

# A Rare Case: Duplication of Lungs on Left Side in Human Cadaveric Study

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**ABSTRACT**

Knowledge of lung variation is essential to all medical professionals to exactly interpret radiographs, computed tomography scans, to diagnose, plan and modify a surgical procedure.

In this case, a very rare variation has been studied, where three lungs were present in a cadaver. There was a duplication of lungs on left side, none of them had a fissure. Whereas, right lung had normal gross anatomical features. Such variation has not been reported till date. It should be taken into consideration while interpreting radiological variations and during surgeries like lobectomy, segmentectomies.

**Key Words:** Lung; Variation; Duplication of Lung; Three Lungs

**INTRODUCTION**

Lungs are essential paired respiratory organs situated in thoracic cavity on either side of heart. The right lung has oblique and horizontal fissures dividing it into superior, middle, and inferior lobes; whereas the left lung has superior and inferior lobes separated by an oblique fissure [1].

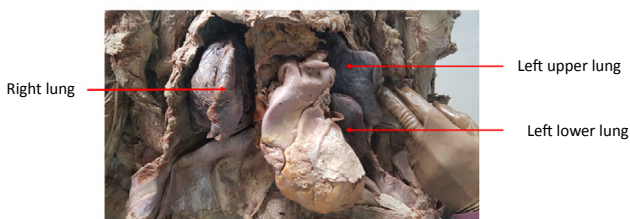
The fissures facilitate a uniform expansion of whole lung for more air intake during respiration. As the fissures form boundaries for lobes of the lungs, knowledge of their position is necessary to appreciate lobar anatomy and locating the bronchopulmonary segments which is significant both anatomically and clinically [2].

**CASE REPORT**

During regular cadaveric dissection of thorax region (1st MBBS batch 2017- 2018 MGM medical college, Kamothe), a rare variation in lungs was discovered. While studying lungs in situ, it appeared that there were two separate lung segments on left side. To study it further, lungs on either side were separated and removed by cutting their attachments at hila. It was confirmed that on left side there were two lungs. The gross appearance of two lungs in situ was as shown in (Figure 1).

Each of two lungs on left side presented an apex and a base, a hilum with its own bronchus, a branch of pulmonary artery and pulmonary veins (Figure 2). The left lower lung presented a lingula. No fissure was observed in either of two lungs on left side (Figure 3).

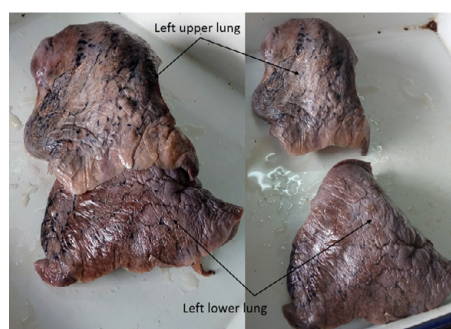
The lung on right side was normal and did not show any variation. Gross anatomical features and dimensions in 3 lungs were as follows (Table 1).



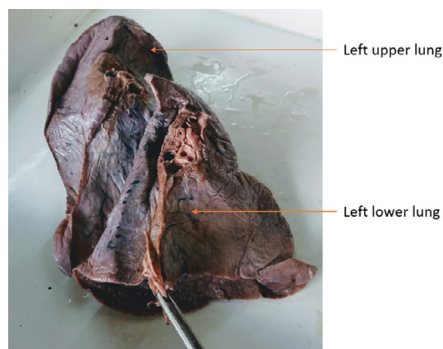
**Figure 1)** Gross appearance of thoracic cavity when anterior thoracic wall is removed.

**DISCUSSION**

Number of studies have been done in past pertaining to variations in gross Anatomy of lungs. A single lung extending uniformly throughout the thoracic cavity was detected in a 35year old male cadaver [3]. However, a rare variation



**Figure 2)** Gross appearance of two lungs on left side (costal surface) when separated from thoracic cavity.



**Figure 3)** Gross appearance of two lungs on left side when arranged as they were in situ (mediastinal surface).

**TABLE 1**

Comparison of gross anatomical features of 3 lungs in a cadaver.

	Rt. Lung	Lt. upper lung	Lt. lower lung
Length	9 cm	11 cm	15 cm
Width	14 cm	11 cm	11 cm
Thickness	6 cm	3 cm	3 cm
Lobes/ fissures	3 lobes / 2 fissures	1 lobe/ no fissure	1 lobe with lingula / no fissure

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like this case has not been reported in any of past studies till date.

When the embryo is approximately 4 weeks old, the respiratory diverticulum (lung bud), develops as an outgrowth from the ventral wall of the foregut. At the beginning of the fifth week, it expands caudally into the surrounding mesenchyme and bifurcates into right and left bronchial buds. The right bud then forms three secondary bronchi, and the left, two, thus foreshadowing the three lobes on the right side and two on the left [4].

The fissures of the lung are complete, when the lobes remain held together only at the hilum by the bronchi and pulmonary vessels, they are incomplete when there are areas of parenchymal fusion between the lobes and the cleft fails to reach the hilum. Parenchymal fusion of varied extent along the floor is also found in case of incomplete fissures. Sometimes, fissures may be absent altogether [5].

In the present study, it appears that the left bronchial bud, during its development further divided secondary bronchial buds which further developed into two separate lungs. Instead of presence of an oblique fissure in left lung as seen in normal left lung, it appears that the oblique fissure extended and continued even at the level of hilum and resulting in the formation two separate lungs on left side.

Hilum of the upper left lung presented a principal bronchus, a pulmonary artery and a pulmonary vein. Whereas the hilum of the lower left lung presented a principal bronchus, a pulmonary artery and two pulmonary veins. Thus each of the duplicated lung portion had its own broncho-vascular unit.

Such variation should be taken into consideration by clinicians, radiologists, cardiothoracic surgeons to exactly interpret radiographs, computed

tomography scans, and also to diagnose, plan and modify the surgical procedure like segmentectomies, lobectomies. This will help to reduce the morbidity and mortality associated with lung surgeries. Also, it would be of immense help in case of lung donation and lung transplantation surgeries.

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