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Unveiling Infectious Pericarditis and Stent Infection with 18F-FDG PET-CT in a Lung Cancer Patient: A Diagnostic Turning Point

Salah Oueriagli Nabih[1], Ikram Zahfir[2], Omar Ait Sahel[3], Pr. Abderrahim Doudouh.[4]

[1]***De*partment of Nuclear Medicine, Mohammed V Military Teaching Hospital, BP 10045, Rabat -Morocco-**
Email: salah.nabihoueriagli@gmail.com
[2]Nuclear Medicine, Mohammed V Military Teaching Hospital, BP 10045, Rabat -Morocco- *ikramzahfir*@gmail.com.
[3]*De*partment of Nuclear Medicine, Mohammed V Military Teaching Hospital, BP 10045, Rabat -Morocco- *Omaraitsahel*85@gmail.com.
[4]*De*partment of Nuclear Medicine, Mohammed V Military Teaching Hospital, BP 100045, Rabat -Morocco- *adoudouh0@gmail.com*

ABSTRACT :

Pericarditis is an inflammatory disorder of the pericardium, caused by a range of factors, including infectious, inflammatory, and malignant conditions. Diagnosing the underlying cause is often challenging. This case report discusses a 64-year-old male with a history of cardiovascular disease and lung adenocarcinoma, who presented with suspected infectious pericarditis. The 18F-fluorodeoxyglucose positron emission tomography-computed tomography (18F-FDG PET-CT) was essential in identifying methicillin-resistant *Staphylococcus aureus* (MRSA) infection related to pericarditis, illustrating the expanding role of PET-CT beyond oncology. This case highlights its importance in diagnosing infectious cardiac conditions, particularly in immunocompromised patients.

Key words: 18F-FDG PET-CT, pericarditis, lung adenocarcinoma, stent infection.

Introduction

Pericarditis is an inflammatory condition affecting the pericardium, with causes ranging from viral to bacterial infections, autoimmune disorders, and malignancy. Determining the precise etiology remains difficult, particularly when patients have multiple comorbidities or overlapping symptoms. [1]

18F-FDG PET-CT, initially developed for cancer imaging, has emerged as a valuable tool for detecting cardiac and pericardial inflammation. However, the physiological uptake of FDG in cardiac tissues can complicate its interpretation, underscoring the need for proper patient preparation. Our case demonstrates the utility of PET-CT in diagnosing infectious pericarditis in a patient with a history of lung adenocarcinoma and coronary artery disease.

Case Presentation :

A 64-year-old male with a background of inferior ST-elevation myocardial infarction, managed with percutaneous coronary intervention and bare-metal stent placement in the right coronary artery, was diagnosed with lung adenocarcinoma. As part of his oncologic staging, he underwent 18F-FDG PET-CT. At the time of imaging, the patient presented with midsternal chest pain and fever (39°C), raising concerns of a systemic infection due to his immunocompromised state. 18F-FDG PET-CT scan showed several notable findings: intense FDG uptake at the site of the coronary stent (SUVmax = 6.8), widespread pericardial activity (SUVmax = 9.9), and multiple splenic foci with high FDG uptake, suggestive of microabscesses or septic emboli. Laboratory tests revealed leukocytosis (18,100/mm³), and blood cultures confirmed methicillin-resistant *Staphylococcus aureus* (MRSA) bacteremia. Chest radiography revealed a mildly enlarged cardiac silhouette, and transesophageal echocardiography showed a small pericardial effusion. Given these findings, infectious pericarditis and possible stent infection were diagnosed. The patient received broad-spectrum antibiotics, later adjusted to vancomycin after culture results, and showed significant clinical improvement within 72 hours.

Discussion

Infectious pericarditis, though less common than idiopathic or viral causes, poses a significant clinical challenge, particularly in patients with lung cancer or other immunocompromised conditions. [1-2] The clinical presentation often overlaps with other forms of pericardial inflammation, making the diagnosis difficult. Traditional imaging techniques like echocardiography and CT scans provide structural data but may miss early or mild inflammation. In contrast, 18F-FDG PET-CT offers a unique advantage by capturing metabolic changes associated with inflammation, making it a valuable tool for diagnosing cardiac infections, including pericarditis. [3-4]

It is essential to recognize that myocardial FDG uptake can be physiological, especially in the left ventricle during fasting. Therefore, proper preparation, including extended fasting (8–12 hours), is critical to suppress baseline myocardial glucose uptake, improving the specificity of the imaging. [5] Despite optimal preparation, interpreting PET-CT images requires a comprehensive understanding of the clinical context and the potential for overlap with other conditions.

The diagnosis of coronary stent infection in this patient demonstrates the utility of PET-CT in detecting infections of vascular and cardiac devices, which are often challenging to identify with conventional imaging methods. Infections at the site of a coronary stent can present with nonspecific symptoms and are often underdiagnosed. PET-CT's ability to detect increased metabolic activity at the stent site allowed for a targeted diagnosis, corroborating prior studies highlighting the value of PET-CT in detecting prosthetic device infections. [4]

The presence of splenic microabscesses further reinforced the diagnosis of a systemic infection with septic embolization. This case underscores the broad diagnostic capabilities of PET-CT, which is not only useful in oncological imaging but also in evaluating secondary complications in cardiovascular and infectious diseases.

Differentiating between benign and malignant pericarditis on FDG PET-CT remains challenging. Neoplastic conditions typically show focal, intense uptake, often accompanied by soft tissue masses, while inflammatory pericarditis may exhibit diffuse and less intense uptake. [6-7] In the case of our patient, the diffuse pericardial uptake, in the context of a positive infection history, pointed to an infectious etiology rather than malignancy.

While PET-CT is a powerful diagnostic tool, its use in non-oncological settings requires careful interpretation. Studies have demonstrated that initial PET-CT staging in lung cancer patients can impact clinical management, and its findings may lead to changes in treatment strategies, as seen in Takeuchi et al.'s research. [8]

Conclusion :

This case emphasizes the diagnostic power of 18F-FDG PET-CT in identifying infectious cardiac conditions, particularly in immunocompromised patients. By enabling early diagnosis of infectious pericarditis and stent infection, PET-CT facilitated targeted treatment, leading to significant clinical improvement. The findings support the broader application of PET-CT in cardiovascular and infectious disease contexts beyond oncology.

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Conflict of Interest

Authors declare that they have no competing interests.

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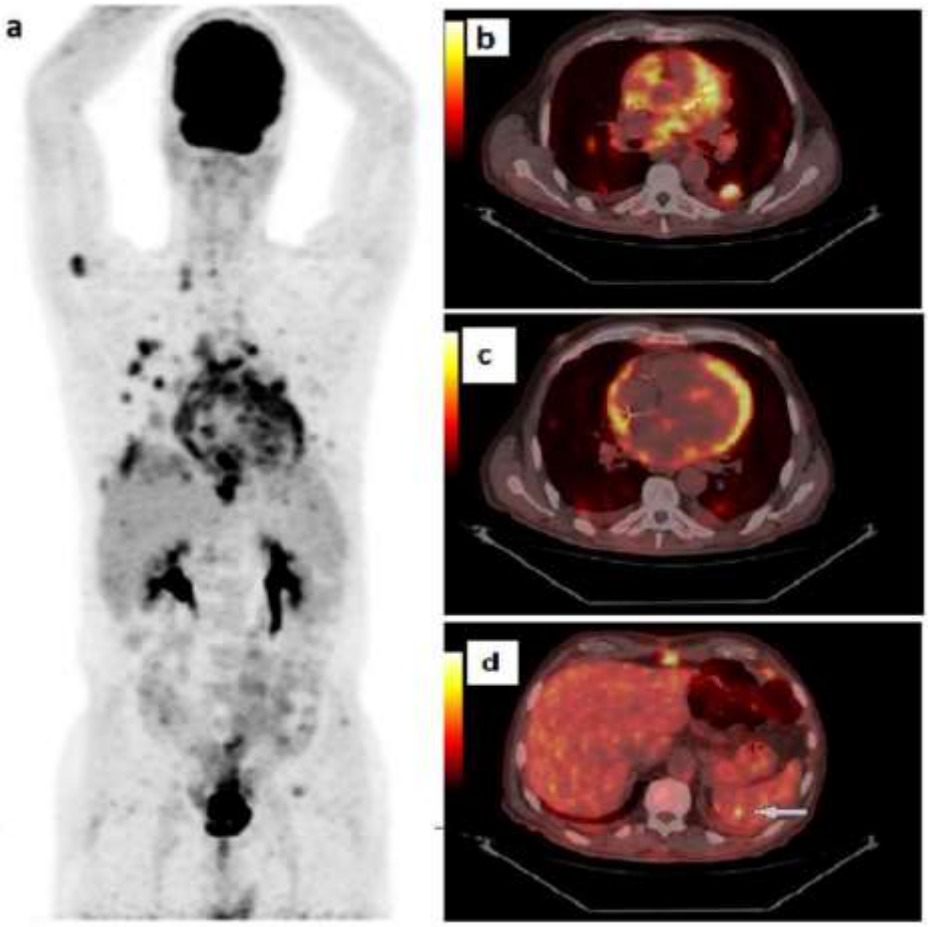

Figure 1: (a) Maximum Intensity Projection (MIP). 3D Whole body scan showing physiological and pathological distribution of the radiopharmaceutical product (18F-FDG). **(b)** Fusion image in axial section showing intense uptake of 18F-FDG interesting the bare metal stent related to a stent infection (SUVmax=6.8). **(c)** Fusion image in axial section showing intense hyper metabolism interesting pericardial wall (SUVmax=9.9). **(d)** Fusion image in axial section showing hot spot in the spleen relative to a systemic infection.