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CASE REPORT

Misinterpretation of [^{99m}Tc]Tc-Octreotide scan due to accessory spleen in a patient with well-differentiated neuroendocrine tumor: A case report

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ABSTRACT

A 76-year-old woman with a medical history of type II diabetes and hypertension underwent an upper gastrointestinal endoscopy due to persistent dyspepsia and epigastric pain for the past six months. During the procedure, the gastroenterologist identified multiple small polyps in the antrum and distal pylorus, which were subsequently removed. The polyps were sent to pathology, and the final report revealed a diagnosis of a well-differentiated (low-grade) neuroendocrine tumor. Afterward, the patient was referred to nuclear medicine for a whole-body scan using [^{99m}Tc]Tc-Octreotide. The resulting images demonstrated a focal increased activity in the upper left quadrant of the abdomen. To clarify the diagnosis, SPECT/CT imaging was employed to evaluate the area of concern, which showed a focal uptake in the basal part of the left lung, raising suspicion for lung metastasis. However, a subsequent diagnostic CT demonstrated an accessory spleen in that region. It was later determined that there was misregistration in the SPECT/CT study, which is a common finding in this region. This case underscores the potential for misinterpretation of imaging results, where uptake in an accessory spleen can be mistaken for metastatic disease.

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INTRODUCTION

Neuroendocrine tumors (NETs) are neoplasms arising from neuroendocrine cells found throughout the body. These cells generate different peptides and neuro-amines that can cause a spectrum of clinical symptoms, depending on the tumor location and the secreted substances. The incidence of NETs has been increasing, which can be attributed to greater awareness and advancements in diagnostic techniques. Imaging plays a crucial role in diagnosing, staging, and follow-up of these tumors. Given the frequent overexpression of somatostatin receptors in NETs, [^{99m}Tc]Tc-Octreotide scans are commonly employed. However, these scans can yield false positive results which may lead to potential misdiagnosis [1-5].

CASE PRESENTATION

A 76-year-old woman presented to our clinic complaining of dyspepsia and epigastric pain, both lasting six months. The patient described her complaints as a burning sensation occasionally radiating to her back with accompanying early satiety and nausea. Her symptoms had consistently become aggravated, prompting her to investigate. Besides, she was a known case of Diabetes Mellitus (type 2) and hypertension.

An upper gastrointestinal endoscopy showed a 2×2 mm polyp in the antrum, two sessile polyps in the duodenal bulb, and a 10×5 mm polyp in the distal part of the pylorus, which were resected during the procedure. The histopathological examination revealed these polyps were well-differentiated NETs (G1).

Accordingly, she underwent a whole-body [^{99m}Tc]Tc-Octreotide to find potential metastatic disease, which demonstrated a focal area of increased radiotracer uptake in the upper left part of the hypochondriac region (Figure 1).

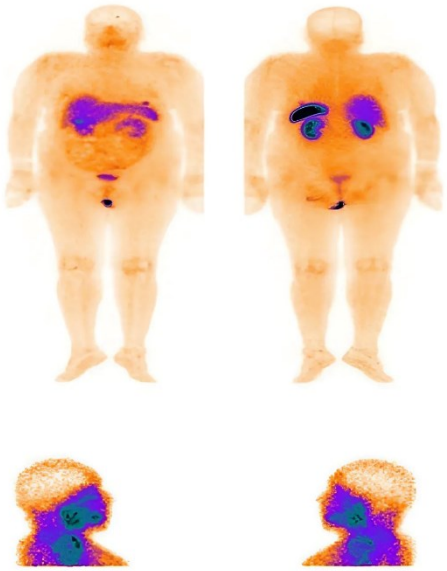

Figure 1. Anterior and posterior views of whole-body scan conducted three hours after administering 20 mCi of [^{99m}Tc]Tc-Octreotide scan demonstrate a focal area of raised radiotracer uptake in the upper left part of the hypochondriac region

Moreover, SPECT/CT was conducted, suggesting focal uptake in the basal part of the left lung, which raised concerns for lung metastasis (Figure 2). A CT scan of the chest and abdomen confirmed the presence of an accessory spleen (Figure 3), which explained the radiotracer uptake observed in the [^{99m}c]Tc-Octreotide scan. Further retrospective analysis unveiled misregistration in the SPECT/CT study, a common artifact in this region.

This case highlighted the importance of considering accessory spleens in differential diagnoses, when interpreting [^{99m}Tc]Tc-Octreotide scans, particularly in regions where misregistration artifacts are likely, such as at the base of the lungs. Accessory spleens are congenital anomalies found in approximately 10-30% of the population [6-8] and usually present asymptotically, meaning they are often detected incidentally during imaging for other workups.

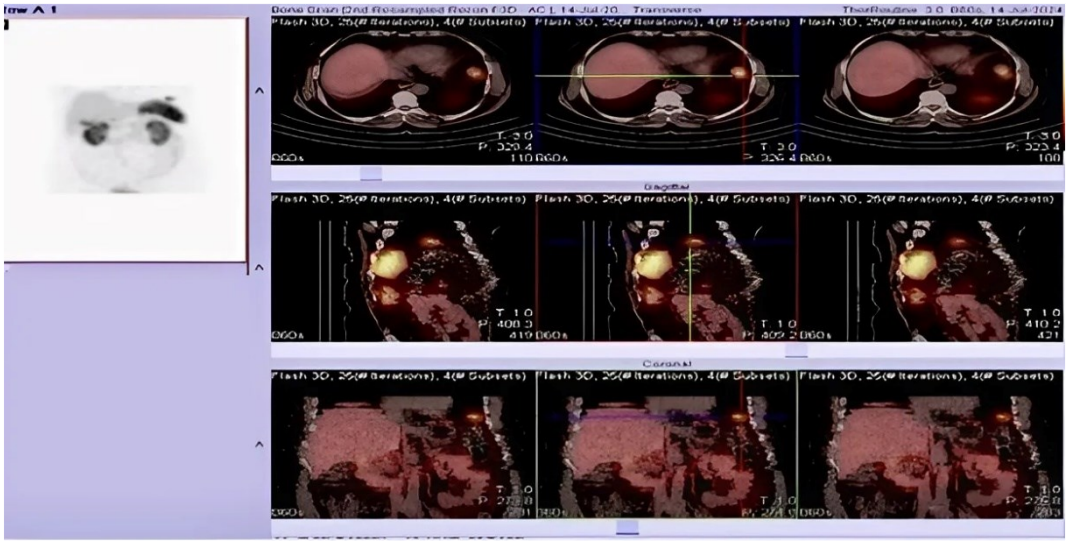

Figure 2. Transaxial, sagittal, and coronal slices of the SPECT/CT images revealed a focal uptake in the basal part of the left lung, raising concerns about possible lung metastasis

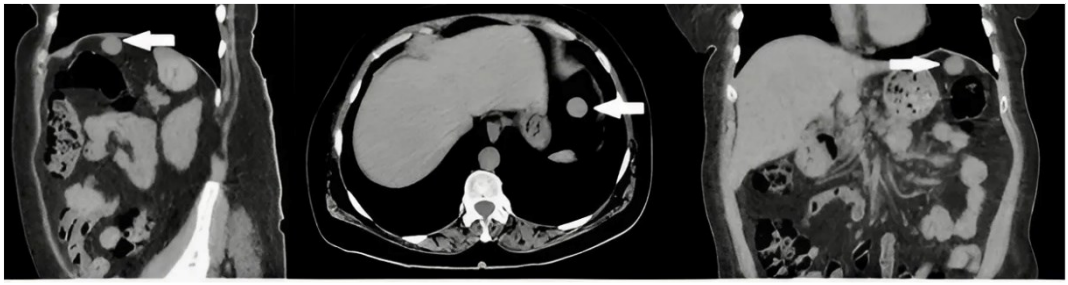

Figure 3. Sagittal, transaxial, and coronal slices of the CT scan of the chest and abdomen confirmed the presence of an accessory spleen located below the left hemidiaphragm

Although in this patient, the focal uptake initially raised suspicion for metastatic disease, which is a common complication of NETs, hybrid imaging using SPECT/CT, and the subsequent diagnostic CT led to a definitive diagnosis of an accessory spleen; hence, unnecessary treatment was avoided alleviating the patient's anxiety.

NETs are a diverse group of tumors able to secrete hormones, leading to various clinical syndromes depending on the specific hormone produced and the location of metastasis. Imaging is deployed to detect primary tumors, identify metastatic disease, and assess the extent of disease spread. One common imaging method is somatostatin receptor scintigraphy (SRS) with [^{99m}Tc]Tc-Octreotide which in known for its high sensitivity and specificity for detecting NETs. However, interpreting SRS can be challenging. This arises due to the physiological uptake of the radiotracer in various organs such as the spleen, kidneys, and liver. Additionally, there is potential for false-positive results from non-malignant conditions such as accessory spleens, granulomas, and inflammation. Consequently, interpreting SRS can be challenging [3, 4, 9-11].

Due to respiratory motion and different acquisition times between SPECT and CT components, misregistration artifacts on SPECT/CT hybrid imaging typically occurs at the base of the lungs. This can lead to false-positive findings, as observed in the current case. An accessory spleen was mistaken for a metastatic lesion because of its location and the features of its radiotracer uptake [12, 13]. Accessory spleens are commonly benign and asymptomatic; however, it is crucial to identify them in oncology to prevent misdiagnosis. Diagnostic CT imaging provides precise anatomical details that are essential to distinguish accessory spleen from pathological lesions, underscoring the importance of careful correlation between functional and anatomical imaging to avoid potential interpretation errors. In situations where differentiating between an accessory spleen and metastatic lesions is difficult, a denatured RBC scan

can be a valuable diagnostic tool. This scan specifically identifies splenic tissue, thereby helping to avoid potential misdiagnoses and unnecessary interventions.

CONCLUSION

This case illustrates how anatomical variations such as accessory spleens can lead to misinterpretation of [^{99m}Tc]Tc-Octreotide scans. It is essential to carefully correlate anatomical imaging modalities, such as diagnostic CT and SPECT/CT, to achieve an accurate diagnosis and differentiate between benign findings and actual pathological uptake. Clinicians should remain vigilant to avoid incorrect diagnoses that could result in inappropriate treatment for patient with neuroendocrine tumors (NETs).

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