Skin Manifestation of Unsuspecting Prostate Cancer Detected by 18F-FDG PET/CT Performed To Assess Underlying Multiple Myeloma

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Abstract Background: Skin metastases from either prostate adenocarcinoma or multiple myeloma rarely occur. We report the case of a 73-year-old man with multiple myeloma who presented with multiple subcutaneous nodules 3 years after his initial diagnosis. Methods: Fluorine-18 fluorodeoxyglucose (18F-FDG) positron emission tomography/computed tomography (PET/CT) imaging was suggestive of a concomitant second primary from the prostate. Results: This case highlights not only a rare initial manifestation of prostate cancer, but also the role of 18F-FDG-PET/CT in detecting a clinically unsuspected second malignancy. Conclusion: It potentially corroborates the possible association of both diseases, as has been reported before.

Keywords Metastatic prostate carcinoma · Multiple myeloma · Subcutaneous nodules · 18F-FDG PET/CT

Introduction

Prostate cancer is one of the most common and lethal cancers in men. It commonly manifests as bony metastases [1]. Cutaneous spread of prostate cancer is very rare, representing less than 1 % of all cutaneous metastases [2]. Similarly, patients with multiple myeloma commonly present with symptoms related to multiple osteolytic lesions and bone marrow plasma infiltration. Skin involvement is a rare occurrence in both multiple myeloma [3, 4] and prostate adenocarcinoma [5]. In both disease

entities, cutaneous involvement is usually associated with advanced disease and poor prognosis [3–5]. We report a patient with underlying multiple myeloma whose initial manifestation of unsuspected prostate cancer was multiple subcutaneous nodules. The constellation of 18F-FDG PET/CT findings raised the index of suspicion for possible underlying prostate cancer. Although rare, cutaneous metastases from prostate cancer have been reported [6–9]. We did not find any reports of cutaneous nodules as the initial manifestation in a patient with clinically unsuspected prostate cancer. Our case is unique in that the findings from 18F-FDG PET/CT led us to instigate relevant investigations for a metachronous tumor. Albeit a surprise, the revelation of metastatic prostate adenocarcinoma from the biopsy of the subcutaneous nodule (which was done after the 18F-FDG-PET/CT scan) further confirmed the PET/CT suspicions.

Case Report

A 73-year-old man had been diagnosed with multiple myeloma (Durie-Salmon staging IIIA) 3 years previously. He had completed six cycles of CDT (cyclophosphamide, dexamethasone, thalidomide) and had been on maintenance thalidomide therapy for the past 2 years. He re-presented with a 3-month history of multiple subcutaneous, non-tender nodules over the sternum, anterior chest wall, right arm, anterior abdomen and left thigh. Clinically, these nodules were thought to represent a manifestation of extramedullary plasmacytoma. 18F-FDG-PET/CT imaging to assess possible progression of the extramedullary component of the underlying multiple myeloma was requested. In view of the rarity of this entity, a biopsy of the subcutaneous sternal nodule was also planned (to be performed after 18F-FDG PET/CT imaging) to verify the clinical suspicion. Bone marrow aspirate and trephine biopsy performed 1 week prior to the scan were negative for active disease.

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Fig. 1 Sagittal PET (a) and fused PET/CT (b) images showing FDG uptake in multiple subcutaneous nodules (*solid arrow*) and bones (*dashed arrow*)

FDG uptake was noted in all the clinically palpable as well as a few other additional subcutaneous nodules that were not palpable clinically (Fig. 1). The SUVmax of these nodules ranged from 3.9 to 9.0. Multiple abnormal FDG-avid sclerotic and lytic lesions were also noted in the skeletal system, predominantly affecting the pelvic girdle. In addition, there were extensive FDG-avid infrarenal abdominal and pelvic nodes (Fig. 2). The morphometabolic appearance of the prostate gland was suspicious as it was enlarged, lobulated and contained specks of calcification. It also demonstrated diffuse, heterogeneously increased

metabolic activity (SUVmax: 5.9) with a superimposed hypermetabolic focus on the left side of the peripheral zone (Fig. 3). In view of this, as well as the pattern of the nodal and bony lesions (bearing in mind the negative marrow biopsy), the possibility of a concomitant second primary from the prostate was suggested. At this juncture, the subcutaneous nodules were nevertheless ascribed to an extramedullary manifestation of disease progression from underlying multiple myeloma.

Guided by the 18F-FDG PET/CT findings, a prostate cancer workup was initiated, and the serum PSA level was indeed

Fig. 2 Coronal PET (a) and fused PET/CT (b) images showing FDG uptake in pelvic and abdominal nodes

Fig. 3 Axial PET (a), fused PET/CT (b) and CT (c) images showing FDG uptake in the prostate

raised. Subsequently, the biopsy of the subcutaneous nodule revealed metastatic prostate adenocarcinoma.

The patient chose conservative treatment and was started on goserelin acetate hormonal treatment.

Discussion

Prostate carcinoma mainly favors the bones and lymph nodes [1]. Cutaneous metastasis is rare, and when it occurs, it usually involves the inguinal region [7]. The chest accounted for 14 % of 78 cases of skin metastasis from prostate cancer. The inguinal region and penis are twice (28 %) more commonly involved and are the most common sites [8]. Skin metastases from prostate carcinoma are usually asymptomatic and may occur at single or multiple sites [9]. Cutaneous metastases rarely ulcerate [10]; indeed, our patient presented with non-ulcerating nodules at multiple sites. The mechanism of cutaneous metastasis from prostate cancer is usually due to hematologic seeding, lymphatic and direct infiltration. The peculiarity of our case is that the initial manifestation of the undiagnosed prostate cancer was cutaneous nodules, which is rare and signifies its advanced stage.

Cutaneous involvement in multiple myeloma is very rare and commonly is due to direct subcutaneous-skin infiltration from the subjacent osteolytic bony lesions [11]. In our patient, none of the subcutaneous nodules were a direct extension of the bony lesions, and the pattern of skeletal involvement pointed more toward metastases from prostate cancer.

The incidence of the simultaneous occurrence of prostate cancer and hematolymphoid malignancies has been reported to be 1.2 % [12]. We are not sure whether the multiple myeloma and prostate cancer in our patient occurred independently or if one disease influenced the development of the other. Kao et al. [13] suggested that consequent immunosuppression and certain chemokines such as interleukin-6 (IL-6) and vascular endothelial growth factor (VEGF), which are released in multiple myeloma, may contribute to prostate cancer progression. The presence of both pathologies in our patient may substantiate the

potential association of the two entities, although further studies are needed to confirm and clarify this association.

In general, a skin lesion is clinically detected. Imaging is not necessary except for assessment of the deeper extension of a particular lesion, and ultrasound is normally employed for such purposes. If clinically suspicious, a biopsy should ensue. Further assessment with other imaging modalities is normally reserved for patients with known underlying malignancy, as skin manifestations usually signify a grave prognosis.

Cutaneous metastases from primary malignancy are relatively uncommon. It is important to differentiate them from benign lesions because they can be the initial manifestation of a visceral malignancy. From our review of the literature, there has been no report of distant skin metastases from prostate cancer detected by FDG-PET/CT. This case highlights the fact that ¹⁸F-FDG-avid skin nodules should always raise suspicion of skin metastases. The patient should be scrutinized for possible underlying malignancy and should be further evaluated.

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