

Prevalence of Tuberculosis Among Bronchial Asthma Patients Treated with Steroids

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Abstract

Background. Bronchial asthma and tuberculosis (TB) are two of the common diseases seen in developing countries, and most of the patients with bronchial asthma require life-long therapy with steroids.

Objectives. To estimate the frequency of pulmonary TB among bronchial asthma patients treated with corticosteroids.

Methods. Patients with bronchial asthma who have been on steroid therapy were enrolled. Diagnosis of TB was made by history, clinical examination, and laboratory tests findings.

Results. Of 100 patients with bronchial asthma, 11 patients developed pulmonary TB (4 sputum-positive, 7 sputum-negative). Of the 60 patients who were on oral steroids, 52 were taking steroids for more than 2 years; of them, 10 (19%) patients developed pulmonary TB. Of the 40 patients who were on inhaled steroids, 80% were using it for more than 2 years; 1 (3.2%) of them developed pulmonary TB.

Conclusion. Systemic corticosteroid therapy significantly increases the risk of pulmonary TB in patients with bronchial asthma. [Indian J Chest Dis Allied Sci 2017;59:13-15]

Key words: Bronchial asthma, Corticosteroids, Tuberculosis.

Introduction

Bronchial asthma is one of the disease recognised as a distinct entity since long, but it has come to the center stage as a public health problem only in the last 3-4 decades. Prevalence of asthma has increased dramatically¹ and is now recognised as a major cause of disability, medical expense and preventable deaths. Asthma is a heterogeneous disease with chronic airway inflammation usually presenting with a history of respiratory symptoms, such as wheeze, shortness of breath, chest tightness and cough that may vary over time and in intensity, along with variable expiratory airflow limitation.²

Bronchial asthma and tuberculosis (TB) are two of the very common diseases seen in developing countries. Patients with bronchial asthma often require life-long therapy with steroids. Whether use of steroids in an asthmatic causes flare up of TB lesions has been a long continuing debate. More than 30% of the Indian population is sub-clinically infected with *Mycobacterium tuberculosis*. Corticosteroids have been shown to affect the lymphocytes, and thereby, affecting inflammatory and immunologically mediated processes. Corticosteroids impair antibody production and cell-mediated immunity, leading to blunting of the patients response to infection.^{3,4} Hence,

this study was undertaken to estimate the incidence of pulmonary TB among patients with bronchial asthma treated with corticosteroids.

Material and Methods

This hospital-based, cross-sectional study was conducted at Government Medical College, Kota in Rajasthan State of India from February 2015 to January 2016. One hundred patients with bronchial asthma on oral or inhaled corticosteroid therapy for more than 1 year were included in the present study. All the patients were taking either oral prednisolone 20-40 mg per day or inhaled beclomethasone 800 mcg per day or equivalent preparations. Patients who had complications of bronchial asthma like pneumothorax, past history of pulmonary TB, human immunodeficiency virus/acquired immunodeficiency syndrome (HIV/AIDS) and other immunocompromised conditions were excluded from the study. Diagnosis of bronchial asthma was based on Global Initiative for Asthma (GINA) guidelines. All patients who fulfilled inclusion criteria were screened for pulmonary TB clinically by taking history about unexplained cough persisting for more than 2 weeks, fever for more than 2 weeks, haemoptysis, unexplained weight loss, history of direct contact with cases of pulmonary TB or family history of TB.

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Chest radiography and sputum smear for acid-fast bacilli (AFB) by Ziehl-Neelsen technique were done in all patients. All diagnosed cases of pulmonary TB were given directly observed treatment, short-course (DOTS) and were followed-up for 4 months. We confirmed sputum-negative TB by clinical findings, radiological features (hilar lymphadenopathy, opacity, cavity, fibrosis, fibrocavitary lesion, infiltrates), and clinico-radiological improvement with DOTS treatment.

Statistical Analysis

Data were analysed using the Statistical Package for the Social Sciences (SPSS) version 16.0 software. Quantitative data frequencies were calculated and the Chi square test was done for analysis of quantitative data.

Results

We included 100 patients of bronchial asthma who have been on anti-asthmatic steroid therapy. The number of male and female patients were 60 (60%) and 40 (40%), respectively. Seven (11.6%) male and 4 (10%) female patients developed pulmonary TB (Table). Among the study participants, 60% were on oral steroid therapy, of which 10 (10%) developed pulmonary TB. Remaining 40% of patients were only on inhaled steroids; of them, 1 (1%) patient developed pulmonary TB ($p=0.02$). Of the 60 patients who were on oral steroids, 52 were taking these for more than 2 years, and from these, 10 (19%) patients developed pulmonary TB, which was statistically significant ($p=0.023$). Of the 40 patients who were on inhaled steroids, most of the patients (32 [80%]) were using it for more than 2 years. Of these 32 patients, 1 (3.2%) patient developed pulmonary TB, which was not statistically significant ($p=0.083$). Of the 11 patients who developed pulmonary TB, only 4 were sputum-positive and the remaining 7 were sputum-negative.

Table. Age and gender distribution

Age	Male	No. of Patients Developed Tuberculosis	Female	No. of Patients Developed Tuberculosis
<30 years	16	0	4	0
31-40 years	14	1	10	0
41-50 years	10	2	10	2
51-60 years	12	0	4	2
61-70 years	8	4	8	0
>70 years	0	0	4	0

Discussion

Asthma is a worldwide problem with an estimated 300 million affected individuals,² and its prevalence is increasing especially among children in many countries. Despite number of published reports on the prevalence of asthma in different populations, and lack of a precise and universally accepted definition of asthma makes it difficult to compare the reported prevalence from different parts of the world. Health-care expenditure on asthma is also very high, up to 1% to 2% of total health-care expenditures.

In the early days of corticosteroid therapy, concerns were often expressed about reactivation of latent TB and the development of TB in tuberculin-positive individuals with no evidence of clinical disease. Whenever a patient on corticosteroids developed overt TB, the two events tended to be regarded as causally related. The view that asthma and pulmonary TB are mutually exclusive is widespread globally. A long continuing debate has been whether steroids result in flare up of TB lesions. The role of steroid therapy in an asthmatic precipitating TB is controversial. Many studies conducted worldwide showed definite association between corticosteroid therapy and development of overt TB.^{5,6} In 1972, Lieberman *et al*⁷ observed no reactivation of TB among 50 asthmatic patients in a study of complications of corticosteroid treatment and found that the difference was not statistically significant.

In our study, among 100 patients with bronchial asthma, 11 patients developed pulmonary TB which was significant. Behera *et al*⁵ conducted a study on 70 patients who were on oral corticosteroids therapy for various respiratory diseases and 80 patients suffering from similar diseases but not receiving steroids therapy, and followed up for 1 year; 5 (6.5%) patients developed TB as against none amongst the controls ($p<0.05$). Dharampal *et al*⁸ reported that 7 (5%) patients developed TB compared to none in the controls in a study of 143 cases who were receiving corticosteroids.

In the present study, there was a significant increase in the incidence of pulmonary TB among asthmatics treated with systemic corticosteroids when compared to the asthmatics treated with inhaled steroids. Lee *et al*⁹ showed that inhaled steroid use was associated with increased rate of TB diagnosis, which was dose-dependent. Incidence of pulmonary TB in the present study was more among patients who were on oral steroids for longer duration (>2 years). Sasaki *et al*¹⁰ found that mean length of time from appearance of collagen vascular disease and the occurrence of TB was 4.1 years. In the present study, out of 11 patients with TB, only 4 were sputum

positive. This indicates that for some reason open cases are less frequent among asthmatics those who develop pulmonary TB.

Conclusions

We observed that systemic corticosteroid therapy significantly increases the risk of pulmonary tuberculosis. There is a need for surveillance for tuberculosis among patients of bronchial asthma treated with steroids.

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