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ROLE OF HIGH RESOLUTION CT IN DIAGNOSIS OF CHRONIC OBSTRUCTIVE PULMONARY DISEASES

Thesis

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INTRODUCTION

Chronic obstructive pulmonary diseases (COPD), cause significant high mortality and morbidity rate. The World Health Organization estimates that chronic obstructicve pulmonay diseases are the fourth leading cause of death world wide *(David et al., 2003)*.

Chronic obstructive pulmonary diseases (COPD), are characterized by progressive limitation of airflow due to inflammation of small airways, fibrosis and destruction of lung parenchyma *(Brown, 2003)*.

High Resolution CT of the lung (HRCT) is a widely used technique which has proved to be of great value in the assessment of pulmonary diseases. It is used as a supplement of plain chest radiography and clinical studies in problematic patients with suspected chronic lung diseases *(Dubois et al., 2004)*.

High Resolution CT is an established technique for the detailed evaluation of the pulmonary parenchyma and can characterize anatomic details of the lung as small as 200 to 300mm, which corresponds to approximately the seventh to ninth generations of the airways and lung segments *(Klein et al., 1998)*.

High resolution CT is the recommended imaging technique for assessing the airway. Owing to its capability to provide a super tool to visualize even minor intraluminal and extraluminal pathology in the trachea, proximal and distal bronchi *(Genier et al., 2002)*.

AIM OF THE WORK

The aim of this study is to assess the value of high resolution CT in the assessment of chronic obstructive pulmonary disease.

ANATOMY OF THE LUNG

The Airway

The airways can be divided into central airways, extending from the trachea to the segmental bronchi, and peripheral airways, extending from the subsegmental bronchi to the bronchioles *(Susan et al., 2005)*.

The Center Airway

Trachea

The trachea is a mobile tube 5 inches (13cm) long and 1 inches (2.5cm) in diameter. It has a fibroelastic wall in which are embedded a series of U- shaped bars of hyaline cartilage that keep the lumen patent. The posterior free ends of the cartilage are connected by smooth muscle, the trachealis muscle. The trachea commences in the neck below the cricoid cartilage of the larynx at the level of the body of the sixth cervical vertebra. It ends below in the thorax at the level of the sternal angle (lower border of the fourth thoracic vertebra) by dividing into the right and left principale (main) bronchi. The bifurcation is called the carina. In deep inspiration the carina descends to the level of the sixth thoracic vertebra *(Snell, 2000)*.

The upper limits of normal for its coronal and sagittal diameters in adults on plain chest radiography are 21 and 23mm, respectively, for women, and 25 and 27mm for men, the mean transverse diameter is 15.2mm for women and 18.2mm for men, the lower limits of normal being 12.3 for women and 15.9mm for men. Cross sectional areas can also be measured: the mean is 194 mm^2 in women and 272mm^2 in men *(Holbert et al., 1995)*.

Principal bronchus:

The right principal bronchus is wider, shorter and more vertical than the left, being about 2.5cm long. It gives rise to its first branch, the superior lobar bronchus, then enters the right lung opposite the fifth thoracic vertebra *(Susan, et al., 2005)*.

The left principal bronchus is narrower and less vertical than the right, is nearly 5cm long, and enters the hilum of the left lung level with the sixth thoracic vertebra *(Susan et al., 2005)*.

The Bronchopulmonary segments:

The segments of a lung supplied by segmental bronchi are called bronchopulmonary segments. Within each segment there is further branching of the bronchi. Each segment is pyramidal in shape with its apex facing the root of the lung and its base on the pleural surface. Each segment is named according to the