International Journal of Anatomy and Research,
Int J Anat Res 2018, Vol 6(1.2):4959-62. ISSN 2321-4287
DOI: https://dx.doi.org/10.16965/ijar.2017.523

Original Research Article

MORPHOLOGICAL STUDY OF FISSURE AND LOBES IN FETAL LUNGS

Vimala V [*1], Jamuna M [2], Nirmaladevi M [3], Amudha G [4].

[*1]Assistant Professor, Department of Anatomy, Coimbatore Medical College, Coimbatore, Tamilnadu, India

[2,4]Professor, Department of Anatomy, PSG Institute of Medical Science & Research, Coimbatore, Tamilnadu, India

[3]Senior Associate Professor, Department of Anatomy, PSG Institute of Medical Science & Research, Coimbatore, Tamilnadu, India

ABSTRACT

Background: The lungs are the essential organs of respiration which are divided into lobes and fissures. Fissures help in a more uniform expansion of lungs. Knowledge about the fissures is helpful in appreciation of lobar anatomy and for locating bronchopulmonary segments and it is important for anatomists, pediatrician, radiologists, cardiothoracic surgeons and also for clinicians.

Materials and methods: 50 spontaneously aborted fetuses were collected from labour room of Obstretrics and Gynaecology Department of PSG Institute of Medical Science and Research Centre, Coimbatore and the study was conducted in the Department of Anatomy. The morphological details of fissures and lobes of the lungs and presence of any variation in the fissures and accessory fissure were studied.

Results: Out of 50 specimens in the age group of 10 weeks to 39 weeks of gestation, the horizontal fissure was incomplete in 35 fetuses (68%), complete in 14 fetuses (28%), absent in 1 fetus (2%) and accessory fissure was found in 1 fetus (2%).

Conclusion: Awareness of the variations in the lobes and fissures of the lungs is important for radiologists for proper diagnosis and to surgeons for performing segmental lung resections.

KEYWORDS: Fetal Lung, Fissures, Lobes, Variation.

Address for Correspondence: Dr.V.Vimala, M.D, Assistant Professor, Department of Anatomy, Coimbatore Medical College, Coimbatore, Tamilnadu, India, **Email id:** dr.vimal.v@gmail.com

Access this Article online	Journal Information
Quick Response code	International Journal of Anatomy and Research
	ICV for 2016 90.30
	ISSN (E) 2321-4287 | ISSN (P) 2321-8967
	https://www.ijmhr.org/ijar.htm
	DOI-Prefix: https://dx.doi.org/10.16965/ijar
DOI: 10.16965/ijar.2017.523	

Article Information	
Received: 11 Dec 2017	Accepted: 02 Jan 2018
Peer Review: 11 Dec 2017	Published (O): 05 Feb 2018
Revised: None	Published (P): 05 Feb 2018

INTRODUCTION

The lungs are the essential organs of respiration. They are situated on each side of the heart and other mediastinal contents. The right lung is divided into upper, middle and lower lobes by an oblique and a horizontal fissure. The left lung is divided into upper and lower lobes by oblique fissure. In each lung the oblique fissure begins from the mediastinal surface above and behind the hilum and cuts the posterior border of the lung. On the posterior border it is either level with the spine of T4 or slightly lower. It runs along the costal surface and cuts the inferior border of the lung at sixth costochondral junction 7.5cm from the midline and reappears on the mediastinal surface and finally it ends at the lower end of the hilum. The short horizontal fissure separates the superior and middle lobes. It passes from the oblique fissure near the midaxillary line horizontally forwards to the

anterior border of the lung, level with the sternal end of fourth costal cartilage and then passes backwards to the hilum on the mediastinal surface [1].

The fissures facilitate the movement of the lobes in relation to one another, which will accommodate the greater distension and movement of lower lobes during respiration and thereby it helps in uniform expansion of whole lung. These fissures may complete, incomplete or absent. The lung can also have accessory fissures which may be single or multiple dividing the lungs into many lobes. This is significant anatomically, radiologically and clinically. So awareness of their variations is essential in performing lobectomies and in surgical resection [2]. Considering its clinical significance and also studies on fetal lung is less, we have conducted study in fetal lungs.

Embryology: Defective pulmonary development gives rise to variation in fissures and lobes. Fissures are spaces present between bronchopulmonary segments or buds in fetal life. Later on they get obliterated except along two planes which persist after birth as oblique and horizontal fissures. Non- obliteration of some of these spaces is responsible for the presence of accessory fissures [2].

MATERIALS AND METHODS

The present study was conducted in the Department of Anatomy, PSG (IMS &R), Coimbatore, India. Ethical clearance was obtained from institutional ethical committee. After getting informed consent from the parents 50 spontaneously aborted fetuses ranging from 10 weeks to 39 weeks of gestation were collected from the Obstretrics and Gynaecology Department of PSG (IMS&R). After collection the fetuses were immersed in 500-1000ml of 10% formalin for fixation. The morphological details of fissures and lobes of the lungs and presence of any variation in the fissures and accessory fissure were studied.

RESULTS

Horizontal fissure in the right lung: Out of 50 specimens in the age group of 10 weeks to 39 weeks of gestation, the horizontal fissure was incomplete in 35 fetuses (Fig-1), complete in 14 fetuses (Fig-2), absent in 1 fetus(Fig-3) and accessory horizontal fissure was found in 1 fetus (Fig-4) [Table -1].

Oblique fissure: The fetal lungs were examined for any variations in the oblique fissure. The oblique fissure was found to be normal without any variations in both lungs [Table -3].

Table1: Horizontal fissure in the right lung.

S.No	Horizontal Fissure	Present Study
1	Incomplete	34(68%)
2	Complete	14(28%)
3	Absent	1(2%)
4	Accessory	1(2%)

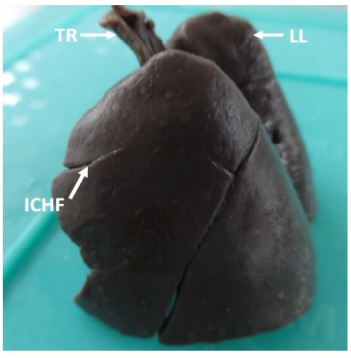
Table 2: Comparison of complete, incomplete, absent and accessory horizontal fissure in right lung.

S.No	Horizontal Fissure	Zareena Study (2014)	Present Study (2014)
1	Incomplete	4 (40%)	34 (68%)
2	Complete	6 (60%)	14 (28%)
3	Absent	Nil	1 (2%)
4	Accessory	Nil	1 (2%)

Table 3: Comparison of complete and incomplete oblique fissure in both lungs.

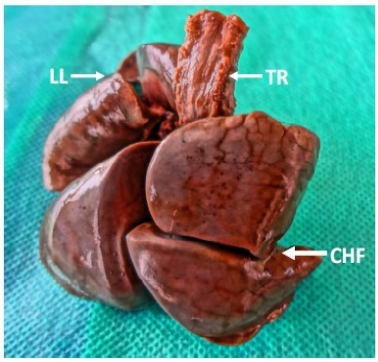
S.No	Oblique fissure	Zareena Study (2014) – in 10		Present study (2014) – in 50 specimens	
		Right	Left	Right	Left
1	Incomplete	2 (20%)	4 (40%)	Nil	Nil
2	Complete	8 (80%)	6 (60%)	50(100%)	50(100%)

Fig. 1: Incomplete horizontal fissure in right lung.



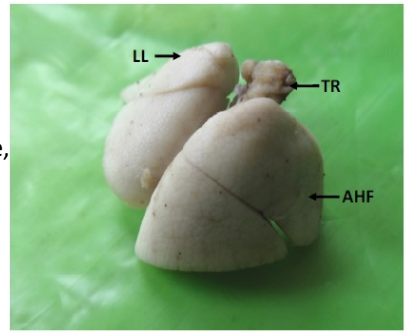
ICHF-Incomplete horizontal fissure, TR- Trachea, LL-Left lung.

Fig. 2: Complete horizontal fissure in right lung.



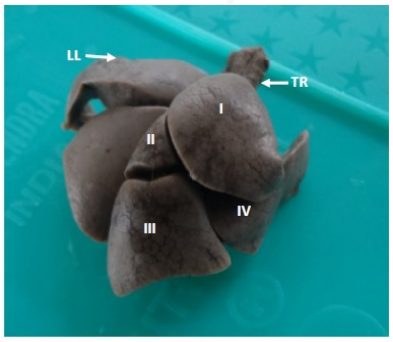
CHF-Complete horizontal fissure, TR-Trachea, LL-Left lung.

Fig. 3: Absent horizontal fissure in right lung.



AHF-Absent horizontal fissure, TR-Trachea, LL-Left lung.

Fig. 4: Accessory fissure in right lung.



TR-Trachea, LL- Left lung.

DISCUSSION

Meenakshi et al stated that out of 44 adult lungs in the right side the horizontal fissure was absent in 5 and middle lobe was not appreciated. The horizontal fissure was incomplete in 19 lungs and oblique fissure was incomplete in 11 lungs and lobulation was imperfect. In two of the specimens the horizontal fissure was absent and oblique fissure was incomplete. In left lungs the oblique fissure was incomplete in 14 and accessory fissure were found in 3 specimens [2].

Zareena (2014) observed that out of 10 fetal lung specimens, in 4 fetuses the right side lungs showed the normal pattern of oblique fissure, in 2 fetuses they showed incomplete oblique fissure in the right lung and in 4 fetuses the right side lungs showed incomplete horizontal fissure. In 6 fetuses the left side lung showed the normal pattern of complete oblique fissure [3].

Varalakshmi et al stated that out of 64 adult lungs 34 lungs belongs to left side and 30 lungs from right side. In the left lung complete oblique fissures were noted in 23[67.6%], incomplete in 10[29.4%] and absence of oblique fissures in 1[3%]. Accessory fissures were noted in 5[14.7%]. Among the right lungs, oblique fissure was complete in 25[83.3%] lungs, incomplete in 5[16.7%] lungs. Horizontal fissure was complete in 18[60%], incomplete in 9[30%], absent in 3[10%]. Accessory fissures were noted in 6[20%] lungs [4].

Eroje et al reported two anomalous right lungs of adult specimens which displayed variation in the pattern of fissures and lobes. One lung showed a complete horizontal fissure and an incomplete oblique fissure. In other lung the horizontal fissure was absent [5].

Enakshi et al reported that in 82 adult lung specimens, 46 were of right and 36 were of left side. Incomplete oblique fissures were noted in 19.56% of right lungs and 13.88% of left lungs. It was absent in 5.55% of left lungs and 2.77% of right lungs. Horizontal fissure was complete in 26% of cases. It was absent in 47.8% of cases [6].

Divya et al stated that out of total 28 right lungs only 8 lungs exhibit normal pattern of fissures and lobes. Horizontal fissures was absent in 6 lungs [21.4%] hence middle lobe was not appreciated. Horizontal fissure was incomplete in 11 lungs [39.2%]. In 3 lungs [10.7%] both oblique and horizontal fissures were incomplete. Out of 27 left lungs 18 lungs [66.6%] had normal pattern of fissures and lobes. Oblique fissures was absent in 2 lungs [7.4%] and it was incomplete in 4 lungs [14.8%]. 3 lungs [11%] showed accessory fissure [7].

Sarita et al reported presence of accessory fissure in right lung in two specimens. In one lung the accessory fissure was extending horizontally backwards from the oblique fissure at midaxillary line towards the vertebral part of the medial surface and it was meeting the normal horizontal fissure. In another specimen it was not meeting the horizontal fissure [8].

In our study, Out of 50 specimens in the age group of 10 weeks to 39 weeks of gestation, the horizontal fissure was incomplete in 35 fetuses (68%), complete in 14 fetuses (28%), absent in 1 fetus (2%) and accessory fissure was found in 1 fetus (2%).

CONCLUSION

Knowledge about the variation in the fissures and lobes is important for anatomists during routine dissection of cadaver by undergraduates and postgraduates students and for paediatrician in treating premature infants. It is also

important for radiologists, cardiothoracic surgeon and for clinicians to exactly diagnose, plan and modify the surgical procedures.

Conflicts of Interests: None

REFERENCES

[1]. Standring S, Borley NR, Collins P et al.Gray's Anatomy: The Anatomical Basis of Clinical Practice-Pleura, lungs, trachea and bronchi.40th ed.Spain:Churchill Livingstone; 2008;993-94.

[2]. Meenakshi S, Manjunath. KY ,BalasubramanyamV. Morphological variations of lung fissures and lobes. Indian.J. chest.Dis.Allied sciences. 2004; 46(3):179-82.

[3]. Zareena SK. A study of morphology and variations of lungs in adults and fetus. International Journal of Advancements in Research and Technology. 2014(Apr); 3(4):150-57.

[4]. Varalakshmi K L, Jyothi N N, Sangeetha M. Morphological variations of fissures of Lung: An Anatomical study. Indian Journal of Applied Research. 2014 (aug); 4(8):467-69.

[5]. Eroje m A, Onyije F M. Lobar Variation of Right Lung as Seen in a Nigerian Cadaver: A Case Report. Asian Journal of Biological Sciences. 2011;4:196-200.

[6]. Enakshi G, Rituparna B, Anjana D, Anindya R, Hironmoy R, Amitava B. Variations of Fissures and Lobes in Human Lungs- A Multicentric Cadaveric Study From West Bengal, India. International Journal of Anatomy, Radiology and Surgery. 2013(Apr); 2(1):5-8.

[7]. Divya C, Venkatesu K V, Swaroop R B. Anatomical Study of Pulmonary Fissures And Lobes. Int. Journal of Recent Scientific Research. 2015; 4(6):4554-57.

[8]. Sarita B, Bijaya K D, Mamata S. Accessory Fissure of Right Lung: A Report of Two Cases. International journal of Anatomy and Research.2014; 2(2):434-36.

How to cite this article:

Vimala V, Jamuna M, Nirmaladevi M , Amudha G. MORPHOLOGICAL STUDY OF FISSURE AND LOBES IN FETAL LUNGS. Int J Anat Res 2018;6(1.2):4959-4962. **DOI:** 10.16965/ijar.2017.523