

Intrathoracic Gossypiboma Interpreted as Bronchogenic Carcinoma. Another False Positive With Positron Emission Tomography

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Gossypibomas from inflammatory reactions to textile foreign bodies are a rare postoperative complication and are easily confused with neoplastic processes because of their diversity of symptoms and radiographic signs. Positron emission tomography (PET) is seldom used to diagnose gossypibomas and PET findings can result in false positives for a diagnosis of neoplastic disease. We describe the case of a 56-year-old man in whom PET findings showed an intrathoracic mass suggesting a tumor. The final diagnosis was gossypiboma, identified 23 years after pneumothorax surgery.

Key words: Positron emission tomography. False positive. Retained surgical sponge (gossypiboma). Intrathoracic mass. Bronchogenic carcinoma.

Introduction

Intrathoracic gossypibomas, or intrathoracic textilomas, are the result of a secondary inflammatory reaction to textile material left in the chest cavity.¹ Although they are rare, they have serious postoperative medical and legal implications. In x-rays, gossypibomas appear as intrathoracic masses that mimic intrapulmonary abscesses, aspergillomas, or tumors. Their low incidence, variety of symptoms, and nonspecific radiologic findings, which occasionally lead to false positives, mean that this entity is under- or erroneously diagnosed.

We describe the case of a 56-year-old man who had previously undergone chest surgery in whom computed tomography (CT) and positron emission tomography (PET) findings showed a growing intrathoracic mass that was

Textiloma intratorácico interpretado como carcinoma broncogénico. Otro falso positivo de la tomografía por emisión de positrones

Los textilomas, reacciones inflamatorias contra cuerpos extraños de tipo textil, representan una complicación posquirúrgica poco frecuente. La diversidad de síntomas y signos radiológicos con que se manifiestan contribuye a que su diagnóstico se confunda con un proceso de tipo neoplásico. Los hallazgos descritos con la tomografía por emisión de positrones (PET), técnica poco habitual en el manejo diagnóstico de esta entidad, pueden condicionar falsos positivos neoplásicos. Describimos el caso de un varón de 56 años, que 23 años después de una cirugía de neumotórax presentó una masa intratorácica indicativa de neoplasia en la PET, cuyo diagnóstico final fue de textiloma.

Palabras clave: Tomografía por emisión de positrones. Falso positivo. Esponja quirúrgica retenida (textiloma). Masa intratorácica. Carcinoma broncogénico.

suggestive of a tumor. The final diagnosis was intrathoracic gossypiboma.

Case Description

A 56-year-old man with a medical history of perennial rhinitis, persistent but mild bronchial asthma, and sensitization to the house dust mite had been a smoker of 37 pack-years until 6 months before the consultation. There was no evidence of chronic mucosal hypersecretion and the patient was not an abuser of nonprescription drugs or alcohol. He had undergone right and left upper lobe bullectomies in 1980 and 1981, respectively, as a consequence of recurrent spontaneous pneumothoraces. Postoperative recovery was slow after both interventions; fever that developed after the left thoracotomy resolved with antibiotherapy.

The patient consulted in regard to symptoms that had lasted a month, namely, cough, thick, purulent sputum with mucus plugs, dyspnea in response to moderate effort, and left pleuritic pain. The patient occasionally had a low-grade fever and produced blood-stained sputum, but there was no clear sign of weight loss and wasting. The physical examination revealed a generally good state of health, with normal breathing at rest, normal blood

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pressure, no fever or cyanosis, and no palpable enlarged lymph nodes. The chest showed the scars of the previous thoracotomies and auscultation revealed scattered rhonchi on the left side. Blood tests revealed a normal white blood cell differential count, a glomerular sedimentation rate of 65 mm/h, a C-reactive protein level of 6.1 mg/dL, and a serum iron level of 50 µg/dL; there was no evidence of anemia, and kidney and liver functions were normal. A chest x-ray revealed a solid left parahilar mass with an adjacent air-fluid level extending to the left upper lobe (LUL). Empirical broad-spectrum antibiotherapy was administered and CT was ordered. The scan confirmed the existence of a cystic lesion in the LUL, with an air-fluid level and an adjacent mass that extended to the pulmonary hilum. The mass had hypodense areas in its interior and macroscopic calcifications that had caused slight stenosis of the LUL bronchus. There were also 1-cm lymph nodes in the aortopulmonary window and lower right paratracheal region (Figure 1).

Clinical progress was satisfactory, but a follow-up CT scan revealed that the pulmonary mass was growing. A first bronchoscopy was not diagnostic, but given the possibility of a neoplastic process, it was decided to conduct a second bronchoscopy. The endoscopic findings revealed mucopurulent secretions and signs of inflammation in the bronchial mucosa of the apicoposterior segment of the LUL. Radiologically controlled brushing and a transbronchial biopsy were performed, as also right paratracheal aspiration using a Wang needle. Microbiological cultures of the samples showed no evidence of the growth of the usual germs, fungi or mycobacteria, and the pathology report was negative for malignancy. Given the absence of a diagnosis, PET was performed. The PET image confirmed a 7-cm hypermetabolic mass in the posterior segment of the LUL and a high uptake value (maximum 5.2). The mass had a hypometabolic center, related to necrosis and cavitation (Figure 2). These findings were considered to be consistent with a neoplasm.

Given the absence of remote lesions and the fact that the lung function assessment did not contraindicate pulmonary resection, a left posterolateral thoracotomy was performed. This revealed the cavitated mass, as well as areas of obstructive pneumonia. The pathologist's intraoperative examination of the lesion ruled out a neoplastic process. The abscess was drained and material was removed from the interior of the mass. Findings from microscopic examination were conclusive in establishing a diagnosis of advanced obstructive pneumonia with areas of organizing pneumonia secondary to a large crumbly mass formed in reaction to a fibrillar, textile material (gossypiboma).

Postoperative progress was satisfactory and the patient was discharged 6 days after surgery. He was free of symptoms a year later.

Discussion

Intrathoracic gossypibomas are the result of an inflammatory reaction to foreign bodies in the form of textile material left in the thoracic cavity. The word gossypiboma derives from the Latin *gossypium* (cotton) and the Swahili *boma* (place of concealment). Gossypibomas are also referred to as textilomas or retained surgical sponges. Although they are a rare complication of chest surgery, they have serious consequences.² The number of intrathoracic—as compared to intraabdominal—gossypibomas described in the literature is relatively small. The real incidence is difficult to ascertain from the reviewed literature, probably because some cases remain asymptomatic and are never diagnosed, but also because some are probably not reported given the medical and



Figure 1. Computed tomography scan showing the intrathoracic heterogenous mass, with elevated uptake in the center that is suggestive of calcification.

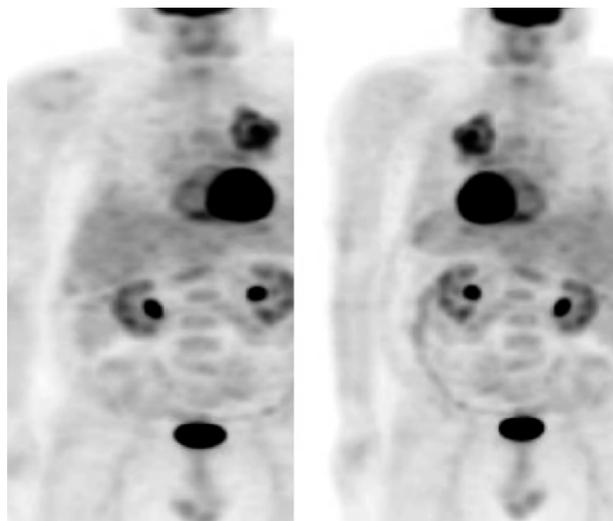


Figure 2. Coronal positron emission tomography scans showing a hypermetabolic mass, with a hypometabolic center, located in the posterior segment of the left upper lobe.

legal implications. The incidence has been estimated as between 1 in 1000 and 1 in 3000 procedures.³

Gossypiboma presentation is variable, depending on the location of the gauze and the type of reaction it causes. The typical acute presentation is a local, exudative, and highly symptomatic inflammation, which tends to develop into an abscess and lead to the formation of a fistula. This acute presentation requires differential diagnosis to rule out postoperative collections such as hematomas and abscesses.⁴ The most common presentation is an aseptic granulomatous reaction with fibroblastic activity that fully encapsulates the foreign body.⁵ Patients who have the latter type of reaction may remain asymptomatic or oligosymptomatic for months or even years.⁶ This was the case of our patient, who developed cough and recurrent blood-stained sputum 23 years after pneumothorax surgery.

A range of radiologic findings in simple radiographs, ultrasound and magnetic resonance images, or CT and PET scans have been described for gossypibomas—particularly for those found in the abdomen.⁷ Simple radiography is the most frequently used diagnostic technique, followed by CT, which is the technique of choice for detecting gossypibomas and possible complications. Many authors consider a gossypiboma to be specifically indicated by a CT finding of a low-density heterogenous mass with an external high-density wall (further highlighted by a contrast medium), and with a spongiform pattern containing air bubbles.⁴ A radiopaque mark—which is simply a radiological tracer carried by most surgical gauzes—is another sign that a lesion corresponds to this diagnosis. Unfortunately, however, these signs are frequently absent, or, when present, are often misinterpreted—as, for example, when a radiopaque mark or the gauze itself is assumed to be a surgical suture or a calcification.⁷ Radiologic findings, although very specific, are not pathognomonic, hence the possible confusion with abscesses, bronchiectasis, hydatid cysts, mycetomas,^{4,6} or neoplasms.

Given the progression evident from our patient's x-rays, we considered a neoplastic etiology, which was why we decided to continue our study with PET. False positives arise because some inflammatory or infectious processes absorb fluorodeoxyglucose (FDG)—the most typically used PET tracer—at rates similar to those for uptake by tumoral tissues.^{8,9} PET is thus considered to have high sensitivity but relatively low specificity.¹⁰ In a recent meta-analysis, Gould et al¹¹ reported a PET sensitivity of 96.8% and a specificity of 77.8% for malignant neoplasms. False negatives are typically associated with tumors of less than 1 cm and with low metabolic activity, such as carcinoid tumors and bronchioloalveolar carcinoma. The first description of a combined PET-CT imaging pattern for a gossypiboma was as a granuloma developing in response to an intraabdominal foreign body.⁷ Our findings from PET were of a mass with low central uptake in relation to the actual gauze; the combined PET-CT image revealed an internal radiopaque mark. The external capsule of the lesion had a high level of FDG activity secondary to the fibroblastic content. The fact that bleeding tumors or tumors with significant central necrosis could result in a similar pattern explains why these findings might produce a false

positive in a combined PET-CT image of a neoplasm—as occurred with our patient. Our findings are very similar to those of Ghersin et al,⁷ except for the difference of an erroneous interpretation of the radiopaque mark as a calcification. Our case represents the first description of an intrathoracic gossypiboma that produced a false-positive PET image.

In conclusion, gossypibomas should be included in the differential diagnosis of intrathoracic masses with high peripheral FDG uptake and with low central uptake, particularly if the patient has previously undergone cardiothoracic surgery. The use of gauzes with radiopaque marks and the counting of gauzes before and after closing the cavity are essential measures for preventing gossypibomas.¹²

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