# The Role of High Resolution Computed Tomography in the Diagnosis of Interstitial Lung Diseases



Essay

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of the MSc. Degree in *Radiodiagnosis*

By

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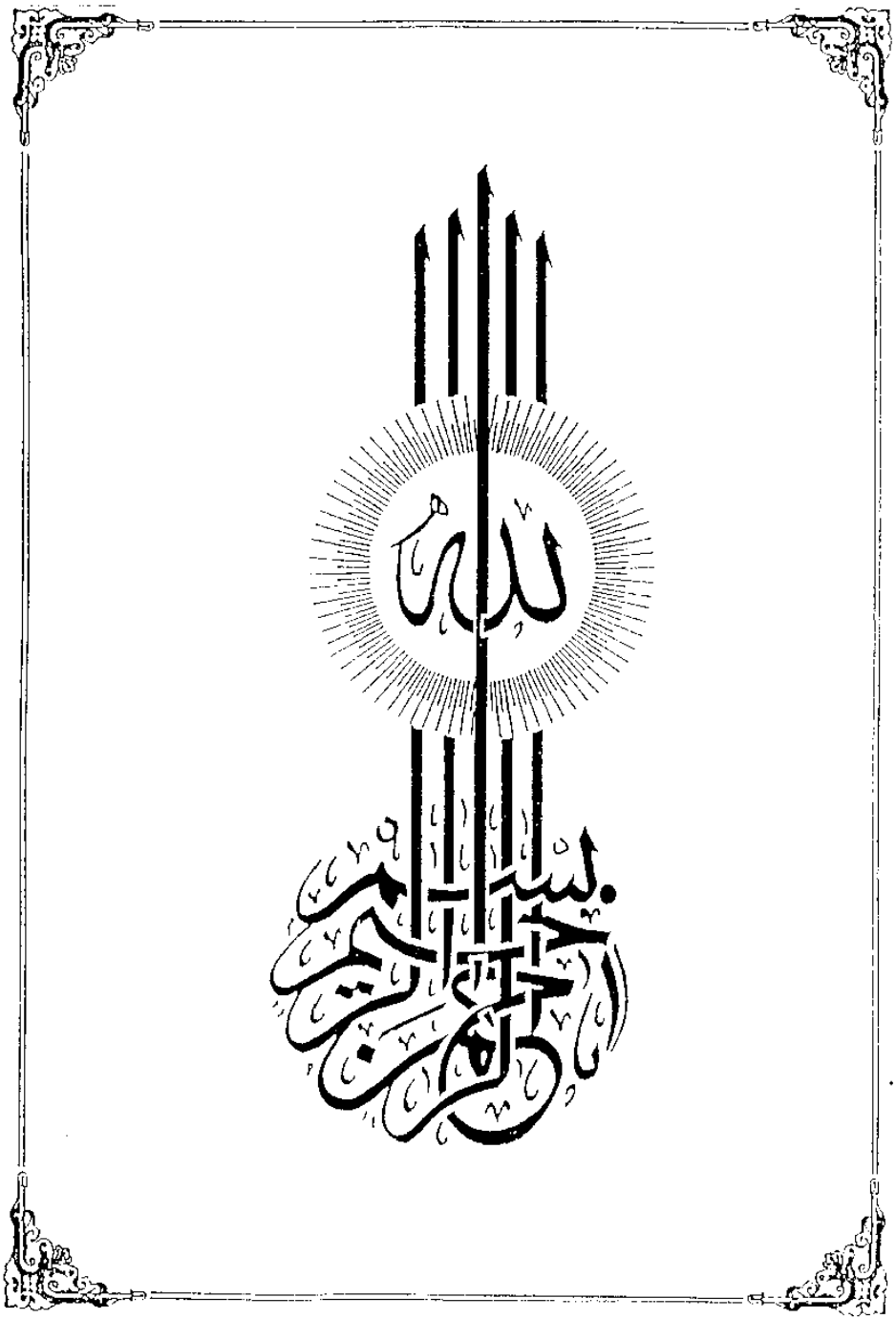
بسم الله الرحمن الرحيم



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# *INTRODUCTION AND AIM OF WORK*

For a long time, the chest radiograph has been the only imaging technique used in the assessment of patients with suspected diffuse lung disease. Also, the main use for computed tomography was the detection of pulmonary nodules.

Improvements in scanner technology, notably in terms of spatial resolution and shorten scan times had led to renewed interest in the application of computed tomography to show fine parenchymal morphological lung details.

The aim of this work is to emphasize the role of high resolution computed tomography (HRCT) in confirming or excluding a questionable shadowing on a chest radiograph, investigation of dyspnic patient with abnormal lung function test values, characterization of the disease, disclosing a coexisting disease as emphysema and providing a guide to the site and type of lesion before biopsy.

# II. C.T. anatomy of the normal Lung

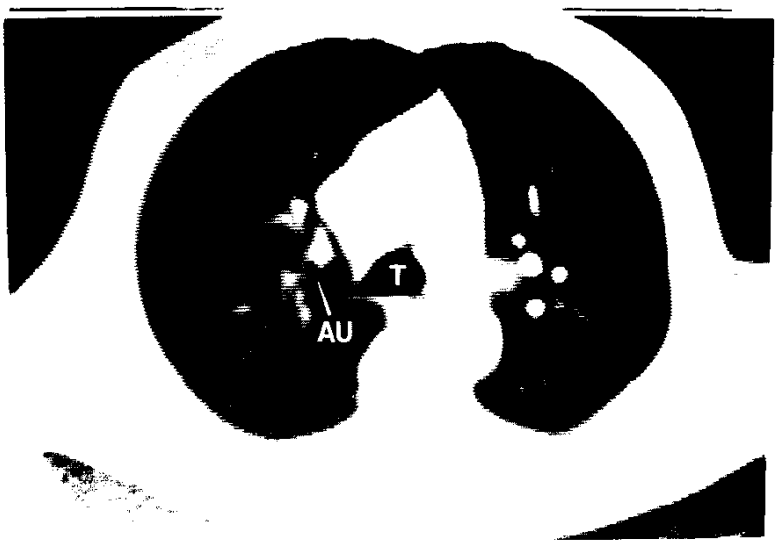


**Fig. 1 Airway anatomy:**
Au = Apical segment right upper lobe bronchus.
T = Trachea.
***(Quoted from Gale and Karlinsky, 1988).***

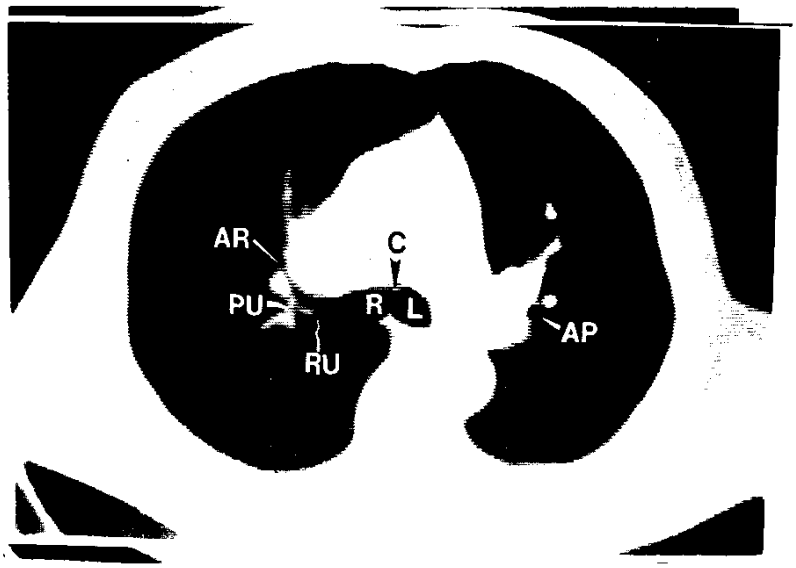


**Fig. 2 Airway anatomy:**
AP = Apical posterior segment left upper lobe bronchus.
AR = Anterior segment right upper lobe bronchus.
C = Carina.
L = Left main stem bronchus.
PU = Posterior segment right upper lobe bronchus.
R = Right main stem bronchus.
RU = Right upper lobe bronchus.
***(Quoted from Gale and Karlinsky, 1988)***

same or next lower level, separated by the right upper lobe pulmonary vein *(Heitzman, 1984)*.

The right upper lobe borders the major portion of the right upper lobe bronchus, but the right lower lobe can be touch the medial posterior portion.

The bronchus intermedius (Fig. 3) lies immediately posterior to the main right pulmonary artery below the origin of the right upper lobe, it is tubular structure and contacts the superior segment right lower lobe posteriorly and also posteromedially in the azygoesophageal recess, it runs from the origin of the right upper lobe bronchus to the origin of the middle lobe bronchus.

At a lower level, the right middle lobe bronchus is seen as a tubular structure coursing anteriorly, (Fig. 4). This divides into the medial and lateral segmental bronchi, which are visualized 60% of the time on standard CT examination *(Naidich et al., 1980)*.

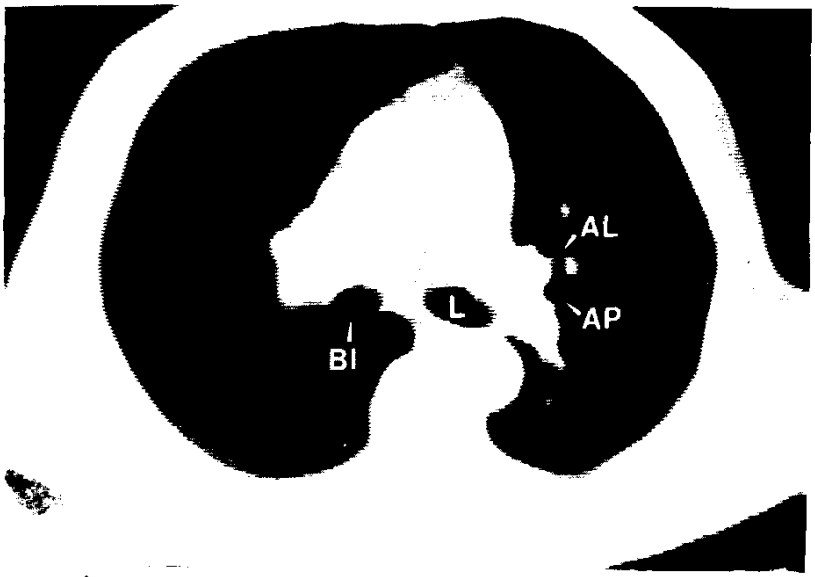


**Fig. 3 Airway anatomy:**
AL = Anterior segment left upper lobe bronchus.
AP = Apical posterior segment left upper lobe bronchus.
BI = Bronchus intermedius.
L = Left main stem bronchus.
***(Quoted from Gale and Karlinsky, 1988)***

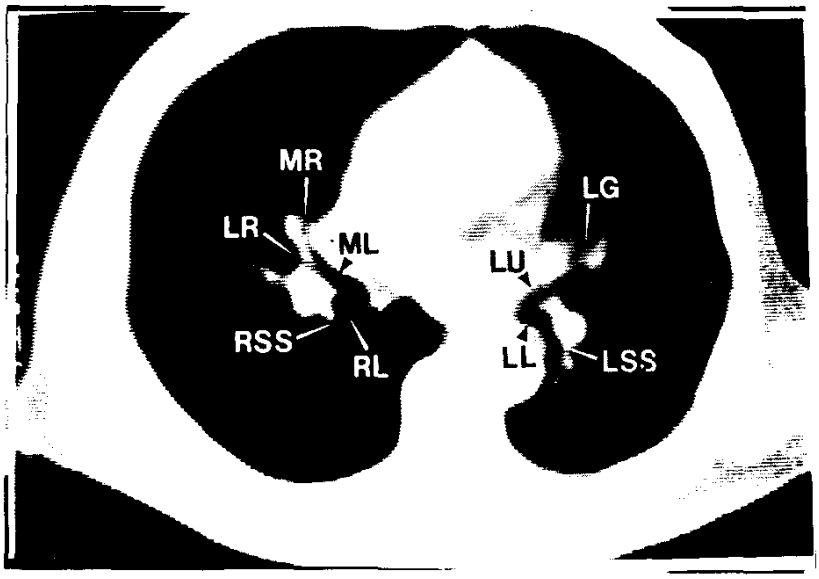


**Fig. 4 Airway anatomy:**
LG = Lingular bronchus.
LL = Left lower lobe bronchus.
LR = Lateral segment right middle lobe bronchus.
LSS = Left lower lobe superior segment bronchus.
LU = Left upper lobe bronchus.
ML = Right middle lobe bronchus.
MR = Medial segment right middle lobe bronchus.
RL = Right lower lobe bronchus.
RSS = Right lower lobe superior segment bronchus.
***(Quoted from Gale and Karlinsky, 1988)***

Only a short segment of the medial segmental bronchus is seen because it extends obliquely, whereas more of the lateral segment is visualized during its more horizontal and lateral course. They are usually equal in size, occasionally the medial segmental bronchus is much larger than the lateral one *(Felson, 1973)*.

The pulmonary artery to the right lung lies just posterolateral to the right middle lobe bronchus, also the right superior pulmonary vein is just anterior to it.

The superior segmental bronchus of the right lower lobe originates at or just below the right middle lobe bronchus, extending posteriorly as a tubular structure. Then it divides into the four basal segmental bronchi (Fig. 5), the posterior and lateral segmental bronchi may arise as a common trunk. The divided and undivided lower lobe bronchi lie medial and anterior to their corresponding pulmonary artery segment, which they parallel. The lower lobe pulmonary vein is seen lateral to the right lower lobe bronchus, running horizontally toward the left atrium, *(Frasr et al., 1977)*.

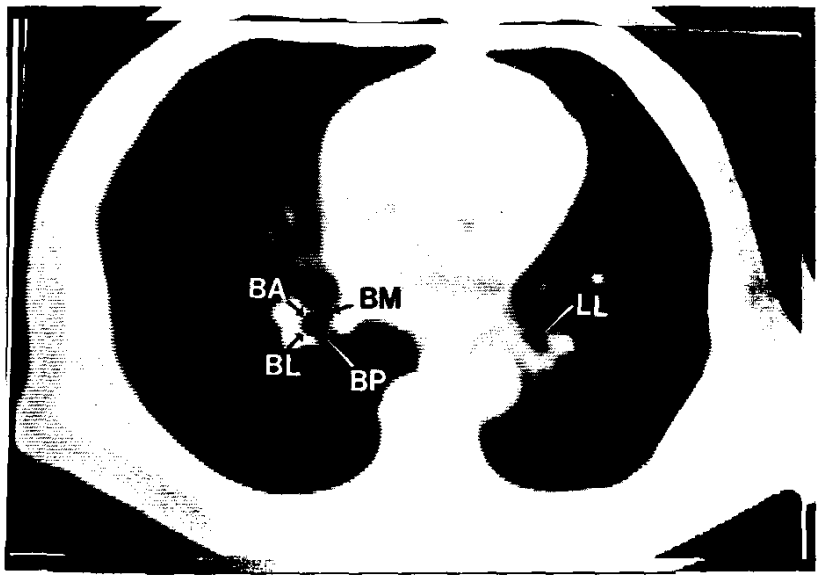


**Fig. 5 Airway anatomy:**
BA = Anterior basal right lower lobe bronchus.
BL = Lateral basal right lower lobe bronchus.
BM = Medial basal right lower lobe bronchus.
BP = Posterior basal right lower lobe bronchus.
LL = Left lower lobe bronchus.
***(Quoted from Gale and Karlinsky, 1988).***