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Morphological Anatomy Of Accessory Fissures In Human Cadaveric Lungs

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Abstract:
Introduction: *An accessory fissure in the lung is an anatomical variation of variable depth, lined by visceral pleura, and typically corresponds to the boundaries between bronchopulmonary segments. There are three commonly observed types of accessory fissures in the lungs: the Superior Accessory Fissure (SAF), Inferior Accessory Fissure (IAF), and Left Minor Fissure (LMF).*
Aim & Objectives: *To study morphological anatomy of accessory fissures in human cadaveric lungs.*
Material & Methods: *The study examined 35 pairs of human cadaver lungs (35 right and 35 left), obtained from the Department of Anatomy at Santosh Medical College & Hospital, Ghaziabad, NCR Delhi.*
Results: *The SAF was not present in any of the right lungs but was identified in 2.86% of the left lung specimens among the 35 pairs examined. IAF (inferior accessory fissure) were 5.71% found in right lung and 11.43% found in left lung 35 pair of specimens. LMF (left minor fissure) were 2.86% found in right lung and 25.71% found in left lung of 35 pair of specimens.*
Conclusion: *Understanding the frequency of specific fissure variants in a population can assist radiologists and clinicians in making precise diagnoses.*
Keywords: *Accessory fissure, Bronchopulmonary segments, Frequency*

INTRODUCTION-

The lungs are paired organs situated in the thoracic cavity, necessary for respiration. Compared to the left, the right lung is wider and heavier, whereas the left lung is longer and less heavy.

Accessory fissure of the lung: -

An accessory fissure in the lung is an anatomical variation of variable depth, lined by visceral pleura, and typically corresponds to the boundaries between bronchopulmonary segments. There are three commonly observed types of accessory fissures in the lungs: the Superior Accessory Fissure (SAF), Inferior Accessory Fissure (IAF), and Left Minor Fissure (LMF). The SAF is typically located within the lower lobe region; when present, it causes the superior segment of the lower lobe to appear as part of the basal segments, often referred to as the posterior or dorsal lobe. The IAF is usually found near the medial basal bronchopulmonary segment in the lower lobe of the lung. It originates near the pulmonary ligament and curves forward to merge with the major fissures on the diaphragmatic surface of the lung. The LMF serves to separate the lingula from a remaining portion of the left upper lobe. These accessory fissures can vary in length or depth and may be like a complete fissure. On radiographic images, they appear as thin white lines, similar in appearance to major and minor fissures but are distinguishable based on their specific locations.[19]

MATERIAL AND METHODS

- The study examined 35 pairs of human cadaver lungs (35 right and 35 left), obtained from the Department of Anatomy at Santosh Medical College & Hospital, Ghaziabad, NCR Delhi. Age and sex of the specimens were not specified.
- These specimens were dissected out from cadavers during routine dissection sessions conducted for MBBS students. Standard dissection tools, as recommended in Cunningham's Manual, were used for the procedure.
- All the lung specimens were preserved in a 10% formalin solution before examination.

RESULTS

The SAF was not present in any of the right lungs but was identified in 2.86% of the left lung specimens among the 35 pairs examined. **(Table 1)**
IAF (inferior accessory fissure) were 5.71% found in right lung and 11.43% found in left lung 35 pair of specimens. **(Table 1)**
LMF (left minor fissure) were 2.86% found in right lung and 25.71% found in left lung of 35 pair of specimens. **(Table 1)**

Table-1 :- Presence of Accessory Fissure

Fissure	Right lung		Left lung	
	No. of specimens (N=35)	%	No. of specimens (N=35)	%
SAF	0	0.00	1	2.86
IAF	2	5.71	4	11.43
LMF	0	0.00	9	25.71

Fig. 1:– Right Lung Showing IAF

Fig. 2:– Left Lung Showing Oblique And IAF

Fig. 3: Left Lung Showing Comp. Oblique And LMF

DISCUSSION-

In this study, we have found that the SAF was absent on the right side, which aligns with the findings of Gayathri et al. (2016) and Victor Mutua et al. (2021). However, Ochieng JJ et al. (2023) reported the highest occurrence of SAF on the right side at 9.68%. SAF on the left side was absent in the studies of Victor Mutua et al. (2021), Mukhia et al. (2013), Sudikshya et al. (2018), Quadros et al. (2013), and Nene R. et al. (2011). In contrast, AK Manickavasuki et al. (2019) demonstrated a 10% incidence, while the present study found an occurrence of 2.86%. Neither Gayathri et al. (2016) nor Biswas et al. (2018) observed the IAF on the right side. However, Sudikshya et al. (2018) reported the highest prevalence at 21.73%, while the current study found an occurrence of 5.71%. This result is similar to the 5.55% demonstrated by Quadros et al. (2013) and 6% by Gopalakrishna et al. (2018). In the present study, the IAF on the left side was found in 11.43% of cases, which is almost similar to the 12.50% reported by AK Manickavasuki et al. (2019). The highest incidence, 24%, was noted by Nene et al. (2011), while Victor Mutua et al. (2021), Megadum et al. (2015), and Gayathri et al. (2016) reported no cases (0%).

In our study, the LMF (lingula medial fissure)/transverse accessory fissure was demonstrated only to the left side in 25.71% cases, which is consistent with the 26% founded by Nene R. et al. (2011). The maximum incidence, 37.50%, was stated by Victor Mutua et al. (2021), while no cases were found in the Megadum et al. (2015), Gopalakrishna et al. (2018), and Gayathri et al. (2016).

Table -2 : A comparative analysis of the SAF, IAF, and LMF in both lungs was performed against findings reported by other investigators.

Authors	**Year**	**Population**	**Accessory fissure**					
			Superior Accessory fissure		**Inferior Accessory fissure**		**Left Minor Fissure**	
			Right	**Left**	**Right**	**Left**	**Right**	**Left**
Nene R.et al.	2011	Andhra Pradesh	4%	•0%	14%	*24%	-	26%

Mukhia et al.	2013	Mumbai	4%	•0%	8%	10%	-	12%
Quadros et al.	2013	Karnataka	8.33%	•0%	5.55%	5%	-	17.50%
Magadum et al.	2015	Karnataka	2.50%	7.5%	5%	•0%	-	•0%
Gayathri et al.	2016	Hyderabad	•0%	4%	•0%	•0%	-	•0%
Gopalakrishna et al.	2018	Kerala	6%	2%	6%	2%	-	•0%
Sudikshya et al.	2018	Nepal	4.34%	0.00%	*21.73%	3.70%	-	29.62%
Biswas et al.	2018	Silchar	4.35%	2.17%	•0%	2.17%	-	17.39%
AK Manickavasuk	2019	Coimbatore	7.50%	*10%	5%	12.50%	-	2.50%
Victor Mutua et al.	2021	Nairobi, Kenya.	•0%	•0%	5.26%	•0%	-	*37.50%
Ochieng JJ. et al.	2023	Western Kenya	*9.68%	2.70%	3.22%	5.41%	-	8.11%
Present study	**2025**	**Delhi,NCR**	**•0%**	**2.86%**	**5.71%**	**11.43%**	**-**	**25.71%**

*** Highest finding, • lowest finding**

CONCLUSION -

A comprehensive study was conducted on 35 pairs (35 Rt. & 35 Lt.) human cadaveric lung at Santosh Medical College, Ghaziabad to assess clinical correlation based on morphological variation. The findings of this study, compared with previous research, highlight notable differences in the major, minor, and accessory fissure prevalence across various populations. This indicates that genetic and environmental factors may influence the formation of these fissures. Recognizing these variations can help explain atypical clinical presentations of lung diseases. Additionally, understanding the frequency of specific fissure variants in a population can assist radiologists and clinicians in making precise diagnoses. For surgeons, this knowledge is essential for planning, adjusting, and performing surgical procedures tailored to the individual case.

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