The role of splenic scintigraphy in the diagnosis of thoracic nodules

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Keywords: Splenic scintigraphy - Thoracic nodules - Thoracic splenosis - Splenectomy

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Received:
2 February 2025
Accepted revised:
4 Jul 2025

Abstract
Thoracic splenosis is the presence of acquired ectopic splenic tissue within the thoracic cavity, typically following thoracoabdominal trauma or surgery. It is mostly asymptomatic and detected incidentally on radiography or tomography. A 64-year-old man was admitted with exertional dyspnea without any other respiratory complaints. The patient had a history of diabetes mellitus and hypertension and had undergone bilateral lung surgery and splenectomy due to a traffic accident 30 years ago. Thoracic computed tomograph (CT) revealed an 11x7mm nodular lesion in the posterobasal lower lobe of the left lung, multiple millimetric nodular lesions in the pleura corresponding to the left lung operation site, a focal defect in the right diaphragm, and liver herniation in this area. The diagnosis of 'thoracic splenosis' was made by splenic scintigraphy.

Hell J Nucl Med 2025; 28(2): 173-175 *Epub ahead of print: 4 August 2025* *Published online: 30 August 2025*

Introduction

A 64-year-old male presented to our outpatient clinic with chronic exertional dyspnea. The patient was a non-smoker and reported no additional respiratory or cardiac symptoms. His medical history included diabetes mellitus and hypertension. He also had a history of bilateral lung surgery and splenectomy following a traffic accident 30 years ago. There was no family history of malignancy, nor did the patient report asbestos exposure. His physical examination was unremarkable, and respiratory function tests were within normal limits. Thoracic computed tomography (CT) revealed an 11 ×7mm nodular lesion in the posterobasal segment of the left lower lobe, multiple millimetric nodules in the pleura near the site of the left lung operation, a focal defect in the right diaphragm, and herniation of the liver through this defect. The absence of malignancy-related symptoms, a family history of cancer, or smoking history, combined with the patient's splenectomy, raised the suspicion of thoracic splenosis. Spleen scintigraphy and single photon emission computed tomography (SPECT) imaging using heat-denatured erythrocyte-labeled technetium-99m (^{99m}Tc) confirmed the diagnosis. The imaging showed intense fusiform activity uptake extending vertically across 3-4 rib spaces at the upper ribs on the posterolateral side of the left chest wall and focal activity in 3-4 areas in the splenic region. Based on these findings, the patient was diagnosed with thoracic splenosis and placed under follow-up care.

Thoracic splenosis is the presence of acquired ectopic splenic tissue within the thoracic cavity, typically following thoracoabdominal trauma or surgery. It is mostly asymptomatic and detected incidentally on radiography or tomography. The mean interval between trauma and detection of thoracic splenosis is 21 years, ranging from 3 to 45 years [1].

Intrathoracic splenosis develops with the simultaneous rupture of the diaphragm and spleen, migration of splenic tissue into the hemithorax, and proliferation on the serous surface of the pleura [2]. Splenic implants are usually observed as benign, round, smooth, sessile pleural-based nodules in the left hemithorax [3]. On CT, the attenuation of the lesions resembles the normal splenic appearance. Scintigraphic imaging techniques, such as those using indium-111 labeled platelets, denatured erythrocytes, or ^{99m}Tc labeled sulfur colloid, are effective for detecting ectopic splenic tissue, including splenosis and accessory spleens. Among these, splenic scintigraphy with ^{99m}Tc labeled denatured erythrocytes is commonly favored due to its greater availability compared to indium-111 [4].

Following the administration of the radiopharmaceutical, ^{99m}Tc labeled denatured erythrocytes are selectively sequestered by splenic tissue, allowing for a highly accurate and specific diagnosis [5]. Single photon emission computed tomography or hybrid SPECT/CT imaging, when used alongside planar imaging, reduces activity overlap seen in planar images and offers additional three-dimensional cross-sectional localization of the focus [4]. In our case, to aid in the differential diagnosis of suspicious nodular lesions detected on thoracic CT scans, we performed SPECT imaging at our institution. The scintigraphic planar images and SPECT images were compared with the thoracic CT images for interpretation.

In cases of pleural nodules, a history of thoracoabdominal trauma or surgery should raise suspicion for a diagnosis of thoracic splenosis. Confirming the diagnosis through splenic scintigraphy can prevent the patient from undergoing unnecessary biopsies or surgeries, along with the associated risks and complications [6]. Additionally, it is important to note that thoracic splenosis carries a high risk of bleeding during surgical procedures due to the presence of functional splenic tissue lesions [7].

Thoracicsplenosis is usually a slow-growing and non-invasive condition. If splenic tissue is large, it may lead to symptoms such as shortness of breath, hemoptysis, and chest pain. Asymptomatic surgical resection is generally not recommended. In splenosis, splenic tissue is active and receives blood from surrounding tissues, potentially contributing to immune defense.

The authors declare that they have no conflicts of interest.

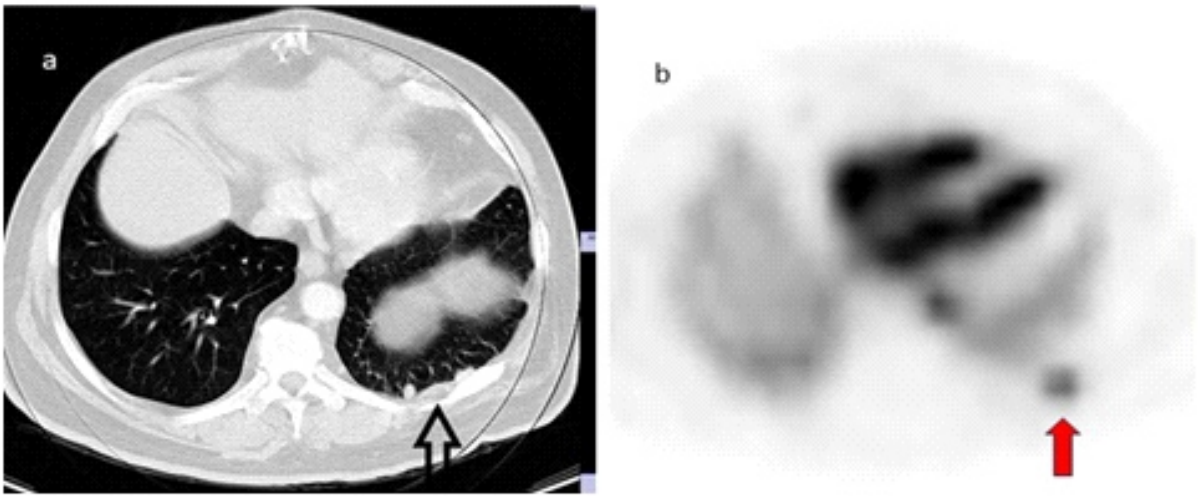

Figure 1. a) Thoracic CT shows a multiple nodular lesion measuring 11×7mm in the pleura adjacent to the posterobasal segment of the left lower lobe of the lung (arrow). b) Selective spleen scintigraphy SPECT transaxial section reveals focal activity (red arrow) beneath the costal margin, located in the pleura adjacent to the posterobasal segment of the left lower lung lobe.

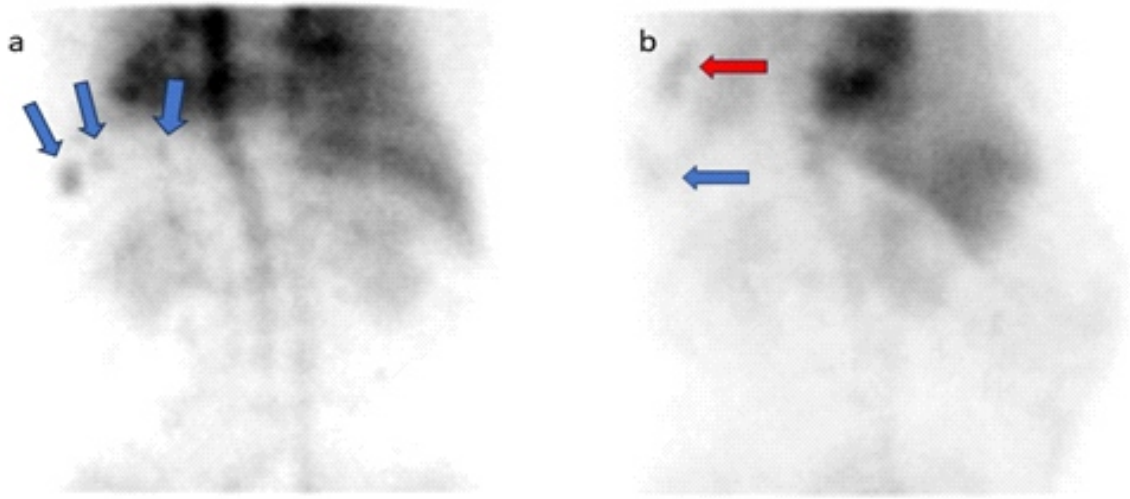

Figure 2. Selective spleen scintigraphy using heat-denatured erythrocyte-labeled technetium-99m: a) Posterior planar image shows focal activity uptake in three distinct foci within the splenic region (blue arrows). b) Lateral planar image reveals fusiform activity uptake extending vertically across 3-4 rib spaces beneath the pleura adjacent to the posterolateral segment of the left chest wall (red arrow) and focal activity uptake in the splenic region (blue arrow).

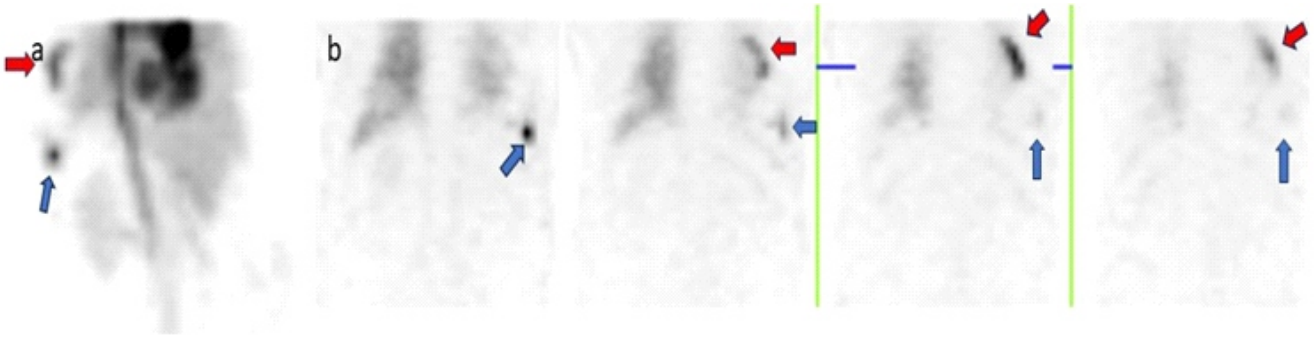

Figure 3. Selective spleen scintigraphy SPECT images using heat-denatured erythrocyte-labeled technetium-99m: a)Posterolateral image. b) Coronal view across four consecutive slices shows fusiform activity uptake (red arrow) extending vertically over 3-4 rib spaces beneath the pleura adjacent to the posterolateral segment of the left chest wall, along with focal activity uptake (blue arrow) in the splenic region.

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