



### Original Research Article

## Effect of Ipratropium Bromide and Tiotropium Bromide in Patients Suffers From Chronic Obstructive Pulmonary Disease (COPD), Attending in Tertiary Care Hospital, at S.K.M.C.H., Muzaffarpur

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### Abstract

**Objective:** *The aim of present study was to compare the effect of 9 months treatment with inhaled Ipratropium bromide and inhaled Tiotropium bromide on airflow obstruction and symptoms, by assessing clinical improvement as well as alteration on pulmonary function tests in cases of mild to moderate chronic obstructive pulmonary disease (COPD).*

**Material and Methods:** *A total of 64 patients of 25-65 year of age group of either sex suffered from mild to moderate chronic obstructive pulmonary Disease (COPD) diagnosed by clinical examination, Pulmonary function tests (FEV<sub>1</sub>, FEV<sub>1</sub>/FVC, PEFR, FVC by spirometry) and Routine investigation (CBC, Blood sugar, LFT, KFT, Arterial Blood gas analysis, X-ray chest and ECG) were included in the study. All the patient were randomized into two treatment group, with equal proportion of patients (Group A-32 patients and Group- B 32 patients) on the basis of age, sex, severity of disease and smoking habits. Group A patients received inhalation of Ipratropium bromide 40 micrograms by 6 hourly daily for 9 months and the group B patients received inhalation of Tiotropium bromide 18 micrograms by once daily for 9 months. All the patients were followed up at 1 month, 3 months, 6 month and 9 months interval to monitor and improvements in clinical status, Pulmonary function tests, frequency of acute exacerbation and need of additional drugs. Any adverse effect of drugs and any changes in laboratory parameter were noted.*

**Results:** *Inhaled Tiotropium bromide was more effective in compare to Ipratropium bromide in patients with mild to moderate cases of COPD And Both drugs were equally effective in clinical improvements over the period of a months.*

**Conclusion:** *It is suggested that Tiotropium bromide (18 micrograms OD) inhalation could be more suitable and acceptable by the patients of COPD due to its longer duration of action and it is more effectiveness as compared to Ipratropium bromide (40 micrograms QID inhalation).*

**Keywords:** *COPD, Ipratropium bromide, Tiotropium bromide, Pulmonary function tests, Asthma.*

## Introduction

Chronic obstructive pulmonary disease (COPD) is defined by American Thoracic Society as a chronic slowly progressive disorder characterized by airflow obstruction (Reduced FEV<sub>1</sub> and FEV<sub>1</sub>/FVC ratio) which does not change markedly over months of observation, a definition which is intended to differentiate it from Asthma.

In COPD most of the lung function impairment is fixed, although some reversibility can be produced by bronchodilator or other therapy. COPD is internationally preferred term that includes various types of Emphysema and chronic bronchitis either alone or in combination. The term COPD is not conventionally used to include other specific condition which can cause air way obstruction such as cystic fibrosis, Bronchiectasis or Bronchiolitis obliterans.

It is very difficult to differentiate COPD from persistent airway obstruction in older asthmatics, although a history of heavy cigarette smoking, evidence of emphysema, decreased diffusion capacity of carbon monoxide and chronic hypoxemia favors a diagnosis of COPD. In various studies by Malik et al on different population of north India its prevalence varied from 1% in urban nonsmokers to 21 % in rural smokers.

A significant proportion of patient with COPD show little or no reversibility of obstruction of airways. However bronchodilators have been shown to confer symptomatic relief and improvement of functional capacity even in patients with COPD are currently treated with regularly administered bronchodilators, with a goal of optimizing the limited airflow as continuously as possible and to give symptomatic relief.

Inhaled short acting beta-2 adrenoreceptor agonists like salbutamol, long acting beta-2 agonists like salmeterol and anticholinergic agents like Ipratropium bromide and Tiotropium bromide are preferred bronchodilator for the treatment of COPD. Because longer duration of action and better tolerability compared to short acting beta -

2 agonists, Ipratropium bromide has been considered more suitable for use on regular basis. With development of longer acting beta - 2 agonists like salmeterol, Formeterol and long acting anticholinergic Tiotropium, the management of COPD patients appears more convenient.

## Material and Method

The Present study was conducted in the Department of Pharmacology, Sri Krishna Medical College, Muzaffarpur with the help of Department of Medicine, during the period of October 2017 to July 2018. A total of 64 patients of 25-65 year of age group of either sex suffered from mild to moderate chronic obstructive pulmonary Disease (COPD) diagnosed by clinical examination, Pulmonary function tests (FEV<sub>1</sub>, FEV<sub>1</sub>/FVC, PEF, FVC by spirometry) and Routine investigation (CBC, Blood sugar, LFT, KFT, Arterial Blood gas analysis, X-ray chest and ECG) were included in the study. Patients suffering from other associated disease, Patients needing continuous oxygen therapy, Patients having history of respiratory tract infection in the previous month and Patient needing additional drug other than theophylline (e.g. Steroids) were excluded from the study.

Patients who experience an exacerbation during baseline period, required steroids or hospitalized for an exacerbation during study were excluded from the study. Treatment of exacerbation with theophylline when required inhalational salbutamol was permitted without withdrawing the patient from the study.

After initial screening patients were randomized into two groups. Each group included 32 patients. One group was put on dry powder inhalation of Tiotropium 18 mcg OD and The other group was placed on Ipratropium bromide 2 puff 40 mcg QID. Patients were assessed clinically by chest expansion, reduction in breath sounds, wheezes and crackles and other investigations.

## Results

The results of this study demonstrated that for long term treatment of patients with mild to moderate cases of COPD, inhaled tiotropium bromide 18 micrograms once daily was more effective than ipratropium bromide 40 micrograms QID daily statistically. Both drugs were equally effective in clinical improvement over the period of 9 months and tiotropium was more effective in short term effects on various parameters of airflow obstruction e.g. FEV<sub>1</sub>, FEV<sub>1</sub>/FVC, PEF. Both drugs were comparable in respect to frequency of acute exacerbation experienced by the patients and need of additional drug therapy as theophylline or inhaled Salbutamol.

## Discussion

COPD is also an inflammatory disease of the lungs, characterized by progressive emphysema (alveolar destruction) and bronchiolar fibrosis in variable proportion. Loss of bronchiolar elasticity leads to closer of smaller air tubes during expiration. The airway obstruction is accentuated during exercise causing shortness of breath. It is clearly related to smoking and characteristically start after the age of forty years. Quitting smoking reduce the rate of decline in lungs function. Bronchodilator prevent closure of peripheral air tubes during expiration and effort symptomatic relief in COPD patients.

This study was designed to compare the effects of inhaled Ipratropium bromide and inhaled Tiotropium bromide in mild to moderate case of COPD. Out of total 64 patients 32 patients were put in each treatment groups. The two treatment groups were made comparable by distributing equal proportion of patients on the basis of age, sex severity (mild or moderate) of COPD and smoking habits. First 32 patient received inhalation of Ipratropium bromide 40 micrograms 6 hourly daily for 9 months and the second treatment group of 32 patients received inhalation of Tiotropium bromide 18 micrograms once daily for 9 months. The patients were observed first at baseline value for clinical symptoms and

pulmonary function test. Then they were followed up at 1 month, 3 months 6 months and 9 months interval to monitor and improvements in clinical status, pulmonary function test, frequency of acute exacerbation and need of additional drugs.

The longer duration of action of tiotropium bromide i.e. 24 hours and thus once daily dosing schedule compared to the shorter duration of action of Ipratropium bromide i.e., 6 hours may have some effect on patient acceptability and compliance, which is expected to be greater in tiotropium bromide treatment group. No tachyphylaxis to tiotropium bromide was observed over 9 months therapy. No significant adverse reaction or safety concern were note during the course of this study in both treatment groups. Taken together, these observations indicate that tiotropium bromide (18 micrograms OD) inhalation were statistically and clinically more effective than ipratropium bromide 40 micrograms inhalation for stable symptomatic patients of COPD.

## Conclusion

Bronchodilator prevent closure of peripheral air tubes during expiration and effort symptomatic relief in COPD patients. This study was designed to compare the effects of inhaled Ipratropium bromide and inhaled Tiotropium bromide in mild to moderate case of COPD. Nevertheless these findings should be confirmed by larger randomized multicenter trials or even longer duration.

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