

Case Study

UNUSUAL NON-AZYGOUS ACCESSORY FISSURES IN RIGHT UPPER LOBE

Giriraj Singh ¹, Roma Rai ².

¹ Senior Advisor, Department of Radiodiagnosis, Command Hospital, Kolkata 700027, India.

² Graded Specialist, Department of Radiodiagnosis, INHS Patanjali, Karwar-581308, India.

ABSTRACT

The lungs are divided into various lobes by the oblique fissure bilaterally and horizontal fissure on the right side. Apart from these common fissures, various accessory fissures are sometimes identified; namely the azygous fissure, superior and inferior accessory fissure on the right and minor (or horizontal) fissures on the left. These accessory fissures are usually detected as incidental findings in radiographs or Multi Detector Computed Tomography (MDCT) scan. Accessory fissures can act as an anatomic barrier to the spread of inflammatory or neoplastic disease and due to the variant anatomy, can mimic lesions. It is important to recognize the presence of accessory fissures, as they affect surgical planning of pulmonary lobectomy and segmentectomy. Occurrence of an accessory fissure in the right upper lobe other than due to the anomalous course of azygous vein is very rare. We report four cases of incidental detection of non-azygous accessory fissures in right upper lobe on MDCT Chest in patients referred for evaluation of unrelated diseases. In conclusion, knowledge of occurrence of uncommon accessory fissures is essential for superior diagnostic and surgical management.

KEYWORDS: Lung, Pleura, Fissures, Accessory, Computed Tomography, Right upper lobe

Address for Correspondence: Dr. Roma Rai, Graded Specialist, Department of Radiodiagnosis, INHS Patanjali, Karwar-581308, India. Mobile: 91-9923581505; Fax No: 08382-263612
E-Mail: drromarai@gmail.com

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INTRODUCTION

An accessory fissure of the lung is a cleft of varying depth lined by visceral pleura and appears as a thin white line in unusual locations on chest radiographic/ Multi Detector Computed Tomography (MDCT) studies [1]. Anatomically, accessory fissures are more common than their approximate rates of detection at conventional chest radiographs and computed tomographic scans [2].

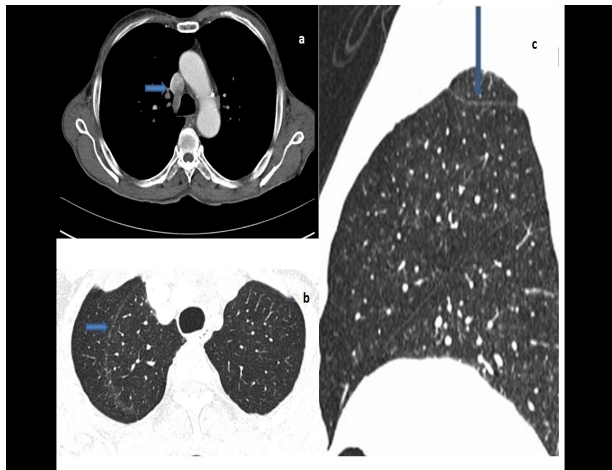
We report four cases of non-azygous accessory fissure in the right upper lobe, which were incidentally detected on the CT images in patients referred for evaluation of non-related clinical

conditions.

Case 1: A 71 years old man was referred for a contrast enhanced computed tomography (CECT) scan of chest and abdomen to determine the cause for extrinsic right atrial compression suspected on 2 D Echocardiography examination during a routine medical checkup. The chest radiograph and ultrasound done at our facility revealed raised right hemi-diaphragm without any other abnormality. CECT revealed raised right hemi-diaphragm with the normal left lobe of the liver indenting the right atrium and mimicking a mass on Echo examination. No other mass was identified. Incidentally, an accessory

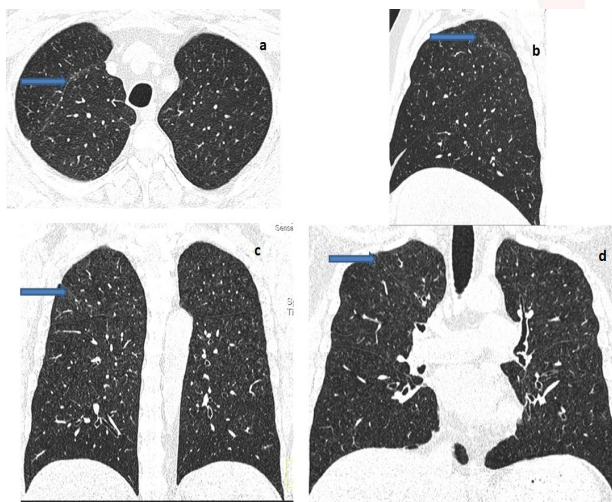
fissure was noted separating the apical segment of RUL (right upper lobe) from the rest of its segments. The contrast-enhanced computed tomography scan showed normal location and course of the azygous vein.

Fig. 1 a: Axial CECT in mediastinal window image shows the normal course of azygous vein (arrow) draining into superior vena cava. **b & c:** Axial and sagittal lung window images show the non-azygous accessory fissure in the right upper lobe (arrows), between the apical segment & rest of the segments of RUL in case 1.



Case 2: A 55 years old male diagnosed clinically as a case of probable Interstitial Lung Disease (ILD), was referred for High Resolution Computed Tomography (HRCT) of the chest for confirmation and characterisation of the disease. The study revealed a 2 cm diameter solitary pulmonary nodule in the right lower lobe but there was no evidence to suggest ILD. Evaluation of lung window revealed a non-azygous accessory fissure separating the anterior segment from the other segments of RUL.

Fig. 2 a,b,c,d: Axial, sagittal and coronal CT images in lung window show the non-azygous accessory fissure in the right upper lobe (arrows), between the anterior segment and rest of the segments of RUL in case 2.



Case 3: A 31 years old male, a proven case of sputum positive pulmonary tuberculosis (on follow up) was referred for a CECT chest to delineate the present status of the disease. CT revealed few scattered fibrotic opacities and calcified nodules in both lung fields with no morphological features suggestive of active infection. In addition, a non-azygous accessory fissure separating the anterior segment from the rest of the segments of the RUL was noted.

Case 4: A 67 years old male, a diagnosed case of Transitional cell carcinoma (TCC) of urinary bladder was referred for a CECT chest as a part of metastatic workup. The study revealed few fibrotic tags and thin walled air cysts in bilateral lung fields, however no focal lung lesions suggestive of metastasis were seen. In addition, a non-azygous accessory fissure separating the anterior segment from the rest of the segments of the RUL was noted.

DISCUSSION

Accessory fissures are congenital variations of segmental anatomy of the lung parenchyma. They occur between various broncho-pulmonary segments in the form of a cleft of varying depth lined by visceral pleura. They are more common in fetal and neonatal lung specimens than in adult lung specimens [3].

During embryological growth, lung tissue arises as multiple broncho-pulmonary buds separated by fissures. Later, broncho-pulmonary buds fuse and the fissures obliterate, except the bilateral major (oblique) and minor (on the right side) fissures, which separate the lobes of a developed lung [4]. The less common accessory fissures including the non-azygous fissures persist when some of the fissures dividing the various lung segments fail to obliterate in the course of embryological development.

The accessory fissures are not well demonstrated on conventional imaging techniques. High Resolution Computed Tomography can detect majority of these accessory fissures more frequently compared to MDCT scan due to better spatial resolution [5,6].

Various authors in literature have quoted varying rate of incidence of accessory lung fissures. The most well known accessory fissures are the

superior accessory, inferior accessory and azygous fissures, which occur more commonly in the right lung. The first two occur in the lower lobe. A superior accessory fissure typically separates the superior from the basal segments of the right lower lobe, and is rarely seen on radiographs and MDCT scans. An inferior accessory fissure isolates the medial basal segment in the right lower lobe. Azygous fissure occurs in the upper lobe and is formed by invagination of the azygous vein through the right lung apex. Felson mentions the overall incidence of these accessory fissures to be 5% [7]. David Sutton quotes the incidence of azygous fissure to be 1% and 0.4 % on postmortem and radiological evaluation respectively [1]. The incidence of superior accessory fissure is approximately 5% at post-mortem and incidence of inferior accessory fissure is approximately 5-8% on chest radiographs [1]. A left minor fissure is present in approximately 8% of individuals at postmortem, but can only be identified on chest radiographs in 1.6% of patients [8]. The left minor fissure, when present, typically separates the lingula from the rest of the left upper lobe. In a series of 2,000 consecutive subjects referred for chest radiographs, 81% of the left minor fissures that were discovered were complete [8]. Left minor fissures usually resemble the right minor fissure. They can, however, have variable cranio-caudal location relative to the right and can slope inferomedially or supero-laterally. Various studies have quoted incidence of the more common accessory fissures as detected on HRCT. A study done by Aziz et al using high resolution CT scan of chest documented inferior accessory fissure in 8.6%, superior accessory in 4.6% and azygous fissure in 1.2% of scanned cases [9].

Our cases document uncommon non-azygous accessory fissures separating the apical segment of RUL in one case and isolating the anterior segment in three other cases. A non-azygous accessory fissure in the right upper lobe

has been rarely reported in literature. Gowrinath et al reported a case of non-azygous accessory fissure between the apical and the posterior segment of right upper lobe [2].

In 2012, Muttikkal et al described another case of non-azygous accessory fissure between the apical and the anterior segment of right upper lobe [10].

CONCLUSION

It is important to recognize the presence of uncommon accessory fissures, as it will further aid in the localisation of disease process and aid surgical planning.

Conflicts of Interests: None

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