International Journal of Sciences & Applied Research

www.ijsar.in

Case Report

Variation in the lobar pattern of the right and left lung in a single cadaver: a case report

Hemkanwer Joya*, Ritu Agarwal

Department of Anatomy, Dr. S. N. Medical College, Jodhpur, Rajasthan, India.
Correspondence Address: * Mrs. Hemkanwer Joya,18E/522, Chopasni Housing Board, Jodhpur, Rajasthan, India.

Abstract

The right lung classically has two fissures an oblique and a horizontal which divide it into three lobes namely the superior, middle and inferior lobe. The left lung has only one fissure an oblique fissure dividing it into two lobes superior and inferior lobe. During routine dissection in 2014-2015 under graduate batch, we came across one of old male cadaver we encountered an anomalous pattern of fissures and lobes in right and left lung. The anomaly of the lobar pattern has been described by many research workers studies on gross anatomical specimens. In the present case which was incidentally detected we report multiple fissures and lobes in both lungs. Such abnormal fissures and lobes are clinically important for identifying broncho pulmonary segments. Anatomical knowledge of anomalies of fissures and lobes of lung may be important for surgeons performing lobectomies, radiologists interpreting x-ray, CT scans and also of academic interest to all medical persons.

Keywords: Lung, Lung Lobes, Accessory fissure of Lung, Oblique fissure of lung and horizontal fissure of lung

Introduction

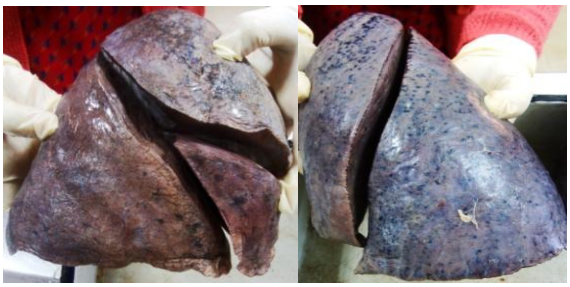
The lobule corresponds to the broncho-pulmonary segment which is the functional unit of the lung. The right lung and left lung are separated into lobes by an oblique fissure present in both lungs and a transverse fissure which is present only in the right lung. The oblique fissures commence 6cm below the apex of each lung, 2cm from the medial plane and at the level of the third and fourth spine of the vertebra[1.] The transverse fissure overlies the fourth rib to meet the oblique fissure at the level of the mid axillary line. The presence of the transverse fissure results in three lobes on the right lung while the left lung presents two lobes. The three lobes on the right lung are named: superior, middle and inferior lobe while in the left lung only the superior and inferior lobe is present[1].

The awareness of anatomical variations of lobes of the lungs are essential because radiologists may misinterpret them on an X-ray or a C. T. Scan, such variations with known factor can help in planning lobectomies involving individual segment[2]. Hence this case study aims to present the unique variations in the morphology of lung fissures and lobes observed during routine dissection of 2014-15 batch. This might serve to generate some new data regarding lung lobes and fissures which can be made

available to surgeons to help them in the appropriate planning of surgery.

Case report

This case of accessory fissures and lobes in both right and left lung was incidentally noted during dissection of the thoracic region in adult male cadaver of about 40 to 45 years of age in undergraduate batch (2014-15) in Department of Anatomy, Dr. S. N. Medical College Jodhpur, Rajasthan (state of India). The medical history of the individual was not known. The fissures and lobes of lungs were studied and the accessory fissures and lobes were also noted. The specimens of lung were photographed (Figures 1- 4).



Normal fissures and lobes in right and left lung: figure 1 and 2

Accessory fissures and lobes in both lungs (right and left): figure 3 and 4

The right and left lungs displayed the classical oblique fissure (Figure 1and Figure 2), which normally commence from a distance of 7cm from the apex of the lung on the vertebral part of the medial surface to cross the inferior border at a distance of 2cm from the anterior border. The conventional transverse fissure (Figure 2) was also noted in the right lung which during life normally passes transversely along the level of the fourth rib to meet with the oblique fissure at the mid axillary line. One superior accessory fissures was observed in the right lung as shown in Figure 3, and multiple accessory fissures were seen in left lung which is shown in figure 4.

Discussion

Lung develops as an endodermal diverticulum at about 28 days after fertilization. The lung bud bifurcates into 2 primary bronchii right and left which ultimately develop into right and left lungs[3]. Each blind endodermal bud gives origin to a monopodial ventral diverticulum. The right endodermal bud gives origin to a monopodial diverticulum which later becomes upper lobe bronchus. At this stage the right lung bud posses 3 bronchial tubes where as the left has only 2 bronchial tubes. These endodermal tubes together with lung buds give origin to definitive lobes of adult lung. In subsequent development 10 bronchii divide dichotomously until 18 generations of sub divisions are produced. The monopodial branching of stem bronchii account for accessory bronchii and lobes often found in an adult lung[4]. In prenatal life fissures separate individual bronchopulmonary segments. All fissures get obliterated except along two planes which are developed fully as oblique and transverse fissures[5]. Defective pulmonary development will give raise to variations as encountered in fissures and lobes[6]. Incomplete or absence of oblique and transverse fissures could be due to a defect in the obliteration of these fissures completely or incompletely[7].

The accessory fissure which separates the superior segment of the lower lobe from the basal segment is termed as ‘superior accessory fissure’ (David & Tarver). In the present study, the accessory fissure detected on the right lung can be correctly termed as superior accessory fissure. The incidence of superior accessory fissure is reported to be

more common in the right lung as compared to the left one (David & Tarver). The present finding agrees to this fact. Interestingly, superior accessory fissure has a reported incidence of 5 – 30 % in autopsy studies as compared to 3 % incidence in high resolution CT scans hence the knowledge of its presence is clinically important for correct interpretation of CT scans (David & Tarver)[8].

Multiple fissures in left lung was seen in our work, where as it was more prevalent or the right side in the study of prakash et al. In the reports published by various authers there was a variation in the presence of or absence of complete or incomplete horizontal and oblique fissure on the right side only. In our study there is greater prevalence of incomplete oblique fissure of left lung when compared with publicatons of other authors[9].

All the variations noted in lobulation and fissures in both lungs might be as a result of altered pulmonary development[7]. Meenakshi et al. in their study also revealed that the presence of a variant fissure could be due to the failure of obliteration of these fissures either completely or partially. The fissures and lobes of the lungs separate the main lobes of the lungs[7].

In many diseases, segmental localization is a must and the knowledge of accessory fissure is of much clinical importance to the clinician. Pre operative planning and strategy for pulmonary lobectomy and segmental resection may also change during presence of such accessory fissures[10].

Often this accessory fissure acts as a barrier to infection spread, creating a sharply marginated pneumonia which can wrongly be interpreted as atelectasis or consolidation (Godwin & Tarver). Incomplete fissures are also responsible for altering the spread of any lung disease. (Meenakshi)[7].

The knowledge of variant fissures is very important especially in the pre-operative planning of lobectomy. Once the presence of a variant fissure is noted the procedure for a segmental resection may also have to change to avoid the post-operative complication of air leakage[7]. segmental localisation is a must for a thoracic surgeon and knowledge of accessory fissure is a great significance to cardio thoracic surgeon for planning segemental resection or pulmonary lobectomy.

This present case of variations in the fissures of lungs might help to explain certain unusual X-ray presentation of the lung. Similarly, it might help to understand certain radiographic findings such as extension of fluid into a variant fissure and the spread of diseases through different pathways in the lungs[6].

References

1. Standring S, Borley NR, Collins P et al. (2008) Gray's Anatomy. The Anatomical Basis of Clinical Practice- Pleura, lungs, trachea and bronchi.40th ed.Spain: Churchill Livingstone. 993.
2. Ugochukwu Godfrey Esomonu, Magaji Garba Taura, Musa Habib Modibbo, et al (2013). Variation in the lobar pattern of the right and left lungs: A case report. Australas Med J. 6(10): 511–514.
3. Sadler TW (2004) Langman's medical embryology, eithed Lippincott Williams and Wilkins, Baltimox Maryland.; Pp223-284.
4. Hamilton, Boy H WMoss (1971). Human embryologyp:326- 330.
5. Larsen W J (1993) Human embryology, New York, Churchill living stone.;11-130.
6. Modgil V,Das S , Suri R (2006) Anamolus lobar pattern of right lung: a case report. Int. J. Mophol.;24:5-6.
7. Meenakshi S, Manjunath. KY , Balasubramanyam V (2004). Morphological variations of lung fissures and lobes. Indian. J. chest.Dis.Allied sciences., vol 46, no.3, P.179-82.
8. Godwin JD, Tarver RD (1985). Accessory Fissures of the Lung. AJR Am J Roentegnol. 144(1): 39-47.

9. Prakash, Ajay Kumar Bharadwaj, M.Sasirekha, Suma H.Y, G.Gowtham Krishna and Gajendra Singh (2010).Lung morphology: a cadaver study in Indian population, IJAE. 115(3): P- 235-240.
10. Craig SR, Walker W S (1997). A proposed anatomical classification of the pulmonary fissures. J.R. Coll Surg,Edirnb.;42;233.