

## Case Report

# Benign emptying of the postpneumonectomy space

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## ABSTRACT

A drop in the air-fluid level in the postpneumonectomy space on a chest radiogram is an early sign of bronchopleural fistula (BPF). Any suspicion of BPF points to the need for urgent evaluation and appropriate management. Very rarely may this drop occur without the existence of a fistula, but such a condition is defined as benign emptying of the postpneumonectomy space. We share our successful conservative management in a case of postpneumonectomy space emptying with a suspicion of BPF.

**KEY WORDS:** Benign emptying, bronchopleural fistula, postpneumonectomy space

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## INTRODUCTION

There has been a decline in patients requiring pneumonectomy in thoracic surgery over the years. Despite improvements in technique and patient care, there is still significant risk of complications after pneumonectomy cases.<sup>[1]</sup> A bronchopleural fistula (BPF) is one of the most common problems seen.<sup>[1-2]</sup> Patients typically present with expectoration of seroanguinous fluid, malaise, fever, subcutaneous empysema, and respiratory distress.<sup>[2,3]</sup> The postpneumonectomy space generally fills up with sterile fluid; therefore, a drop in the air-fluid level within the postpneumonectomy space on an upright chest radiogram is generally considered an early sign of BPF with or without the existence of the symptoms mentioned above, and should prompt urgent drainage and management.<sup>[1-4]</sup> The drop in air-fluid level without a BPF is a very rare condition and may be defined as benign emptying of the postpneumonectomy space.<sup>[2,3]</sup> Diagnosis of benign emptying of the postpneumonectomy space is very important so as to manage the patient in the correct way.

## CASE REPORT

A 71-year-old woman with adenocarcinoma of the left lower lobe had a left thoracotomy and left pneumonectomy, and mediastinal lymph node dissection with a serratus muscle flap for supporting the bronchial stump.

She was discharged on the fifth postoperative day uneventfully. Her chest radiogram showed that her left pleural cavity was almost filled with fluid [Figure 1a]. Six weeks after discharge she presented for routine follow-up. She did not have any serious symptoms, only some pain on the site of the thoracotomy incision. She was afebrile, with benign physical exam findings and with normal lung sounds on the right side. Her white blood cell count was normal. Her chest radiogram showed a marked increase in air (a drop in the air-fluid level compared to the previous chest radiogram) in the left hemithorax, which was a concerning suggesting an interval development of a BPF causing emptying of the space [Figure 1b]. Although there were no obvious signs of infection related to a possible BPF, we hospitalized the patient and placed a chest tube to drain the left hemithorax [Figure 2a]. The fluid samples taken from the left pleural space did not show any signs of bacterial contamination. With an excess of caution we performed fiberoptic bronchoscopy under general anesthesia. Even under positive pressure ventilation, this too did not yield any signs or findings of BPF.

As the patient was in good health we elected not to proceed with any further intervention. We removed her chest

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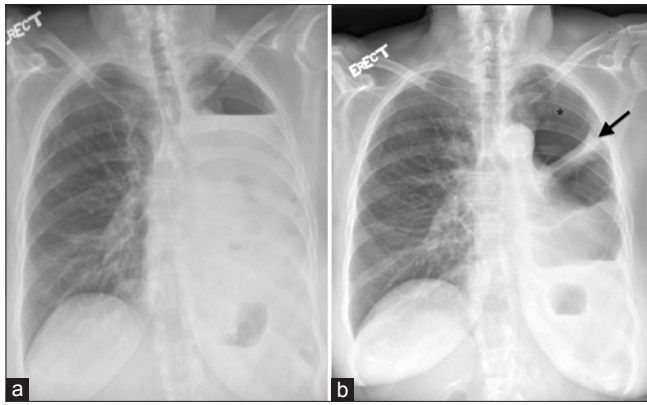


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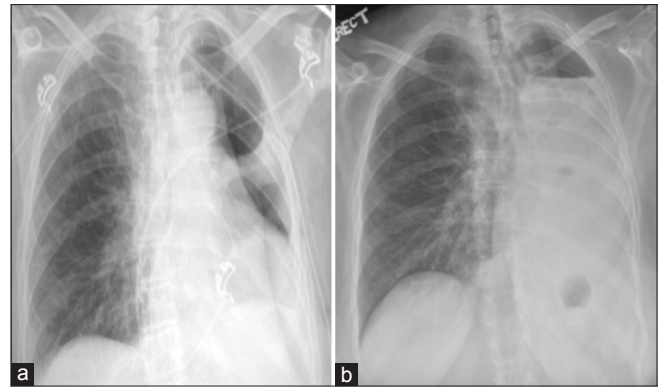
**Figure 1:** Chest x-ray of the patient (a) Nearly totally filled left postpneumonectomy space (b) Marked increase in air (asterisk) in the left hemithorax with suspicion of development of a BPF. The band-like opacity in the midchest represents a previously defined muscle flap (arrow)

tube and discharged her from the hospital after a 4-day stay. By then her left pleural cavity had reaccumulated fluid [Figure 2b]. Her follow-up since the second hospitalization has been uneventful, without recurrence of this phenomenon in over 5 months.

## COMMENT

Patients with BPF following a pneumonectomy generally present with a drop in the air-fluid level within the postpneumonectomy space. Such patients usually have symptoms of fluid expectoration, fever, and respiratory compromise.<sup>[1-3]</sup> This condition can be life-threatening: a BPF can result in infection and/or compromise of the healthy lung. Therefore, prompt drainage of the pneumonectomy space is required.<sup>[3]</sup> Confirmation of a BPF can be made using computed tomography, contrast bronchography, intrapleural methylene blue, or ventilation scintigraphy.<sup>[4]</sup> The most commonly used method for the diagnosis of BPF is bronchoscopy to visualize the bronchial stump under positive pressure. When BPF is diagnosed, the fistula needs to be repaired.

Emptying of the postpneumonectomy space without a BPF induces, however, a similar drop in the air-fluid level.<sup>[2,3]</sup> The existing, limited knowledge indicates that the mechanism might be: a small fistula that spontaneously heals before seeding and infection occur;<sup>[5]</sup> a valve-like fistula of such caliber that only air can enter the pleural space;<sup>[3]</sup> congenital diaphragmatic fenestrations; or a drainage route created during the surgical intervention.<sup>[3]</sup> In the differential diagnosis



**Figure 2:** Chest x-ray of the patient (a) After chest tube placement to drain the left pneumonectomy cavity (b) Refilled left postpneumonectomy space after pulling up the chest tube

such patients are afebrile with no recent history of fluid expectoration. They have no findings for a fistula on the fiberoptic bronchoscopy examination, and their pleural fluid culture is negative for bacteria; in addition, they have a normal white blood cell count. The treatment required in these patients is conservative, without any additional intervention as would be necessary for patients with BPF. The the pneumonectomy cavity refills quickly after the chest tube is out.

Having an accurate differential diagnosis for patients is very important so as not to proceed with a unnecessary surgical intervention that would be challenging to the patient's health.

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