Case Report

Extrapleural solitary fibrous tumor evidenced by ^{68}Ga-prostate-specific membrane antigen positron emission tomography/computed tomography study in the staging of a high-risk prostate cancer patient

ABSTRACT

Positron emission tomography/computed tomography (PET/CT) using ^{68}Ga-labeled prostate-specific membrane antigen (^{68}Ga-PSMA) became an important tool in the prostate cancer (PC) diagnosis. Despite its high sensitivity and specificity, this method may produce false-positive findings, as indicated by previous studies. This case report aims to warn nuclear medicine physicians, oncologists, and urologists about the possibility of false-positive findings using this imaging modality, especially in patients who have already been diagnosed with other malignancies. A 69-year-old man, previously treated for an extrapleural solitary fibrous tumor (ESFT), underwent staging tests after a new diagnosis of high-risk PC. ^{68}Ga-PSMA PET/CT imaging revealed an abnormal uptake in the prostate and in the right humerus. A biopsy was performed, and the pathology showed a lesion consisting of an ESFT metastasis. Diagnostic issues related to ^{68}Ga-PSMA PET/CT imaging should be disseminated to help physicians make appropriate treatment choices for each patient and avoid unnecessary procedures.

Keywords: ^{68}Ga-prostate-specific membrane antigen, bone metastasis, extrapleural solitary fibrous tumor, false-positive result, prostate cancer

INTRODUCTION

Prostate cancer (PC) is considered the second most common type of cancer in men worldwide, with an estimated 1,3 million new cases in 2018.[1] Bones are the most common site of distant metastasis in PC and occur in approximately 70%–84% of patients in the advanced stage.[2] Several studies have confirmed the high detection rate and the excellent diagnostic performance of the positron emission tomography–computed tomography (PET-CT) study with ^{68}Ga-labeled prostate-specific membrane antigen (^{68}Ga-PSMA) in high-risk staging and in the recurrence of PC.[3,4] An accurate detection of the presence of bone metastases is important throughout the course of PC disease to select an ideal treatment strategy and reduce the potential for its possible complications.[5]

Access this article online	
Website: www.wjnm.org	Quick Response Code
DOI: 10.4103/wjnm.WJNM_18_20	

However, despite the high sensitivity and specificity for this pathology, the increase in the uptake of ^{68}Ga-PSMA can also occur in normal structures,[6] benign lesions,[7] and other malignant tumors.[8]

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Submitted: 14-Feb-2020, **Revised:** 06-Mar-2020
Accepted: 31-Mar-2020, **Published:** 22-Jul-2020

How to cite this article: Braga Ribeiro AM, Nascimento TM, Lima EN. Extrapleural solitary fibrous tumor evidenced by ^{68}Ga-prostate-specific membrane antigen positron emission tomography/computed tomography study in the staging of a high-risk prostate cancer patient. World J Nucl Med 2020;19:425-7.

Extrapleural solitary fibrous tumor (ESFT) is a rare mesenchymal neoplasm located in the extremities. Preferably affect patients in the fifth decade and have no gender predilection. The majority is benign and healed by complete excision of the lesion. However, 10%–30% of cases have aggressive biological behavior with late recurrences and/or metastases.[9]

In this case report, we intended to advise oncologists, urologists, and nuclear medicine physicians about the possibility of identifying other pathologies using this modality of diagnostic imaging and thus preventing possible unnecessary treatments from being performed on patients with PC.

CASE REPORT

A.T.P, male, 69 years old, in June 2018, reported a tumor associated with pain in the soft-tissue region of the left forearm. Imaging examinations and a biopsy of the lesion were performed, and a high-grade malignant ESFT was identified. The patient was then submitted to neoadjuvant chemotherapy associated with local radiotherapy and later to marginal resection of the lesion with free margins in the pathological examination.

Six months later, during routine follow-up with his urologist, the patient presented a prostate-specific antigen value of 9.04 ng/mL. He underwent a multiparametric magnetic resonance imaging of the prostate, which demonstrated a highly suspected peripheral prostatic abnormality for clinically significant neoplasia (Prostate Imaging-Reporting and Data System 4). A biopsy of the prostate was then performed by transrectal ultrasound, and the anatomopathological study was compatible with prostate adenocarcinoma, Gleason 9 (4 + 5) in one fragment in the left apex and in two fragments in the left middle third and Gleason 7 (3 + 4) in a fragment at the apex on the right.

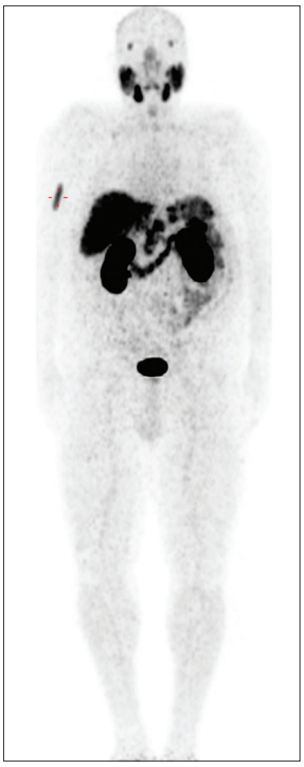

Figure 1: Full-body image in the maximum intensity projection showing the abnormal uptake of ^{68}Ga-labeled prostate-specific membrane antigen in the right humerus (arrow)

In order to complete the PC staging, a PET/CT using a ^{68}Ga-PSMA study was requested. The study demonstrated multiple focal areas of abnormal uptake in the prostate with standard uptake value maximum (SUVmax) up to 5.0 and also a single diffuse intramedullary lesion in the right humerus with SUVmax = 10.8 [Figures 1-3]. No signs of lesions were identified in the pelvic lymph nodes or in the other bones.

By the fact that the bone lesion presents in an uncommon site of PC metastasis, because it does not have common anatomical features of PC, and because the patient had already been treated for a high-grade solitary fibrous tumor (SFT), a biopsy of the humeral lesion was performed to identify its etiology.

Finally, the histopathological and immunohistochemical studies confirmed that the humerus lesion was a metastasis of the SFT and the patient received specific treatment for SFT and specific hormone therapy for PC. The radical prostatectomy was contraindicated, which was the initially planned procedure.

DISCUSSSION

^{68}Ga-PSMA became an important tool in the diagnosis of patients with PC.[3] Despite the high sensitivity and specificity for this pathology, the increased uptake of this radioindicator

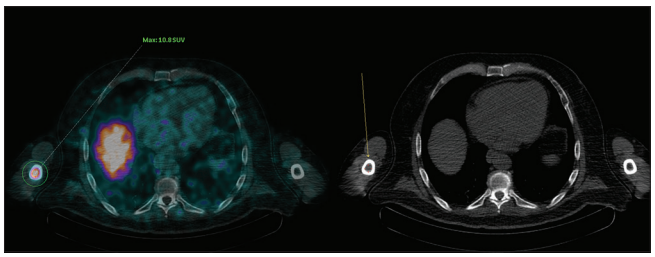

Figure 2: Axial slices from positron emission tomography–computed tomography fusion (left) and low-dose computed tomography (right) demonstrating the intramedullary uptake of ^{68}Ga-labeled prostate-specific membrane antigen in the right humerus with a standard uptake value maximum of 10.8

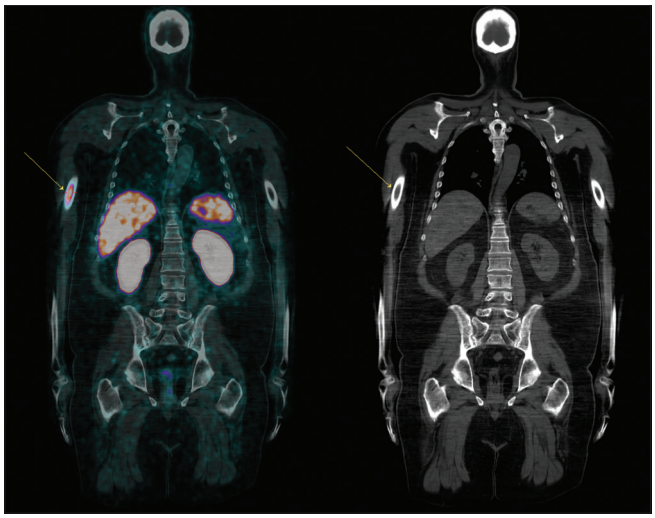

Figure 3: Coronal slices from positron emission tomography–computed tomography fusion (left) and low-dose computed tomography (right) demonstrating the intramedullary uptake of ^{68}Ga-labeled prostate-specific membrane antigen in the right humerus

can also occur in normal structures,[6] benign lesions,[7] and other malignant tumors.[8]

In this report, we identified, for the first time, during the staging of a high-risk PC, an ESFT metastasis. There are an increasing number of reports on the accumulation of ^{68}Ga-PMSA in malignant lesions in addition to PC,[10] and they have already been described in the literature as an overexpression of PSMA in neovascular endothelium of different types of solid epithelial cancer and different malignant soft-tissue tumors,[8] which may explain the presence of PSMA uptake in ESFT, and represent an important pitfall in the clinical use of this diagnostic modality. This knowledge is highly relevant in the interpretation of these studies in patients with PC, providing an adequate direction for treatment.

The present case demonstrates that, although ^{68}Ga-PSMA can be useful in the diagnosis of PC, it can also present possible false-positive results, especially in patients who have already been diagnosed with other malignancies. Thus, physicians should be aware of this when using this diagnostic modality to decide the best treatment option and avoid unnecessary procedures to the patients.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

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