

# Fatty bronchogram: a sign of cystic teratoma rupture in the lung

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## ABSTRACT

A 47-year-old man was admitted to our hospital for septic fever. Multidetector computed tomography showed a pulmonary cavitated consolidation that was partially filled by low-density material and an interrupted rim of soft tissue in adjacent mediastinum, lining an inhomogeneous fat density area. Lung consolidation presented a bronchogram fluid sign with a  $-40$  Hounsfield unit density value, which indicated a fatty bronchogram. Mediastinal cystic teratoma rupture in the lung was derived from a bacterial infection, with the lipoid material pouring into the lung and its drainage bronchus.

**Keywords:** bronchogram sign, mediastinal teratoma, multidetector computed tomography

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## INTRODUCTION

Cystic teratomas are benign tumours composed of well-differentiated tissues deriving from more than one of the three embryonic germ cell layers.<sup>(1)</sup> Rupture into adjacent structures is rare and is associated with severe complications.<sup>(2)</sup> We report a case of bacterial pneumonia causing mediastinal cystic teratoma rupture in the lung.

## CASE REPORT

A 47-year-old Caucasian man was admitted to our hospital, as he had been non-responsive to antibiotics against septic fever (maximal temperature  $39.5^{\circ}\text{C}$ ). He complained of mild chest pain and dry cough, with few expectorations. Chest radiography showed a wide cavitated consolidation in the left upper lobe, extending from the perihilar region to the pleuric surface (Fig. 1). Bronchoscopy showed purulent-like material deriving from the left superior lobar bronchus. A wide coverage antibiotic therapy with amikacin and teicoplanin was administered to the patient. Although the fever disappeared, the patient began to experience sudden and sharp temperature rise during the following days. Multidetector computed tomography (MDCT) with contrast injection was suggested.



**Fig. 1** Chest radiograph shows a wide cavitated consolidation in the left upper lobe, extending from the perihilar region to the pleuric surface.

On MDCT, the consolidation in the left upper lobe presented as a wide cavitation with an air-fluid level inside. In the adjacent anterior mediastinum, there was a rim of soft tissue lining a central area with considerable inhomogeneous fat density, and a peripheral low attenuation area slightly inferior to the near pulmonary cavitation was seen. It seemed to be an abscessual extension of cavitated pneumonia into the mediastinum. Nevertheless, the pulmonary consolidation presented an atypical bronchogram fluid sign, with an intraluminal region of interest showing a fatty density value of  $-40$  Hounsfield units (HU) (Fig. 2).

A more careful analysis revealed the rim to be the wall of a fat density lesion. Furthermore, its features were focal interruptions toward the lung, with a low-density material partially filling the near parenchyma. We assumed that the rupture of mediastinal teratoma in the near lung was caused by bacterial pneumonia. The patient underwent surgery, with an *en bloc* resection of the mediastinal lesion and the left upper lobe. Macroscopic section showed a mediastinal lesion with a cystic pattern containing yellowish material and a fatty nucleus (Fig. 3), corresponding exactly to the CT image (Fig. 2). The lesion communicated with the contiguous parenchyma, which was increased in consistency and

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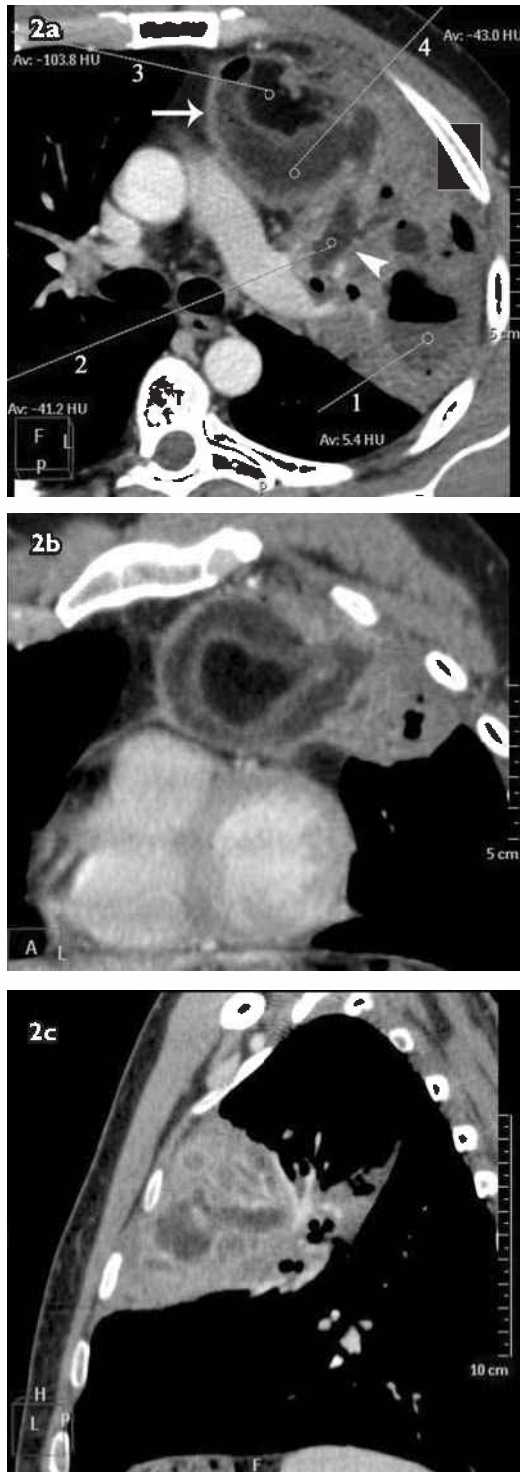
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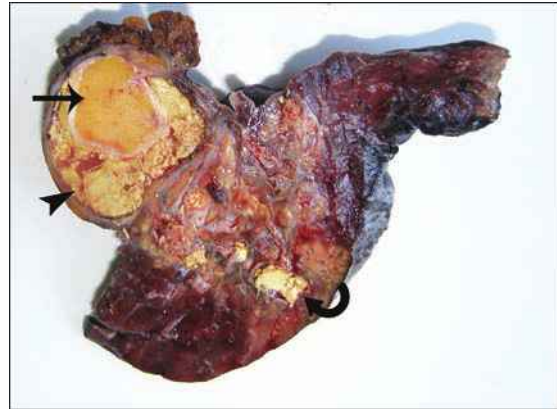
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**Fig. 2** Multiplanar reconstructions (MPR) of contrast-enhanced MDCT imaging on three perpendicular oblique planes. (a) Oblique para-axial MPR image shows the mediastinal teratoma with a soft tissue rim (arrow) lining a central fatty nucleus (-101 HU) and a peripheral inhomogeneous low density area (-40 HU), as indicated by the HU values in the regions of interest. Consolidation in the near lung presents a fluid cavitation (4 HU) and an atypical bronchogram (arrowhead), with a fatty HU value (-40 HU), i.e. the fatty bronchogram. (b) Oblique paracoronal MPR image shows that the internal features of the mediastinal teratoma are well-depicted. (c) Oblique parasagittal MPR image shows the fatty bronchogram extending from the hilus to the paramediastinal area, adjacent to the teratoma and passing through the pulmonary consolidation.



**Fig. 3** Photograph of the macroscopic section shows the mediastinal lesion on the left, with a cystic pattern containing yellowish material (arrowhead) and a fatty nucleus (arrow), and the contiguous lung with a yellowish consolidation for diffuse lipoid pneumonia (curved arrow); and on the right, the surgical specimen of *en bloc* resection of the teratoma and the adjacent lung lobe.

cavitated; it also appeared yellowish, with diffuse lipoid pneumonia. Microscopic examination revealed that the cystic wall contained a keratinising squamous epithelial layer with cutaneous annexes. Lung parenchyma showed severe granulomatous inflammation, with foamy histiocytes and a foreign-body-like giant cell. We concluded that bacterial pneumonia had caused the rupture of the mediastinal cystic teratoma in the lung, with lipoid material pouring into the near parenchyma and its drainage bronchus.

## DISCUSSION

Mediastinal teratomas are usually asymptomatic in up to 53% of cases. Furthermore, they are incidentally discovered on chest radiography,<sup>(3)</sup> with just a few reports being available in the literature.<sup>(2)</sup> Their rupture is usually symptomatic, with variable clinical and radiological manifestations.<sup>(4)</sup> Rupture in the lung is usually associated with pneumonia. Haemoptysis and expectoration of hair or sebaceous material occur when the teratoma opens in the tracheobronchial tree. The presence of tumour material in the lung can produce inflammatory and/or fibrotic processes such as lipoid pneumoniae.<sup>(5)</sup> Consolidation and air bronchogram are usually demonstrated by the radiologic finding of rupture of the cystic teratoma into the lung.<sup>(3,4)</sup> Sometimes, only ground-glass opacity with inflammation and fibrosis of the parenchyma is observed.<sup>(6)</sup>

In our patient, rupture of the mediastinal teratoma was associated with bacterial pneumonia. Following the rupture of the teratoma into the lung, fatty material flowed into the adjacent parenchyma and its drainage bronchus. This event generated an atypical finding – the fatty bronchogram, which has not been reported in the literature to date. Cystic teratoma

rupture in the lung is a rare event, and is often associated with aspecific findings such as lung consolidation or reactive pleural effusion. In the presence of a mediastinal teratoma, areas of fatty attenuation in the bronchial tree, the fatty bronchogram and/or a consolidated parenchyma may be considered to be highly specific signs of its rupture in the lung.

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