ROLE OF MDCT IN DIAGNOSIS OF DIFFERENT CALCIFIED CHEST LESIONS

Thesis
Submitted for the partial fulfillment of the Master degree in Radiodiagnosis

By

Reham Mohammed Abd EL-Hai Refaie

M.B.B.CH (Faculty of Medicine – Cairo University)

Supervised by

Prof. Youssriah Yahia Sabri

Professor of Radiodiagnosis

Faculty of Medicine – Cairo University

Dr. Takeya Ahmed Taymour

Lecturer of Radiodiagnosis

Faculty of Medicine – Cairo University

Dr. HebaAllah Ahmed Moussa

Lecturer of chest

Faculty of Medicine- Cairo university

2015

Abstract

The role of MDCT imaging in diagnosis and evaluation of different calcified chest lesions is central, being accurate and non-invasive. The cause of such calcifications may be determined by means of the location and pattern of the calcific areas of increased opacity and knowledge of the associated clinical features. MDCT is currently the imaging modality of choice in diagnosis of different calcified chest lesions of different structures, being superior to chest radiography in demonstrating the presence and extent of chest abnormalities.

Keywords: MDC, CECT, PAM

ACKNOWLEDGEMENTS

I would like to express my sincere gratitude to my ***Prof. Dr Youssriah Yahia Sabri***, Professor of Radiodiagnosis, Faculty of Medicine, Cairo University, for her continuous support, patience, motivation and enthusiasm. I could not have imagined having a better advisor and mentor. Without her help, I would never have finished this research.

Dr Takeya Taymour, Lecturer of Radiodiagnosis, Faculty of Medicine, Cairo University and ***Dr HebaAllah Ahmed Moussa***, Lecturer of Chest, Faculty of Medicine, Cairo university, deserve my sincere expression of thanks for providing me with invaluable help and support.

I am also extremely indebted to ***Dr. Inas Mohammed Mostafa***, Assistant Lecturer of Radiodiagnosis, Faculty of Medicine, Banha University, for offering the necessary infrastructure to accomplish my research work.

It's my fortune to gratefully acknowledge the care of all members of my family and friends. Your understanding, faith, patience and support to me through the good and hard times are invaluable.

Reham Mohamed Refaie

TABLE OF CONTENTS

LIST OF ABBREVIATIONS

MDCT	**Multi-detector computed tomography.**
NECT	**Non-enhanced copmuted tomography.**
CECT	**Contrast enhanced computed tomography.**
HRCT	**High resolution computed tomography.**
PFT	**Pulmonary function test.**
TBB	**Trans-bronchial biopsy.**
US	**Ultrasound.**
PAM	**Pulmonary alveolar microlithiasis.**

LIST OF TABLES

	established by the means of fine needle aspiration of the lung.	
Figure 17	A chest radiograph and axial CT scan shows a dense nidus of central calcification in an adenocarcinoma of the lung.	29
Figure 17	Axial CT scans show a pleural-based mass with underlying pleural calcification. A CT-guided biopsy revealed a small cell lung cancer.	29
Figure 19	Axial CT scan shows a central pulmonary carcinoid associated with dense amorphous calcification (arrow)	30
Figure 20	Bronchial carcinoid shown as dense nodule at the lower pole of the right hilum on the chest radiograph (arrow). On axial CT scans there is nonuniform density of the pulmonary nodule (white arrow), which revealed calcification on the resected specimen. Note the subsegmental atelectasis distal to the tumor (black arrow).	31
Figure 21	CT scans show multiple calcified metastases from a non-mucinous adenocarcinoma from sigmoid colon confirmed on CT guided needle biopsy.	32
Figure 22	Hydatid cysts do not normally calcify within the lungs; two calcified hydatid cysts in the superior and posterior mediastinum are seen. Note the calcified hydatid cyst within the left lobe of the liver on the coronal CT reconstruction	33
Figure 23	(A): Chest X-ray bilateral infiltration and huge mass shadow with calcification. (B): MDCT chest scan reveals a huge mass at the left thorax; multiple calcifications are recognized at the periphery as well as relatively central lesions. With the heart, aorta and esophagus are displaced to the right. (C) : an old chest X-ray for the same patient shows a mass on left lower field. The heart and mediastinum were not shifted.	34
Figure 24	Silicosis. Axial MDCT at the mediastinal window shows multiple calcified nodules with a conglomerate mass.	36
Figure 25	Metastatic calcifications of the lungs in a patient with chornic renal failure.	37

Introduction

Intrathoracic calcifications occur in a wide variety of disorders. Although they are usually harmless sequel of remote processes, calcifications provide an important information for establishing the diagnosis and evaluating the progression of a known disease. They may arise in the pulmonary parenchyma, mediastinum, hilar and mediastinal lymph nodes, pleura, heart, mediastinal vessels and chest wall, or any combination of these structures. The cause of calcifications may be determined by means of the location and pattern within the lung parenchyma and knowledge of the associated clinical features. The clinical manifestations of pulmonary calcifications are usually minimal but occasionally may cause dyspnea. Therefore, they are rarely diagnosed because of their benign clinical course. No correlation is found between the extent of macroscopic calcifications and the clinical symptomatology; massive calcifications can be completely asymptomatic. Calcifications in the thorax are frequently manifestations of previous infectious process, occupational exposure, or previous medical therapy. MDCT is the most sensitive radiological method for detection in differences in radiologic density in chest lesions (***Wang et al., 2010).***

Areas of high attenuation (visually seen as dense as bony structures) in an abnormality on CT scan can be an important clue to the correct diagnosis. The attenuation is mostly caused by calcification, but may also be due to other causes like, iodine barium, or radio-opaque foreign body (**Camey et al., 2005).**

Aim Of The Study

The objective of conducting this research was to detect the role of MDCT in localizing and diagnosis of different calcified chest lesions of different structures.

Chest Anatomy

I-LUNGS:

The two lungs are similar; they are not completely symmetrical, having a different number of lobes and a different bronchial and vascular anatomy ***(Webb et al., 2009).***

The left lung: is subdivided into two lobes and thereby, into eight segments: (see fig. 1).

- Left upper lobe: - Left upper lobe proper: apicoposterior, anterior segments.
- - Lingula: superior lingular, inferior lingular segments.

left lower lobe: superior segment or apical segment, and inferior segment or basal segment, which is further subdivided into: anteromedial segment, lateral segment, and posterior segment ***(Webb et al., 2009).***

The right lung is subdivided into three lobes with ten segments: (see fig. 1)

- right upper lobe: apical segment, anterior segment, and posterior segment.
- right middle lobe: medial segment, and lateral segment.

right lower lobe: superior segment or apical segment, and inferior segment or basal which further subdivided into: anterior segment, medial segment, lateral segment, &posterior segment***(Webb et al., 2009).***

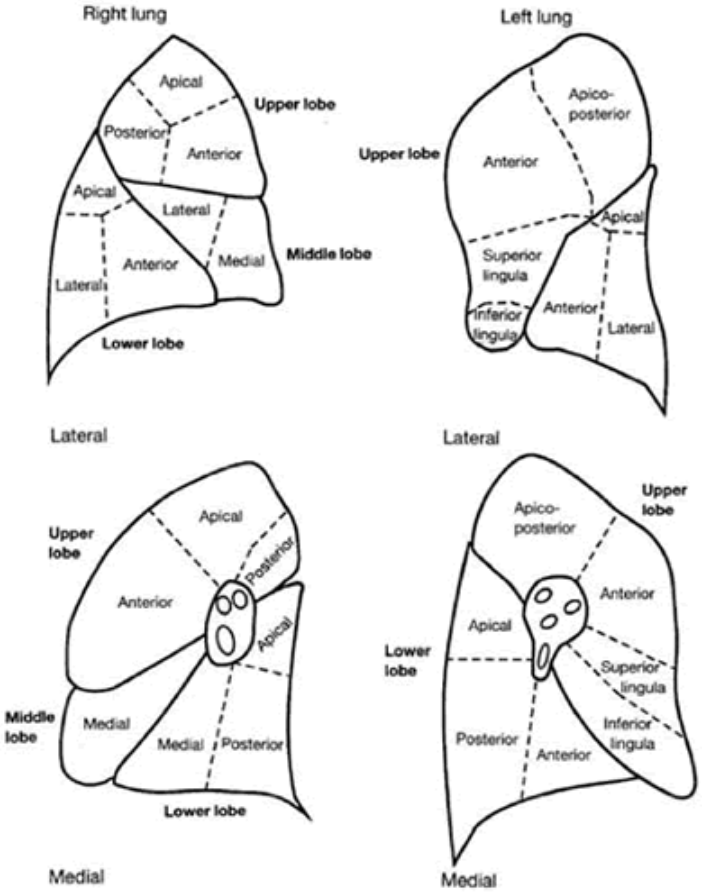

Fig. 1: Lung segments ***(Webb et al., 2009).***

II-Pleura:

The pleura is divided into: (see fig. 2)

- **Visceral pleura**: which covers the surface of the lung and dips into the fissures between its lobes.