






Case Report

A Rare Case of Metastatic Prostate Cancer to the External Auditory Canal Evaluated with ^{18}F -Piflufolastat PET/CT.

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ABSTRACT

Atypical metastatic spread to the external auditory canal (EAC) from prostate cancer is a very rare condition. To the best of our knowledge, this is the first case reporting a prostate cancer patient with a metastasis in the left EAC evaluated with prostate-specific membrane antigen-positron emission tomography/computed tomography. Nuclear medicine physicians should be aware of this atypical metastatic localisation that can be misdiagnosed.

Keywords: Atypical metastasis, Positron emission tomography/computed tomography, Prostate cancer, Prostate-specific membrane antigen

INTRODUCTION

Prostate cancer is the second-most common cancer among men worldwide.^[1] In case of metastatic disease, this tumour typically spreads to the bones and lymph nodes. nevertheless, the number of reports in the literature about atypical metastatic sites is growing in parallel with the developments of new radiopharmaceuticals and with the continuous advances in positron emission tomography (PET) technology.^[2] In this context, atypical metastases from prostate cancer have been reported in the genitourinary tract (e.g., testicular and penile metastases), in the abdomen (e.g., adrenal, renal, and pancreatic metastases, peritoneal carcinomatosis), in the thorax (e.g., cardiac metastases), in the brain, and in soft tissues (e.g., muscle and skin metastasis).^[2]

^{18}F -Piflufolastat (also known as ^{18}F -DCFPYL) is a PET

radiotracer that binds prostate-specific membrane antigen (PSMA), and it is widely used in clinical practice for prostate cancer staging and restaging.^[3] In this case report, we describe the findings of ^{18}F -Piflufolastat PET/computed tomography (PET/CT) in a prostate cancer patient with atypical metastatic spread to the external auditory canal (EAC), a rare condition that can be misdiagnosed.

CASE REPORT

A 65-year-old male (the authors certify that they have obtained the consent form) with a history of prostate cancer (Gleason Score 9), previously treated with radiotherapy, underwent an ^{18}F -Piflufolastat PET/CT scan due to biochemical recurrence (serum prostate-specific antigen (PSA) 0.76 ng/ml) in February 2025. Moreover, the patient referred a progressive hearing loss, which started 1 month before the examination. About 270 MBq of ^{18}F -Piflufolastat

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were administered intravenously, and PET/CT acquisition from the vertex to the mid-thigh was performed 90 min after radiopharmaceutical injection. PET/CT scan documented high and pathologic uptake of ¹⁸F-PiFluFolastat in the right scapula (maximum standardised uptake value [SUVmax] 6.1), in a lung nodule of the left lung (SUVmax 6.1), and in a pelvic lymph node (SUVmax 14.3) [Fig 1]. These findings were referred to prostate cancer metastases. No evidence of disease recurrence was observed in the prostate gland.



Fig 1: Maximum intensity projection image showing pathological uptake of ¹⁸F-PiFluFolastat in a pelvic lymph node (red arrow), in the right scapula (black arrow), and in a nodule of the left lung (orange arrow). Moreover, pathological uptake of the radiopharmaceutical is shown in the left external auditory canal (green arrow, above the left parotid gland)

Furthermore, ¹⁸F-PiFluFolastat PET/CT images revealed increased uptake of the radiotracer in the left EAC (SUVmax 22.4) [Fig 2]. To better characterise this finding, a subsequent high-resolution CT of the skull was performed, and a soft-tissue mass with a diameter of 16 mm in the left EAC (without destruction of bone) was revealed [Fig 3]. Due to the nonunivocal nature of this soft-tissue mass (initially it was referred to as a possible inflammatory disease), in March 2025, a biopsy was performed, and the result was consistent with prostate cancer metastasis (cancer cells were androgen receptor positive, with a Ki67 proliferation index ≈30%).

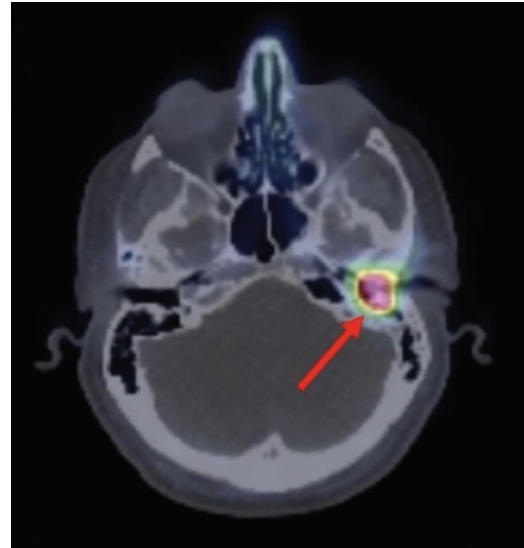


Fig 2: Positron emission tomography/computed tomography axial image showing pathological uptake of ¹⁸F-PiFluFolastat in the left external auditory canal with a maximum standardised uptake value of 22.4 (red arrow)



Fig 3: High-resolution computed tomography axial image showing a soft-tissue mass in the left external auditory canal (red arrow)

DISCUSSION

Malignancies of EAC are extremely rare (with limited data regarding prognosis and overall survival), and they can be divided into primary and metastatic.^[4-6] as regards EAC metastasis, two pathways of metastatic spread from the primary site have been identified (vascular and perineural),^[7] and hearing loss is the most common clinical symptom (followed by otalgia, otorrhagia, and facial paralysis).^[5] Various sites of primary malignancy have been reported in

the literature. In 2024, Epperson *et al.* reviewing 37 cases patients with EAC metastasis, described haematological malignancies as the most frequent primary sites, followed by breast, oesophageal, renal, and prostate cancer;^[5] in addition, Cumberworth *et al.* previously reported 155 cases of metastatic spread to the ear from various tumours, including breast cancer (the most common described by the authors), lung, kidney, and prostate cancer.^[8]

In this context, CT and magnetic resonance imaging may be useful for the evaluation of bone erosion and soft tissue features respectively,^[9] but more evidence is needed to understand the behaviour and to define the diagnostic management of EAC metastasis better: to the best of our knowledge, this is the first case reporting a metastatic prostate cancer patient in the EAC evaluated with PSMA-PET/CT. In a patient with low serum PSA levels (PSA <1 ng/ml), ¹⁸F-Piflufolostat PET/CT demonstrated high uptake of the radiopharmaceutical in the soft-tissue mass localised in the EAC, which was useful as guidance for biopsy in this uncommon site of metastatic spread; in addition, ¹⁸F-Piflufolostat PET/CT was important in the correct definition of disease extension. Interestingly, in our case, there was no bony erosion on CT images, reported in 50% of cases of EAC metastasis as described by Epperson *et al.*^[5] Nuclear medicine physicians should be aware of this rare and atypical metastatic localisation (that can be misdiagnosed), particularly in patients with hearing loss and a history of prostate cancer.

CONCLUSION

EAC malignancies are extremely rare and to the best of our knowledge, this is the first case reporting a prostate cancer patient with a metastasis in the left EAC evaluated with PSMA PET/CT: nuclear medicine physicians should be aware of this rare metastatic localisation, that can be misdiagnosed.

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Declaration of patient consent: The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient has given his consent for his images and other clinical information to

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