

## An Enormous Compensatory Hyperinflated Lung After Pneumonectomy: Pseudo-horseshoe Lung

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### ABSTRACT

Pneumonectomy causes a number of anatomical changes within the thoracic cavity to improve the diffusion capacity of the remaining lung. A 41-year-old female was admitted with the complaints of cough and purulent sputum for the last two weeks. Her past medical history revealed that she underwent left pneumonectomy for bronchiectasis at the age of 10 due to massive hemoptysis. Massive compensatory hyperinflation of the right lung, which was herniated anteriorly across the midline, and extreme mediastinal shift were observed in computed tomography which is called pseudo-horseshoe lung. Although post-pneumonectomy lung compensation can diminish by advanced age, clinicians should be aware that it can be observed in adult patients who had pneumonectomy at early ages.

Keywords: Pneumonectomy, pseudo-horseshoe lung

## INTRODUCTION

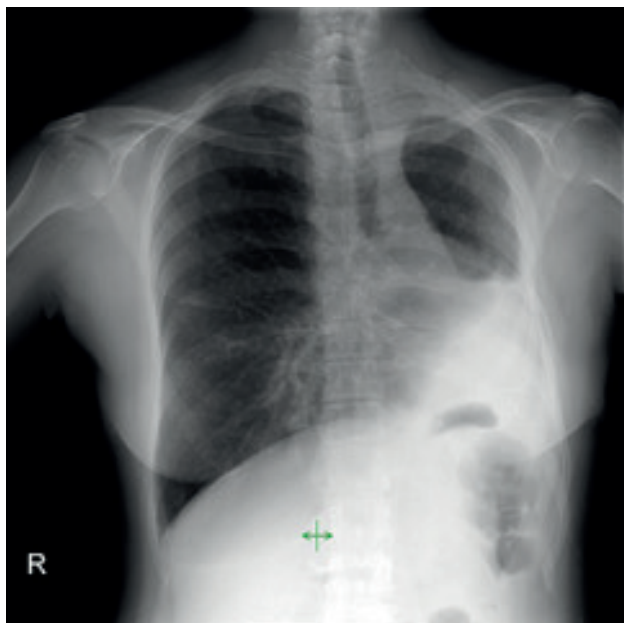
Pneumonectomy causes a number of anatomical changes within the thoracic cavity that improve the diffusion capacity of the remaining lung [1]. In experimental animal models, pneumonectomy initiates compensatory, regenerative growth of the remaining lung tissue that restores normal mass, structure and function [2]. The main determining factors of compensatory lung growth after pneumonectomy are stretch, pulmonary blood flow, hypoxia, age, sex and growth factors [3]. Although post-pneumonectomy lung compensation can diminish by advanced age, clinicians should be aware that it can be observed in adult patients who had pneumonectomy at early ages. In this case report, we presented the images of a patient who

had a left pneumonectomy due to bronchiectasis at the age of 10.

## CASE PRESENTATION

A 41-year-old female was admitted to our department with cough and purulent sputum for the last two weeks. Her past medical history revealed that she underwent left pneumonectomy for bronchiectasis at the age of 10 due to massive hemoptysis. On physical examination, chest auscultation was normal apart from the absence of lung sounds on the basis of left hemithorax. The apical heart beat was extremely shifted to left. Chest X-ray showed

the hyperinflated right lung and mediastinal shift to the contralateral hemithorax (Figure 1). There was also radiolucency on the left hemithorax in spite of the patient's pneumonectomy history. A computed tomography (CT) scan demonstrated massive compensatory hyperinflation of the right lung, which was herniated anteriorly across the midline, and extreme mediastinal shift. Additionally, distal part of the trachea and right main bronchus were abnormally narrowed (Figure 2a&2b).



**Figure 1.** Chest X-ray shows overexpansion of the right lung and radiolucency in left pneumonectomy space

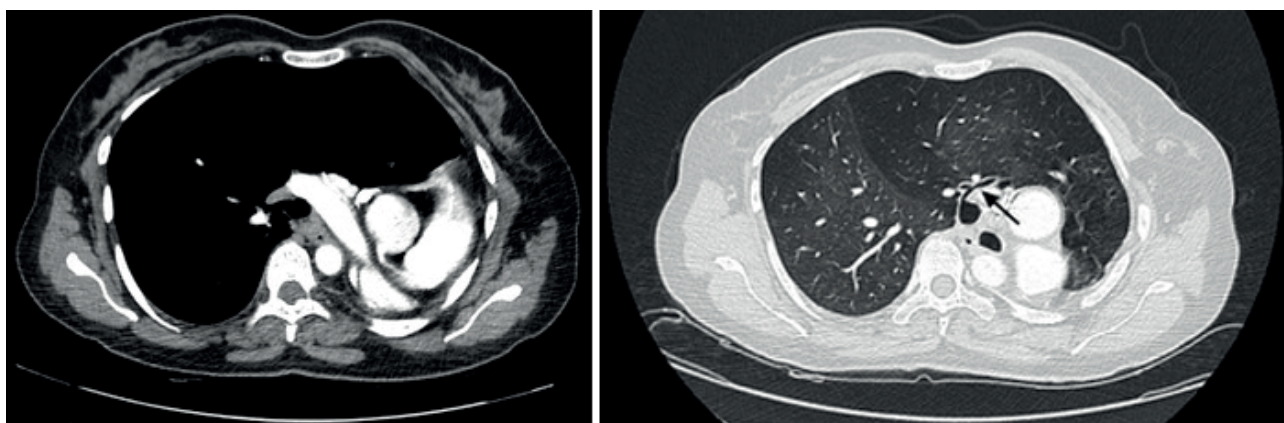
## DISCUSSION

In the literature this appearance is defined as pseudo-horseshoe lung [4,5]. The rotational shifting of mediastinal great vessels and compression of main bronchus are delayed complications of pneumonectomy which usually occurs after right pneumonectomy [6,7]. Patients mainly complain about dyspnea and recurrent pulmonary infections. The presented patient underwent a left pneumonectomy and right main bronchus system was compressed. The patient did not complain about recurrent pulmonary infections.

In conclusion; pneumonectomy at the early ages can cause an enormous compensatory hyperinflation of the remnant lung. Chest X-ray may be insufficient and misleading to identify the exact anatomic changes due to pneumonectomy. CT is the best modality in demonstrating post-pneumonectomy changes including the narrowing and compression of trachea and main bronchi.

## CONFLICT of INTEREST STATEMENT

All authors have no conflict of interest.



**Figure 2a&2b.** Axial CT image demonstrates (a) anterior herniation of the hyperexpanded right lung and (b) narrowed right main bronchus (arrow)

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