

ROLE OF COMPUTED TOMOGRAPHY IN EVALUATION OF BRONCHIECTASIS IN LUNGS

Radiology

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ABSTRACT

CT has become an established and essential diagnostic tool to detect disease in the field of radiology and imaging. Diagnosis of bronchiectasis is usually made using chest computed tomography, which is a gold standard method. In the present study, it has been attempted for identification of bronchiectasis in lungs by computed tomography and to evaluate the type of bronchiectasis. This prospective study was conducted on 52 patients with some clinical indication subjected to CT scanning on PHILIPS 128 slice CT machine. In the present study, it was observed that male patients are more prominent to bronchiectasis lung disease i.e.77.4%. Between the age group of 40-60 more patients with bronchiectasis disease were observed. Thus, CT is useful for the diagnosis of bronchiectasis in lungs.

KEYWORDS

Bronchiectasis, Cystic fibrosis, Tubular bronchiectasis, Varicose bronchiectasis, Pneumonia and essential ciliary dyskinesia (PCD), Gastric acid aspiration.

INTRODUCTION

The lungs are the primary organs of the respiratory system in human. Humans have two lungs, a right lung and a left lung. They are situated within the thoracic cavity of chest. The lungs are part of lower respiratory tract that begins at the trachea and branches into the bronchi and bronchioles, and which receive air breathed in via the conducting zone. The trachea, bronchi and bronchioles form the tracheobronchial tree—a system of airways that allows passage of air into the lungs, where gaseous exchange occurs. Each lung is enclosed within a pleural sac of two membranes called pleurae.

Bronchiectasis is an obstructive lungs disease that results from the presence of chronic inflammatory secretions and microbes leading to the permanent dilation and distortion of airways walls, as well as recurrent infection. Chest CT scan made it possible to identify and detect various types and locations of bronchiectasis.

A radiologist will accomplish bronchiectasis with the common chest computed tomography (CT) scan features, consisting of abnormally widened and thickened airways with an irregular wall, lack of tapering and visibility of the airways in the periphery of the lungs. Bronchiectasis is a man-made “diagnosis” that does no longer have the clear boundaries of prognosis of conditions such as asthma or COPD. There are many motives of bronchiectasis, such as immune deficiency, smoking-related airways disease, foreign body aspiration, recurrent gastric acid aspiration, cystic fibrosis (CF), autoimmune diseases, pneumonia and essential ciliary dyskinesia (PCD).

The aims of the study are-

1. To evaluate gender based prevalence of bronchiectasis
2. To evaluate age based prevalence of bronchiectasis.
3. To evaluate bronchiectasis based on type and location

EPIDEMIOLOGY

The estimated prevalence of bronchiectasis is approximately 30 to 40 per 100,000 individuals. The average annual bronchiectasis-associated hospitalization rate is approximately 16.5 per 100,000 hospitalizations. Bronchiectasis rises steeply from 4-5 per 100,000 adults aged 18-34 years to 250 to 300 per 100,000 individuals aged >75 years. Predominantly in women, the annual increase of about 2.4% in men and 3.0% in women for bronchiectasis-associated hospitalizations.

OBSERVATION AND RESULT

The present find out “Role of computed tomography in evaluation of bronchiectasis in lungs” deals with authentic findings of

bronchiectasis in NCCT chest, CECT chest and HRCT chest examination. The study about topics was patients with suspected case of pancreatic lesion. Based on the history, patients referred from emergency, OPD, surgical wards and other wards for NCCT/CECT/HRCT chest to the Department of Radio-diagnosis and Imaging, Chhatrapati Shivaji Subharti Medical College, Meerut. The findings have been derived from primary data taken from the analysis of images of the patients in the main work stations of the CT scan. The study was undertaken with the aim to evaluate the location of bronchiectasis and relation of bronchiectasis with age and gender of the patients of Chhatrapati Shivaji Subharti Hospital who were for CECT/NCCT/HRCT chest. A total of 52 cases were evaluated in this study for a period from 25th Dec 2021 to 5th June 2022. The findings were described below with the appropriate tables.

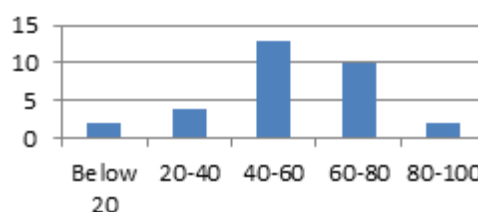
Distribution of patients on the basis of age:

The distribution of patients in accordance to the age of the affected patient in the study. A total of 52 patients were included in this study in which 31 were found to be infected with bronchiectasis. The highest number of infected patients were reported in the age group of 40-60 year.

Table No.1: The distribution of patients on the basis of age is as follows:

Age group	No. of patients	Percentage (%)
Below 20	2	6.4
20-40	4	12.9
40-60	13	41.9
60-80	10	35.2
80-100	2	6.4

No. of patients



Graph No.1: Distribution of patients according to age with bronchiectasis in lungs.

DISCUSSION

To conduct this study 52 patients with suspected CT chest were selected, it was found that 31 patients were having bronchiectasis in lungs. 10 patients were reports with tubular (cylindrical) bronchiectasis i.e., 32.25%, 7 patients were with varicose type of bronchiectasis i.e., 22.58% and 14 (45.16%) patients were with saccular (cystic) type of bronchiectasis.

There was no discrimination according to the gender of the patient in the study. Out of total 52 patients of CT chest, 33 patients were male which was 63.4% of total and 19 patients were female which was 36.5% of total patients.

The highest number of patients with bronchiectasis lung disease were from 40-60 years of age group category, which was 13 out of 31 i.e., 41.9% of the total number of the patients. Similarly, it is observed that minimum patients were found from the age group of below 20 and 80-100 years i.e., 2 (6.4%) each.

MATERIALS AND METHODS

This is a prospective observation study, in which the source of data is collected from the patient referred to the Department of Radiodiagnosis and Imaging for the CT chest with suspected cases of bronchiectasis from OPD/IPD/ER of Chhatrapati Shivaji Subharti Hospital, Subharti Medical College, Meerut, U.P.

The machine used for this study is Philips Ingenuity Core 128 slice MDCT machine. All age group patients without gender discrimination are collected during data collection period.

REVIEW OF LITERATURE

NL Muller, CJ Bergin, DN Ostrow, DM Nichols did a study in 1984 on "Role of computed tomography in the recognition of bronchiectasis" and the CT was performed in 11 patients with clinical finding strongly suggestive of this diagnosis. In two patients, CT showed extensive bilateral cystic and varicose bronchiectasis. In four patients, bilateral, and in five, unilateral bronchograms were obtained. In only six bronchograms did CT give an accurate assessment of the presence and extent of disease. In five, the diagnosis of cylindrical and varicose bronchiectasis was missed on CT.^[3]

Georgeann McGuinness et al. did a study in 1995 on "Bronchiectasis: CT/ Clinical correlation". The association between bronchiectasis and human immunodeficiency virus infection, the resurgence, especially in urban and immunocompromised patients, and the recognition of bronchiectasis as a manifestation of rejection in the transplant population are emerging clinical settings in which establishing the diagnosis of bronchiectasis is becoming increasingly important.^[4]

JC Cooke et al. did a study in 1987 on "Role of computed tomography in diagnosis of bronchiectasis". Bronchograms and computed tomograms were performed in 27 patients who presented consecutively for bronchography with chronic sputum production. The sensitivity and specificity of computed tomography at segmental level compared with bronchography was 66% and 92%, respectively. Conclude that computed tomography alone is not yet suitable for accurate characterization and localization of disease in patient in whom surgery is contemplated.^[5]

CONCLUSION

Computed tomography is fundamentally a method of acquiring and reconstructing an image of a thin cross-section of the body. CT is a technique of creating tomographic images from digitized data obtained by exposing the patients to x-ray from many different angles. High resolution CT is accepted as the gold standard for evaluation of lungs.

In this study, a total 52 patients with suspected CT chest were selected, it was found that 31 patients were reported with bronchiectasis lung disease out of which 10 patients were reports with tubular (cylindrical) bronchiectasis i.e., 32.25%, 7 patients were with varicose type of bronchiectasis i.e., 22.58% and 14 (45.16%) patients were with saccular (cystic) type of bronchiectasis.

The maximum patients were found to be having saccular (cystic) bronchiectasis. The highest number of patients with bronchiectasis in lungs were from the 40-60 years age group category, which was 13 out of 31 i.e., 41.9% of the total number of the patients.

The conclusion of the study is that patients belong to the age group of 40-60 years are more prominent to bronchiectasis lungs disease.

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