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Research Paper

Comparative Study of Inhaled Salbutamol and Ipratropium Bromide Combined With Salbutamol in Chronic Obstructive Pulmonary Disease

Dr. Anjali P.Ghare
M.D. Tuberculosis and respiratory diseases Govt. Medical College and Hospital, Nanded (Maharashtra)

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ABSTRACT:-

Introduction:

COPD is a major cause of morbidity and mortality throughout the world. COPD, a common preventable and treatable disease, is characterized by persistent air flow limitation that is usually progressive and associated with an enhanced chronic inflammatory response in air ways and lung to noxious particles or gases. Salbutamol and Ipratropium bromide are main stay of therapy. This study is designed to compare bronchodilator effect of inhaled salbutamol effect of salbutamol compared with combined ipratropium bromide and salbutamol.

Aims and objectives:

1) To study pulmonary function test abnormalities in patients suffering from COPD.
2) To assess the reversibility of broncho constriction after inhalation of salbutamol and combined ipratropium bromide with salbutamol in these patients.
3) To study comparative response of reversibility broncho constriction with salbutamol and combined ipratropium bromide with salbutamol in these patients.

Materials and methods:

Total 100 patients of COPD were evaluated for this study. In selected patients baseline spirometry was done with computerized spirometer. In 50 patients, salbutamol in a dosage of 2.5mg with 2ml normal saline was given. In another 50 patients, ipratropium bromide in a dosage of 125mcg with 2ml normal saline and combined with salbutamol in a dosage of 2.5mg with 2ml normal saline was given for nebulization. PFT performed after 60 minutes.

Results:

In combined bronchodilator effect, that is inhaled ipratropium with salbutamol, was found to be beneficial in COPD patients.

Discussions:

Combined inhaled salbutamol and ipratropium act through unrelated biochemical pathway and produce additive bronchodilation. Effects of ipratropium bromide occur after 60 minutes of administration and have suggested that the combination produces a longer duration of bronchodilation than either drug alone.

Conclusions:

Inhaled ipratropium combined with inhaled salbutamol is beneficial than inhaled salbutamol alone, in COPD patients.

Keywords:- Salbutamol, Ipratropium bromide, spirometry

I. INTRODUCTION

COPD is a major cause of morbidity and mortality throughout the world [1]. The incidence of COPD has increased dramatically over last 25 years in industrialized nations, as a result exposure to increase air pollution [2]. "COPD, a common preventable and treatable disease, is characterized by persistent air flow limitation that is usually progressive and associated with an enhanced chronic inflammatory response in air ways and lung to noxious particles or gases" [1]. Symptoms COPD include dyspnea, chronic cough and chronic sputum production. Salbutamol and Ipratropium bromide are main stay of therapy.

Sympathomimetic inhaled Beta-2 agonists are the effective drug in COPD[3]. Ipratropium bromide is an anticholinergic bronchodilator that is not as fast acting as Beta-2 agonists or as potent but has a longer duration of action and perhaps more reassuring safety profile. Ipratropium is more useful in border line case of asthma and chronic bronchitis[4, 5]. Both salbutamol and ipratropium are effective bronchodilator in COPD patients. However the issue of their relative status remains unresolved. This study is designed to compare bronchodilator effect of inhaled salbutamol effect of salbutamol compared with combined ipratropium bromide and salbutamol.

II. AIMS AND OBJECTIVES

1) To study pulmonary function test abnormalities in patients suffering from COPD.
2) To assess the reversibility of broncho constriction after inhalation of salbutamol and combined ipratropium bromide with salbutamol in these patients.
3) To study comparative response of reversibility broncho constriction with salbutamol and combined ipratropium bromide with salbutamol in these patients.

III. MATERIALS AND METHODS

Total 100 patients of COPD were evaluated for this study. The diagnosis of each patient was made after obtaining a proper history and according to the clinical, radiological and PFT criteria. In selected patients baseline spirometry was done with computerized Medgraphic spirometer. This spirometer met American Thoracic Society criteria and was volume calibrated daily. Measurement accuracy of spirometry was± 2%. In 50 patients, salbutamol in a dosage of 2.5mg with 2ml normal saline was given. In another 50 patients, ipratropium bromide in a dosage of 125mcg with 2ml normal saline and combined with salbutamol in a dosage of 2.5mg with 2ml normal saline was given for nebulization. PFT performed after 60 minutes.

IV. RESULTS

	Salbutamol	Ipratropium + Salbutamol
FVC	1.94	2.10
FEV_1	2.10	2.87
FEV_1/FVC%	1.70	2.10
FEV_{max}	3.86	4.87
$FEF_{25-75\%}$	3.50	3.86
FIVC	2.72	3.62
FEF_{50}(l/sec)	3.10	3.64
FIF_{max}	3.88	3.90

The above showing spirometric values after bronchodilation in salbutamol and ipratropium combined salbutamol.

V. DISCUSSIONS

The result of this study are analyzed and discussed. 100 patients of COPD were studied. The maximum numbers of patients in our study were in between 40-70 years of age group.

KNV Palmer and ML Diament conducted a study and concluded that the functional defect to all COPD patients was obstruction and restriction of airways[6, 7, and 8] . From this primary abnormality other pathophysiologic mechanisms were as follows:

-disturbances in work of breathing
-lung mechanics
-lung volumes
-distribution of ventilation and perfusion mismatch

These alternatives may in turn lead to arterial hypoxemia and in severe episodes of CO_2 retention and transient pulmonary hypertension.[9]

With decreased vital capacity with hyperinflation of lungs.

A study of Husain AS, Baruna UK, Roy GC, Sutradhar SR and Rahman I, concluded better bronchodilation in combination of salbutamol and ipratropium than salbutamol alone in obstructive disease.[12] PFT values (60.01± 35.01%) more in combination than salbutamol (44.47±25.03%).

Salbutamol inhaled beta-2 agonist bronchodilation plus inhaled ipratropium anticholinergic bronchodilation act through unrelated biochemical pathway and there are theoretical reasons for expecting beneficial additive or synergistic interaction between them. While there in vitro evidence of synergistic interactions producing greater bronchodilation, in vivo studies indicates that the interactions are additive rather than synergistic[13, 14].

Owen and George in 1991 have demonstrated that the effect of ipratropium bromide occurs after 60 minutes of administration, and have suggested that the combination produces a longer duration of bronchodilation than either drug alone[15].

VI. CONCLUSIONS

In this study, male: female ratio was 3: 1. Incidence of COPD was found to be most common after 40 years. Most of the patients (approximately 80%) had given history of tobacco chewing and smoking. COPD definitely affect normal functions of lungs causing abnormal pulmonary test graph showing obstruction and restriction. Both salbutamol and ipratropium have definite role in reversibility of broncho constriction. The interpretation of effect of bronchodilator drug focused on change in spirometric parameters. The American college of chest physician recommended an increase to 15-25% in(FVC, FEV_1 and FEF_{25-75}) in at least two or three spirometric values clinically significant[11], which is comparable to our study. Conclusively combination therapy is beneficial over salbutamol alone.

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Address for Correspondence-

DR. ANJALI P. GHARE,
B-6, Shree Sai Vihar apartment,
Khadkeshwar,
Aurangabad (Maharashtra)
Phone no:--09422149665, 09422171775