

Accessory Lobes and Fissures in Both the Lungs - An Original Cadaveric Case Report

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Abstract: *The lungs are a pair of spongy, air-filled organs situated in the thoracic cavity. The right lung normally presents three lobes and two fissures and the left lung presents two lobes and one fissure. The fissures allow greater distention of the lobes during respiratory movements. Many variations have been reported regarding the number of lobes and fissures. Here we report a case of accessory lobes and fissures seen in both right and left lungs in a single male cadaver. The presence of accessory lobes and fissures were noted during routine cadaveric dissection of a middle aged person in the department of Anatomy, Believers church medical college, Thiruvalla. Knowledge and awareness regarding anatomical variations in the lobes and fissures of lungs is essential for surgeons to avoid complications during surgeries like segmental or lobar resection of lungs. It is even important for radiologists to correctly diagnose the accessory fissures and lobes during radiological imaging techniques.*

Keywords: Lungs, accessory lobes, accessory fissures, anatomical variations, horizontal fissure, oblique fissure

1. Introduction

The lungs are a pair of essential organs of respiration that invaginate into the corresponding pleural sac. The right lung presents three lobes-upper, middle and lower-separated by oblique and horizontal fissure. Left lung presents two lobes-upper and lower-separated by oblique fissure. The horizontal fissure is present only in the right lung. The fissures present in the lungs allow uniform expansion of the lungs. It helps in the distention and movement of the lobes during various movements of respiration. ⁽¹⁾

Lung development begins at about 28 days of embryonic life. During the development, the spaces that separate the individual bronchopulmonary segments become obliterated except along the two planes that gives rise to oblique and horizontal fissure. The fissures maybe complete, partial or even absent. When the lobes are held together only at the hilum by the bronchi and pulmonary vessels, the fissures are said to be complete. In case of incomplete fissures, there may be areas of parenchymal fusion between the lobes as the cleft fails to reach the hilum. Absence of fissures that is normally present leads to reduction in the number of lobes. An accessory fissure is often explained as a cleft lined by two layers of visceral pleura and these are often misinterpreted in radiologic scans. ⁽²⁾

In some cases, there may be presence of azygos lobes. Azygos lobes means accessory or supernumerary lobes of the lung. Lobe of azygos vein maybe seen in about 1% of individuals. It usually affects the upper lobe of right lung. The apex of the lung splits into medial & lateral parts by a fissure, the medial part of which forms the lobe of azygos vein. Accessory lobes are usually connected to bronchi that are not part of the normal bronchial tree. Those bronchi take origin from trachea or oesophagus. Occasionally, the accessory lobe may not have any bronchus.

Sometimes, there may be sequestration of lung tissue, where an area of the embryonic lung tissue may separate from the tracheobronchial tree. Such tissue may form a complete lobe with an independent pleural covering. The sequestered lung tissue derives its blood supply from an abnormal branch of

the aorta. This condition is most commonly seen in the lower lobe of left lung. ⁽³⁾

Knowledge regarding morphological variations in the lobes and fissures of lung are essential for radiologists and surgeons. Presence of accessory lobes and variations in fissures are important for cardiothoracic surgeons in performing lobectomies and surgical resection of individual segments. The field of pulmonology and cardiothoracic surgery is highly advanced now with well-developed radiological techniques. Hence knowledge regarding the morphological variations of lungs would be advantageous for surgeons and radiologists.

2. Case Report

During routine cadaveric dissection for 1st year MBBS students in the department of Anatomy, Believers Church medical college, Thiruvalla, it was observed that there are few accessory lobes and fissures in both right and left lungs. It was observed in a middle aged cadaver. This is the first case reported for accessory lobes and fissures in our department representing a frequency of 4% (1/25 cadavers) during the period 2016-2020.

The thoracic wall was dissected and the thoracic cavity was opened. The lungs were very adherent to the sides and the posterior thoracic wall. Both the lungs were carefully removed and washed under running tap water. The apex of both lungs extended up to the upper border of the neck of 1st rib. The bases of both lungs were tightly adherent with the corresponding domes of the diaphragm.

The right lung was studied thoroughly. The right lung was divided into 4 lobes by 3 fissures. The accessory fissure extended downwards from the horizontal fissure to the oblique fissure dividing the middle lobe into two lobes. The accessory lobe measured 5.5 cms in length and 6.5 cms in width. The fissure measured 7 cms in length and 3.5cms in width. The bronchus, branch of pulmonary artery and tributary of pulmonary vein were found to originate from the middle lobe. No additional branches were found. (Figure-1)

The left lung was carefully studied. It was divided into upper and lower lobes by the oblique fissure. The lower lobe remained normal. An accessory fissure measuring 12 cms in length extending from the hilum to the oblique fissure separated the upper lobe into two lobes. These 2 lobes were partially divided into by 2 accessory incomplete fissures measuring 6 cms and 2 cms in length respectively. Thus the left lung had a total of 5 lobes separated by 4 fissures. The bronchus, branch of pulmonary artery and tributary of pulmonary vein were found to originate from the upper lobe. No additional branches were found. (Figure-2)

The hilum of both lungs appeared normal. All other structures in the mediastinum of the thoracic cavity were also normal.

3. Discussion

During the prenatal life, the individual bronchopulmonary segments are separated by the fissures. As the development progresses, the fissures get obliterated except at the sites of interlobar areas where horizontal and oblique fissures are seen. In some cases, absences of fissures or incomplete fissures are seen. Absence of fissures maybe due to obliteration of the prenatal fissures completely. Incomplete fissures denote partial fusion of the lobes. Accessory fissures could be due to the persistence of prenatal fissures.

The oblique fissure begins from the mediastinal surface above and behind the hilum, passes upward and backward and cuts the posterior border of the lung about 2.5 cms lateral to the junction of T3 and T4 spine. Then it follows downward and forward along the costal surface coinciding with the 5th intercostal space in the mid-axillary line and cuts the inferior border of the lung at the 6th costochondral junction about 7.5 cm lateral to the middle line. Finally the fissure reaches the lower and anterior parts of the hilum. Horizontal fissure extends horizontally from the oblique fissure at the mid-axillary line upto the 4th costal cartilage. (4)

In the present case, there was one complete accessory fissure and an accessory lobe in the right side where as in the left lung, there was 1 complete accessory fissure and 2 incomplete accessory fissures along with 3 accessory lobes. Many other cases have been reported for accessory lobes and fissures. H P Sharma & Manirul Islam reported a case of an accessory middle lobe in the left lung which includes cardiac notch and lingula. (5) Vedapriya A and Fathima H reported a case of an accessory lobe of right lung. (6) Ashwini. H, Archana. M. hatti et al reported a case of an Azygos lobe in the apex of right lung. (7) Kosuri kalian chakravarthi reported a case of a left lung which was completely divided by a vertical fissure into anterior and posterior lobes with separate hilum. (8) Gopal Sharma, Tarun vijayvergeya reported a case of an accessory fissure in the left lung which divided the lung into three lobes. (9) Magadam A & Dixit D conducted a study in forty pairs of lungs which showed that incomplete fissures were seen more on the right side than on the left. (10)

The presence of accessory fissures can be confusing for radiologists. It can be mistakenly reported as pleural scars, bullae or areas of linear collapse. The accessory fissures may impose difficulty in diagnosing a lesion. It gives an atypical appearance of pleural effusion in radiological images. Accessory fissures are often not detected in CT scans due to the orientation in relation to particular plane. Lobar pneumonia usually affects a large area of a particular lobe. In case of incomplete fissures, the pneumonia may spread to adjacent lobes. Identification of accessory lobes and fissures are very important for clinicians in the segmental localization of the lungs. Presence of accessory lobes and fissures are usually incidental findings during the procedure which totally changes the preoperative planning for pulmonary lobectomy or segmental resection. These anomalies in the lung can cause complications during childhood or adult period. (11)

4. Conclusion

Much differential diagnosis can be made for these accessory fissures. It can be misdiagnosed as margins of costal cartilages, basal scars or walls of a bullae. It is evident from various studies that accessory lobes and fissures occur more frequently than is seen on chest radiographs and CT scans. Familiarity and knowledge regarding these structures prevents any misdiagnosis of the structures. The previous studies show that wide ranges of differences are seen in the occurrence of these fissures. It may be due to variety of genetic and environmental factors that affect the development of these fissures. (12) It is evident from the present case report that it is imperative for surgeons to be aware of the variant morphology of lungs in order to plan effectively for various surgeries.

References

- [1] Kosuri kalian chakravarthi, Unreported variant lobar pattern of left lung: A case report, IOSR J. Dental Med. Sci.2012; 1: 31-33.
- [2] N. Bhimai Devi, B. Narasinga rao, V. Sunitha, orphological variations of lungs - A cadaveric study in north coastal Andhra Pradesh, Int. J. Biol. Med. Res.2011; 2 (4): 1149-1152.
- [3] Jacob SM, Venniyoor V, Pillay M. Variations in the Morphology of Human Lungs and its Clinical Implications. Journal of Morphological Sciences.2019; 36: 231-236.
- [4] A. K. Datta, Essentials of Human Anatomy, Part-1, 8th ed.2008: 39.
- [5] H. P. Sharma, Manirul islam, Accessory middle lobe in the left lung: a morphological variation, Sch. j Med Case Rep 2014; 2 (3): 167-168.
- [6] Dr. Vedapriya AK, Dr. Fathima H. Accessory lobe of right lung. International journal of scientific research. February 2020; 9 (2): 11-12.
- [7] Ashwini H, Archana M Hatti, Jaishree H, Azygos lobe of right lung – a case report, I. J. Med. Case reports 2013; 2 (3): 11-13.
- [8] Kosuri kalian chakravarthi, Unreported variant lobar pattern of left lung: A case report, IOSR J. Dental Med. Sci.2012; 1: 31-33.

- [9] Gopal Sharma, Tarun vijay vergiya, Anatomical variations in lobar pattern of lungs-Anatomical study and clinical significance, J. pharm Biomed Sci 2013 Jan; 26 (26): 301-303.
- [10] Magadum A, Dixit D, Bhimalli S. Fissures and lobes of lung – an anatomical study and its clinical significance. Int J Cur Res Rev. February 2015; 7 (3): 8-12.
- [11] Nene AR, Gajendra KS, Sarma MV. Lung lobes and fissures: a morphological study. Anatomy.2011; 5: 30–38.
- [12] Jennifer M. J. Richards, Joel Dunning, Jonathan Oparka, Fiona M. Carnochan, William S. Walker. Video-assisted thoracoscopic lobectomy: The Edinburg posterior approach. Annals of Cardiothoracic Surgery.2012; 1 (1).



Figure 1: Anterior and posterior views of right lung



Figure 2: Anterior and posterior views of left lung