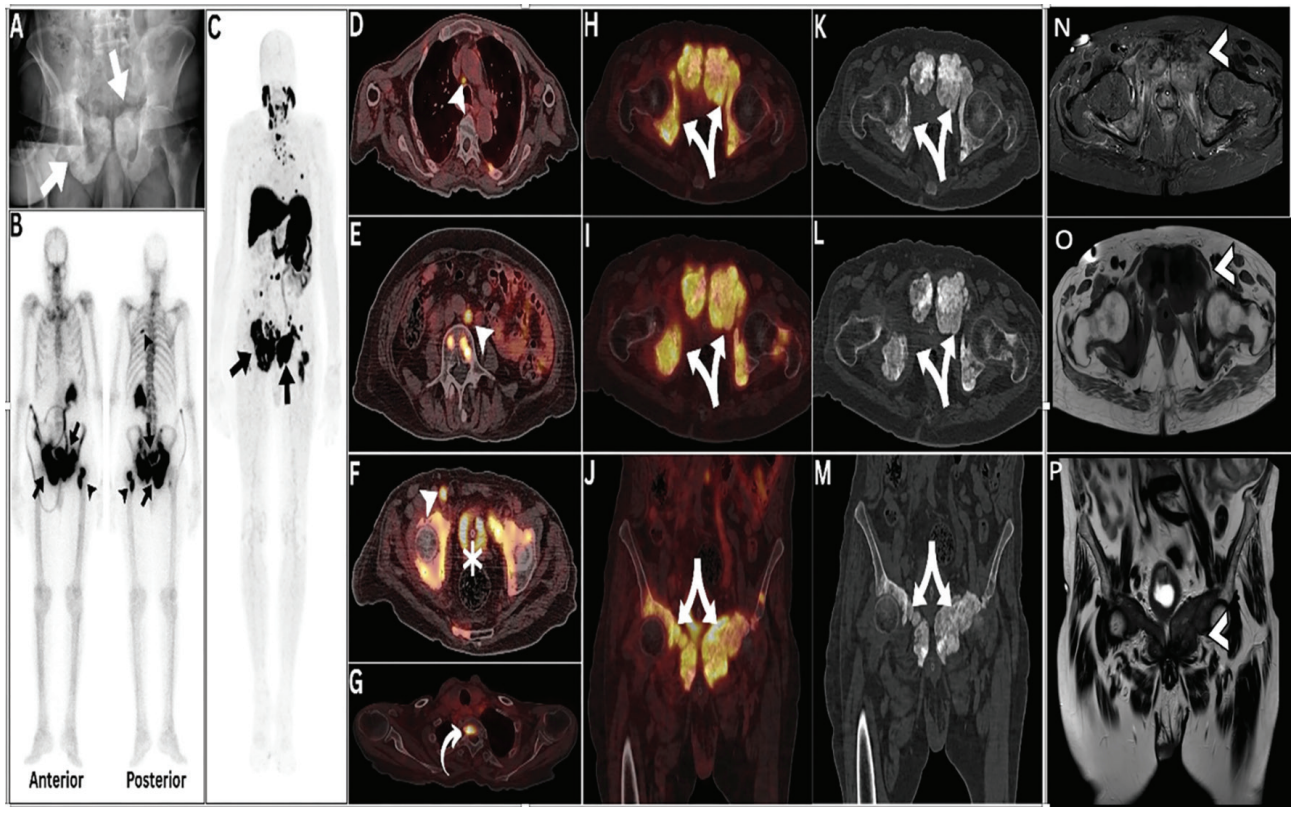

Figure 1. A 70-year-old man with metastatic hormone-sensitive prostate adenocarcinoma, treated with abiraterone and goserelin, developed progressive bilateral pubic pain. The patient provided written informed consent. Lab studies showed significantly elevated prostate-specific antigen and alkaline phosphatase levels. Pelvic X-ray revealed bony expansion with increased bone density and thickened cortex in both pubic bones (A, pelvic radiograph; arrows), which corresponded to an area of increased radiotracer uptake on skeletal scintigraphy (B, anterior and posterior planar skeletal scintigraphy; arrows). Other radiotracer-avid bone lesions were noted on skeletal scintigraphy, raising suspicion for new-onset skeletal metastases (B, anterior and posterior planar skeletal scintigraphy; arrowheads). [68]Ga-prostate-specific membrane antigen positron emission tomography/computed tomography ([68]Ga-PSMA PET/CT), revealed diffuse [68]Ga-PSMA-avid prostatic involvement, and extensive [68]Ga-PSMA-avid lymphadenopathy and bone involvement [C, maximum intensity projection (MIP) PET image, D-G, axial fused images; annotations]. The pubic bones, which corresponded to areas of severe pain, displayed pronounced hyperostosis and a "dripping candlewax" sign consistent with melorheostosis; they also showed intense [68]Ga-PSMA uptake, with a maximum standardized uptake value of 20.2 (C, MIP PET image; H-J, axial and coronal fused PET/CT images; K-M, axial and coronal CT images; arrows). Magnetic resonance imaging further characterized these lesions (arrowheads), demonstrating bilateral cortical and subcortical hyperostosis of the pubic bones with uniformly low signal intensity on T1-weighted images (O) and predominantly low signal intensity on T2-weighted images (P), consistent with dense sclerotic bone. STIR sequences (N) revealed superimposed hyperintensity of the marrow and adjacent soft tissues, indicating associated edema and suggesting metabolically active disease. The patient was diagnosed with metastatic castration-resistant prostate cancer, was started on taxane chemotherapy, and received symptomatic therapy for melorheostosis, which led to rapid relief of pubic bone pain.

In our case; melorheostosis is located in the axial skeleton, more specifically in the pubic bones, which is a rare site of such entity (1,2). It also had increased [68]Ga-PSMA activity, which can be misdiagnosed as bone metastases in patients with prostate cancer (3). The observed expression pattern could be attributable to pronounced hypervascularization within melorheostotic lesions, consequently resulting in increased [68]Ga-PSMA expression (3,4). Also, it can be attributable to the proposition that the RAS signaling pathway, which is implicated in melorheostosis, may interact with other pathways such as TGF-β and PI3K/AKT2 (5). These pathways are known to regulate cellular processes like proliferation and differentiation, suggesting they could influence [68]Ga-PSMA expression in this condition (5). The differential diagnosis encompasses various osseous pathologies, including Paget's disease, heterotopic ossification, and metastatic lesions (6,7,8). Radiological findings showing a dripping candle wax appearance indicated melorheostosis in the patient (4), highlighting the need for clinical follow-up and radiological correlation for accurate diagnosis. To the best of our knowledge, this case describes [68]Ga-PSMA-avid melorheostosis, reported here for the first time, and highlights its relevance as a pitfall in [68]Ga-PSMA PET/CT interpretation, with the aim of preventing false upstaging of prostate cancer and avoiding unwarranted treatment.

Ethics

Informed Consent: The patient provided written informed consent.

Footnotes

Authorship Contributions

Surgical and Medical Practices: D.A.S., A.S.A., A.A-I., Concept: D.A.S., A.S.A., A.A-I., Design: D.A.S., A.S.A., A.A-I., Data Collection or Processing: D.A.S., A.S.A., A.A-I., Literature Search: D.A.S., A.S.A., A.A-I., Writing: D.A.S., A.S.A., A.A-I.

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