



Tracheobronchial Uptake on [⁶⁸Ga]Ga-PSMA-11 PET/CT: An Incidental Finding

Uptake Traqueobrônquico em PET/CT [⁶⁸Ga]Ga-PSMA-11: Um Achado Incidental

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Abstract

Prostate-specific membrane antigen (PSMA) PET/CT is widely used in prostate cancer evaluation but may show uptake in non-prostatic tissues. We report the case of a 69-year-old man with severe COPD and multiple comorbidities undergoing [⁶⁸Ga]Ga-PSMA-11 PET/CT for rising PSA. Imaging revealed heterogeneous prostatic uptake and moderate diffuse tracheobronchial uptake, more intense on the left, along with cervicothoracic ganglia uptake. This case highlights tracheobronchial uptake as a potential pitfall, possibly related to physiologic PSMA expression, and underscores the need for awareness in patients with underlying pulmonary disease.

Keywords: Gallium Radioisotopes; Incidental Findings; Positron Emission Tomography Computed Tomography; Prostatic Neoplasms

Resumo

A tomografia por emissão de positrões com tomografia computadorizada com radioligandos PSMA (PSMA PET/CT) é amplamente utilizada na avaliação do cancro da próstata, podendo, contudo, evidenciar captação em tecidos extraprostáticos. Apresentamos o caso de um homem de 69 anos, com DPOC grave e múltiplas comorbilidades, submetido a PET/CT com [⁶⁸Ga]Ga-PSMA-11 por aumento progressivo de PSA. O exame revelou captação heterogénea prostática e captação traqueobrônquica difusa moderada, mais intensa à esquerda. Este caso evidencia a captação traqueobrônquica como possível pitfall, sublinhando a importância do seu reconhecimento em doentes com patologia pulmonar.

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Palavras-chave: Achados Incidentais; Neoplasias da Próstata; Radioisótopos de Gálio; Tomografia por Emissão de Positrões com Tomografia Computorizada

Prostate-specific membrane antigen (PSMA) PET/CT imaging is increasingly utilised for detecting and staging prostate cancer with high sensitivity and specificity. However, PSMA expression is not exclusive to prostate tissue, being also present in various normal and pathological tissues, potentially leading to diagnostic challenges. Tracheobronchial uptake of PSMA tracers, though an under-recognized pitfall, has been documented and is sometimes associated with underlying pulmonary conditions.

We present the case of a 69-year-old male, active smoker with a medical history of type 2 diabetes, dyslipidemia, arterial hypertension, ischemic cardiomyopathy (previous acute myocardial infarction), chronic renal disease, 10 mm pulmonary nodule (under follow-up) and chronic obstructive pulmonary disease (COPD),

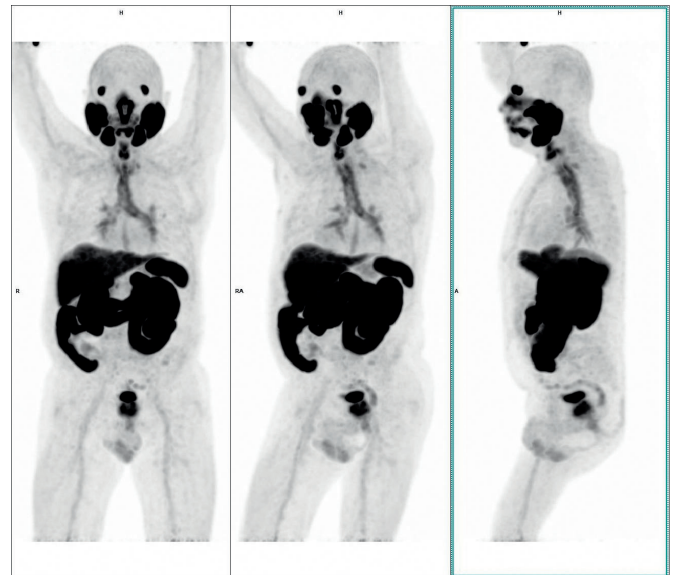


Figure 1 – Full body MIP (maximum intensity projection) images (left to right - in anterior, antero-lateral and left projections) showing moderate diffuse uptake in the trachea and bilateral bronchi, with higher intensity on the left side

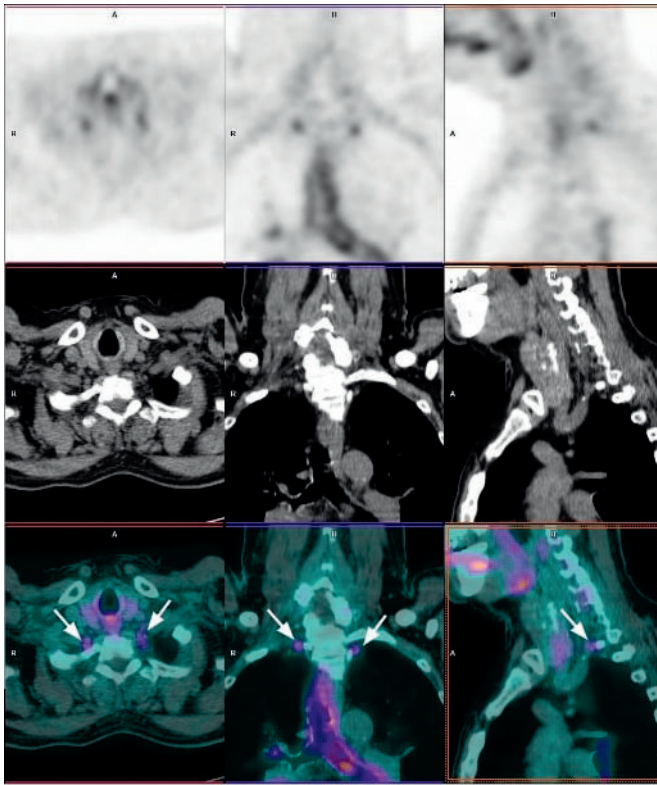


Figure 2 – PET, CT and fused PET/CT images (from top to bottom) in transaxial, coronal and sagittal planes (left to right) showing bilateral uptake in cervicothoracic ganglia of the autonomic nervous system (white arrows).

stable under supplemental oxygen therapy (SOT) 24 hours a day (2 L/min at rest and 5 L/min during exercise). He underwent a [⁶⁸Ga]Ga-PSMA-11 PET/CT scan due to analytical suspicion of prostate cancer (progressive increase in PSA levels).

PET scan revealed heterogeneous uptake in the prostate and moderate diffuse uptake in the trachea and bilateral bronchi, with a higher intensity on the left side. Such a pattern of lower-airway uptake is unusual and nonspecific but has been previously reported. Additionally, uptake in the cervicothoracic ganglia of the autonomic nervous system, a more frequent pitfall, was also seen. Given multiple and complex comorbidities and consequent high risk of complications post-prostatic biopsy, androgen deprivation therapy was started. PSA levels decreased (from 18.39 ng/mL to 7.0 ng/mL). The patient remains clinically stable under SOT.

While PSMA PET/CT is primarily employed for prostate cancer imaging, incidental findings occur. The etiology of tracheobronchial uptake is not fully understood, and it has been observed more frequently in [18F]DCFPyL PET/CT scans compared to [⁶⁸Ga]Ga-PSMA-11 PET/CT.¹ Two published case reports exist of tracheobronchial [⁶⁸Ga]Ga-PSMA-11 uptake associated with inflammation: one with asthma exacerbation² and another with

a case of COVID-19.³ In a study by Osman *et al*,⁴ nonspecific tracheal uptake was noted in 31 of 100 patients undergoing [18F]DCFPyL PET/CT, with histopathologic analysis revealing PSMA expression in bronchial submucosal glands. The authors suggested that tracheobronchial uptake may be attributed to physiologic PSMA expression in these glands, possibly concerning increased autonomic tone. Inflammatory up-regulation, chronic hypoxia or smoking may also be influencing factors. This case underscores the importance of recognising potential pitfalls in PSMA PET/CT imaging, particularly in patients with underlying pulmonary conditions such as COPD. Clinicians should be aware of such incidental findings to avoid misinterpretation and ensure accurate diagnosis and management. Further studies are warranted to better understand the mechanisms and clinical relevance of tracheobronchial PSMA uptake.

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ICF: Conceptualization, methodology, data analysis, and writing.

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OLS: Writing and validation.

JR: Critical review.

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ICF: *Conceptualização, metodologia, análise de dados e redação.*

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