ORIGINAL ARTICLE

Frequency and Patterns of Bronchiectasis in Patients with Chronic Obstructive Pulmonary Disease

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ABSTRACT

Background: Bronchiectasis is associated with chronic obstructive pulmonary disease (COPD) and is under diagnosed due to scarce availability of diagnostic tools like high resolution computed tomography (HRCT).
Aim: To determine the frequency and pattern of bronchiectasis and pattern in COPD patients and to determine the factors associated with its presence.
Methods: A Cross-sectional survey was carried out and 131 diagnosed patients of COPD were included. Bronchiectasis was determined by high resolution CT scan. A structured proforma was used to record all variables of interest either related to severity of COPD or associated with bronchiectasis.
Results: Bronchiectasis was present in 66 (50.4%) patients of COPD. Out of all patients of COPD, cylindrical type was present in 42.7% with more bilateral and lower lobe involvement. Mean age, gender, history of pulmonary tuberculosis and exacerbations of COPD were not found associated with presence of bronchiectasis while Time Elapsed since Diagnosis, pack years of smoking and score on Modified Medical Research Council (MMRC) Dyspnoea Scale were significantly associated with development of bronchiectasis in COPD patients.
Conclusion: It is concluded that frequency of bronchiectasis is quite high in Pakistani patients of COPD.
Keywords: Bronchiectasis, Chronic obstructive pulmonary disease, Pack years of smoking, Types of bronchiectasis, Modified Medical Research Council Dyspnea Scale

INTRODUCTION

Chronic Obstructive Pulmonary Disease (COPD) is a major health problem all over the world[1,2]. Its fourth leading cause of chronic morbidity and mortality world wide and according to recent published data, by year 2020 it is projected to rank 5th in worldwide burden of disease[3,4,5]. Despite the diagnostic and therapeutic advances of current era, the prevalence of airway diseases has increased[4]. The prevalence of COPD is approximately 14% in smokers, 7% in former smokers and 3% in individuals who never smoked[3]. Recent studies have projected worldwide burden of $47 trillion health dollars by 2030 due to airway diseases. In contrast, only $0.40 per individual per year will be the cost if we implement a program aimed at controlling tobacco-related diseases[2,6,7]. Patients with co-existing COPD and bronchiectasis represent a unique population of COPD as these patients have more severe disease, worse outcomes/ complications and more frequent exacerbations[8]. High resolution computed tomography is useful in predicting the extent and severity of COPD and bronchiectasis[8,9,10].

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By determining frequencies of factors and patterns of bronchiectasis in our population of COPD patients, we may help develop guidelines and local policy about who should get an HRCT. By doing so, we can improve resource utility by avoiding un-necessary HRCT's in our resource limited country and on the same time not compromising patient care. This will lead to early treatment, improved symptom control and reduced complications in long term run.

SUBJECTS AND METHODS

A Cross-sectional survey was conducted in department of Pulmonology, Jinnah Hospital, Lahore from 1st September 2013 to 28th February 2014. One hundred and thirty patients were included. Patients were labelled as suffering from COPD if both post bronchodilator FEV1 (forced expiratory volume in one second)/FVC (forced vital capacity) <0.7 and Post bronchodilator FEV1 ≤80% with reversibility <15% or <200ml. Stable Disease was labelled if there is no exacerbation of COPD in last 6 weeks. Exacerbations of COPD were defined as described in GOLD report 2011[1]. Bronchiectasis was labelled on the basis of chest CT scan findings as mentioned by consultant radiologist. Patterns of bronchiectasis included radiological type (cystic/cylindrical), location (right/left side & lobe involved), and severity (localized - limited to one lobule or disseminated - more than 1 lobe

involved) and were defined on the basis of HRCT finding. Basic demographics of these patients including age, sex, body mass index (BMI), current or ex-smoking history, pack year of smoking, history of Huqqa smoking, exposure to biomass fuel, past history of T.B and number of COPD exacerbations in past 1 year was noted. Functional status was assessed with MMRC dyspnoea scale.[11] Factors studied included cigarette smoking (presence of 15 packs year was considered as being positive), current and ex-smoker (who had quit smoking since 1 year), history of TB, smoking pack years, years from onset of symptoms, MMRC Score, Number of COPD exacerbations. All calculations were done on a personal computer using SPSS version 21.0.

RESULTS

One hundred and thirty one patients of mean age 58.8±5.9 years ranging from 42 to 74 years were included in the study. 93 patients (71%) were male and 38 patients (29%) were female. 20 patients (15.3%) were previously treated for pulmonary tuberculosis. Most common type of smoke exposure in our sampled population was cigarette and Hukka which was present in half of the sampled population. 88(67.2%) patients were ex-smokers while rest were current smokers. 66 patients (54.4%) were found having bronchiectasis. 12 patients (9.2%) were having cystic bronchiectasis while 54 patients (41.2%) cylindrical bronchiectasis on CT-scan. Most of the patients with bronchiectasis in our sampled population have more than one lobe involved with bronchiectasis 56(42.7%). Lower lobe was found more involved with bronchiectasis. Most of the patients 42(32.1%) had bilateral involvement of both sides.

Mean exacerbation of COPD per year were 3.18±1.7 ranging from 1 to 9 while mean pack years of smoking were 41.2±18.9 years. Mean MMRC score of severity of COPD was 2.82±0.73. Mean time elapsed since diagnosis came out 7.09±3.6 years. Mean age distribution was found equally distributed among cases of with and without bronchiectasis (p=0.56). Similarly mean number of exacerbation were equal in both patient groups (p=0.24). But time elapse since years, smoking pack years and MMRC score were significantly higher in bronchiectasis group. Gender was not associated with bronchiectasis in our sampled population (p=0.14). Similarly history of pulmonary tuberculosis has no role in development of bronchiectasis in our sampled population. Similarly both current smokers and ex-smokers are equally prone to bronchiectasis (p= 0.58).

DISCUSSION

Chronic obstructive pulmonary disease (COPD) is a common respiratory condition involving the airways and characterized by airflow limitation.[12] It affects more than 5% of the population and is associated with high morbidity and mortality. In our population COPD was found unequally distributed among male and female due to social constrains smoking is prevalent among male. Social structure showing prevalent smoking among male[13,14]. Frequency of pulmonary tuberculosis was found quite high in our sampled population about 15% showing the chronic impact of disease. Cigarette and hukka were more prevalent showing there inter-change able characteristic. Although cigarette are most common modality but recently we found a surge in use of hukka s modern version i.e. Shisha[15]. Shisha is 200 times more potent than a cigarette[16]. Most of the patients were ex-smokers showing delayed quitting of smoking in COPD. Biomass fuel exposure was common among female due to conventional use of high carbon fuel[14].

More than half of the sampled population was found having bronchiectasis showing high morbidity and mortality. Cylindrical bronchiectasis was more prevalent than cystic one. Bilateral involvement is common and usually lower lobe was found involved. Bronchiectasis was found significantly associated with time elapse since diagnosis, smoking pack years and MMRC score of severity of COPD. Age, gender, history of pulmonary tuberculosis and recurrent exacerbations were not significantly associated with presence of bronchiectasis in patients with chronic obstructive pulmonary disease. Results of our study matches results of previous studies.[2,5,12,17-19] In a previous study done on COPD patient, bronchiectasis was found in 53% of patients. Among type of bronchiectasis, cylindrical bronchiectasis was found in 90.6% and cystic bronchiectasis in 18.9%. Among location of bronchiectasis, upper lobe was involved in 11.3%, lower lobe in 60.4%, middle lobe in 28.3%, Right side in 13.2%, left side in 9.4% and bilateral involvement in 77.4%; Among extension of bronchiectasis, localized bronchiectasis was present in 15.1% and disseminated bronchiectasis was found in 18.9%[20].

Same study showed different factors that were present with increased frequency among COPD patient with bronchiectasis; mean smoking pack year was 69.8, current smokers were 22.6%, former smokers were 77.4%, mean years from onset of symptoms was 17.6, mean number of exacerbations leading to hospital admission was 0.57 per year, mean Modified Medical Research Council Dyspnea Scale (MMRC score) was 2.04, past history of TB

was found in 9.4%, mean value of post bronchodilator FEV1 was 1.1 litre (46.4% of predicted) and FVC was 2.47 litre (77.3% of predicted)[2,20].

Limitations of current study included its non-representative sampling as all cases are taken from outpatient department of an urban tertiary care hospital. Secondly a better study design (prospective cohort analysis) is proposed to determine the effect of different factors which lead to development of bronchiectasis in patients with chronic obstructive pulmonary disease.

CONCLUSION

It is concluded that the frequency of bronchiectasis is quite high (50.4%) pattern of bronchiectasis was found cylindrical with bilateral chest involvement of lower lobes and more disseminated. History of tuberculosis and current status of smoking was found equally distributed in patients with and without bronchiectasis mean smoking pack years and years from onset of symptoms and MMRC score was found significantly associated with presence of bronchiectasis in patients of COPD.

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