



## Case report

## Thoracic splenosis as a differential diagnosis of juxtapleural nodules

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## ABSTRACT

Thoracic splenosis is rare and consists of ectopic implantation of splenic tissue into the chest after concomitant thoracic and abdominal trauma with diaphragm injury. It occurs in about 18% of cases of splenic ruptures. In almost all cases, diagnosis is given incidentally once patients are usually asymptomatic. Thoracic splenosis should be considered as a differential diagnosis in all patients with history of trauma presenting with juxtapleural nodules in chest computed tomography. However, malignant conditions should be ruled out firstly. Biopsy is not essential for the diagnosis once nuclear medicine can confirm splenosis in patients with pertinent history of trauma and suggestive tomographic image. We present a typical case of thoracic splenosis whose diagnosis was made by nuclear medicine and no invasive procedures were required.

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## 1. Introduction

Thoracic splenosis (TS) is a rare condition resulting from auto-transplantation of splenic tissue into the chest after thoracoabdominal trauma with spleen and diaphragm injuries [1]. Generally, patients are asymptomatic and diagnosis is given incidentally [2,3]. When juxtapleural nodules are visualized in a chest computed tomography (CT), TS should be considered as a differential diagnosis in patients with history of trauma. However, it is important to rule out some conditions that may present similar radiological findings, especially the neoplastic ones. If the patient has pertinent history of trauma and suggestive tomographic image, it is possible to proceed with nuclear medicine studies to confirm the diagnosis without biopsy. The management is expectant except in symptomatic patients and in those which the diagnosis of splenosis is not clear and other conditions should be excluded [4].

We present a case of a typical clinical and radiologic TS whose diagnosis was given by nuclear medicine and invasive diagnostic procedures were avoided.

## 2. Case report

A woman aged 54 born in Lebanon was admitted to the emergency room presenting cough with yellow sputum, dyspnea,

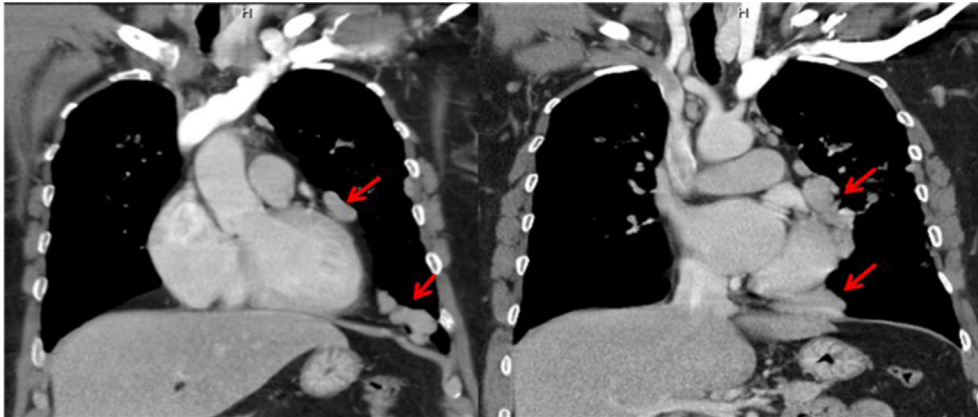
wheezing and fever (39 °C – axillary temperature) for two days. No other symptoms and no smoking history. About 40 years ago she underwent splenectomy due to splenic lesions suffered in a bomb accident during Lebanon War. At first, the case was conducted as a bacterial pneumonia and improvement was seen after seven days of antibiotic therapy. During hospitalization, chest CT caught the attention of medical team because besides the infectious process, it was observed multiple mediastinal and juxtapleural nodules, predominantly on the left side (Fig. 1). Nodules aspect was nonspecific but with a history of trauma and splenectomy TS was a diagnostic hypothesis. In 99m-technetium (99m-Tc) stain colloid scintigraphy, radionuclide anomalous concentrated in the chest at the same topography of nodules seen on CT (Fig. 2). Thus, the diagnosis of TS was confirmed and the patient was discharged after taking antibiotics without surgical approach since she was asymptomatic.

## 3. Discussion

Thoracic splenosis is a rare condition of splenic tissue auto-transplantation into the chest following thoracoabdominal trauma with concomitant lesions of spleen and diaphragm [1]. The time interval between trauma and diagnosis usually ranges from one to 42 years with a mean of 18.8 years [3]. Chest implantation is less frequent than abdominal and occurs in about 18% of cases of splenic rupture [5]. However, the real prevalence is underestimated since most of the patients are asymptomatic and the diagnosis is

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**Fig. 1.** Chest CT scan with multiple pleural and mediastinal nodules predominantly on the left side, most of them elongated/lobulated, the largest ones at cardiophrenic and costophrenic sinus measuring up to  $6.2 \times 2.8$  cm.

incidental [2,3]. There are few reports of recurrent hemoptysis and pleuritic pain [6–8].

Generally, splenic tissue implants on serosal surfaces and when it migrates into the chest the left side is preferable because of the spleen anatomical position [9]. Pulmonary parenchyma is an uncommon site of implantation [4]. Nodules are multiple in 75% of patients and isolated in approximately 25% [10]. They normally reach up to 3 cm in diameter but in some cases TS can grow into an intrathoracic mass [11–13].

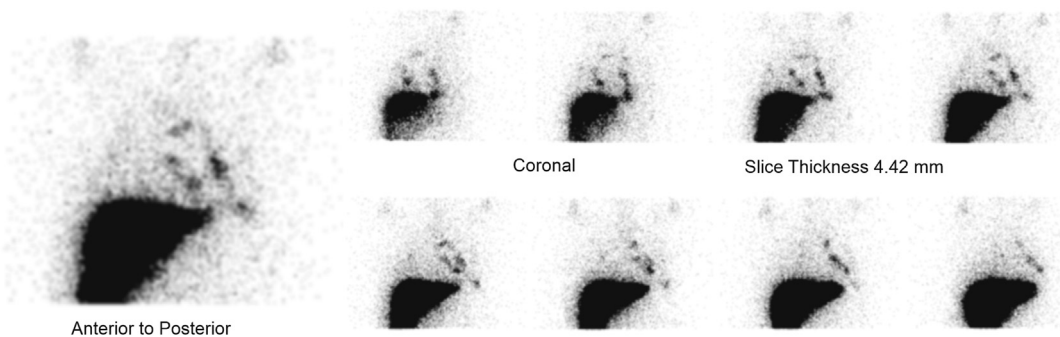
Thoracic splenosis should be suspected in a patient with juxtaleural nodules when there is a history of splenic and diaphragmatic injury. However, it is important to rule out some conditions that mimic radiological findings, such as lymphoma, infectious diseases, hamartomas, pleural metastases (lung, breast and melanoma, most commonly), atelectasis, localized fibrosis, malignant mesothelioma, invasive thymoma, schwannoma and scarred pleural lesions [4]. If the patient presents multiple nodules or masses it is less likely to be malignant mesothelioma or localized fibrosis since these are essentially solitary [10]. Invasive thymoma should be ruled out if concomitant mediastinal image exists [10]. Lymphoma usually comes with pleural effusion and, in a short period of time, tends to increase in size and number while TS is a benign condition with minimal growth over time [10]. Metastases should be considered when patients already have a neoplasia.

If there is a pertinent history of trauma and suggestive tomographic image, nuclear medicine can confirm TS without biopsy. However, if the possibility of malignancy can not be ruled out

safely, thoracotomy or needle biopsy must be proceeded [4]. Nuclear medicine images are usually obtained by scintigraphy using Tc-99m sulfur colloid, indium-111-marked platelets or Tc-99m-labeled heat-damaged erythrocytes. The last two types are preferred due to higher sensitivity and specificity for splenic uptake with lower uptake by liver tissue [14,15]. As these techniques were not available in the service, Tc-99m stain colloid scintigraphy was done and it enhanced reticuloendothelial system cells as well as sulfur colloid. Ishibashi M et al. also used stain with similar results [16].

In almost all cases the management is expectant. Surgery is indicated only in symptomatic patients and in those whose diagnosis was doubtful and it was not possible to exclude malignancy [4]. Nodule resection should be avoided not only because of the procedure risk but also due to the possible protection against post-splenectomy sepsis that splenosis theoretically provides [17]. However, this is still an issue not fully understood. Leemans R et al. demonstrated that spleen transplants provide a better pneumococci blood clearance and increased IgM levels and opsonization activity [17]. Nevertheless, it was shown the necessity of more than 50% of original splenic tissue for the protection against encapsulated microorganisms [18].

In conclusion, TS is a rare condition but should be considered as a differential diagnosis of left-sided located juxtaleural nodules, especially when there is a history of thoracoabdominal trauma. Thereby, it is possible to avoid unnecessary invasive procedures when tomographic and scintigraphic images are conclusive.



**Fig. 2.** 99m-Tc stain colloid scintigraphy demonstrating usual distribution of radionuclide in the liver, no concentration of radioactivity in the spleen and projection areas of anomalous concentration into the left side of the chest.

## Conflict of interest statement

Authors don't have any conflict of interest.

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