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Comparison of Treatment of Salmeterol and Formoterol with Fluticasone on Quality of Life (QOL) of Patients Suffering from Chronic Obstructive Pulmonary Disease (COPD)

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ABSTRACT

Background: *Chronic obstructive pulmonary disease (COPD) is characterized by symptoms of dyspnoea, paroxysmal coughing, fatigue, and insomnia associated with considerable impact on quality of life of patients. Inhaled corticosteroid/long-acting β2-agonist combinations (ICS/LABA) are endorsed for maintenance therapy for COPD. So, we designed this study to compare the treatment of combination of salmeterol or formoterol with fluticasone on Quality of life (QOL) of patients suffering from chronic obstructive pulmonary disease (COPD).* ***Methods:*** *This prospective, randomized, parallel group study was conducted 45 patients suffering from COPD were enrolled in the study after they signed a written informed consent. The patients were divided in two groups based on the treatment in two groups. Group 1 was on treatment with salmeterol with fluticasone whereas group 2 was on treatment with formoterol with fluticasone; they were assessed at baseline and 4weeks. Patients were subjected to St George Respiratory Questionnaire (SGRQ) and WHO – Quality of life (WHO-QOL Bref) Questionnaire.* ***Results:*** *A total of 24 patients in group 1 and 21 patients in group 2 completed the study. The demographic profile of patients was comparable at baseline. Patients in both groups had showed a statistically significant improvement in symptoms score as compared to baseline as is evident by lower scores in SGRQ and high scores in WHO-QOL Bref score Patients on formoterol and fluticasone had slightly better scores as compared to the other group though it was not statistically significant.* ***Conclusions:*** *Both the treatment showed significant improvement in symptoms as well as quality of life as compared to baseline and a combination of formoterol and fluticasone was slightly better as compared to combination of salmeterol and fluticasone.*

Key words: *Chronic Obstructive Pulmonary Disease, Quality of life, patients, symptoms*

INTRODUCTION

Chronic obstructive pulmonary disease (COPD) is a progressive, common, preventable lung disorder characterized by poorly reversible airflow limitation associated with systemic manifestations,[1-3] worsening lung function with immense burden on the patient and society[4] with a considerable impact on quality of life of patients.[5] The morbidity and mortality associated with COPD is rising worldwide with prevalence and disease severity strongly related to age.[3] COPD is responsible for 5.1% deaths worldwide and affecting 6%-10% of the adult population.[2] As per WHO estimates 65 million people have moderate to severe COPD and would be be third leading cause of death by 2030.[1] It affects approximately 12 million Americans and is the fourth leading cause of preventable death for both men and women in the US.[6] In India 30 million patients are reported to be suffering from COPD in India[1] as per 2011 estimates with 75% of them residing in urban with the cost of treatment rising from 3.5 billion rupees to 4.8 billion rupees by 2016.[7]

COPD is an obstructive airway disease characterized by symptoms of dyspnoea, paroxysmal coughing, fatigue, and

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insomnia.[6,8] It is strongly associated with impaired exercise performance and functional capacity progressing to sedentary life style causing muscular and cardiovascular deconditioning.[2] COPD patients also demonstrate high rates of psychological distress with a prevalence rates for depressive symptoms or major depression as high as 80%, and elevated symptoms of anxiety exceeding 90%.[6] Though there is impairment in lung function exercise capacity, quality of life (QoL) and participation in activities of daily living are often impaired out of proportion.[2] Though effective treatment for COPD is available but low adherence and persistence leads to decreased quality of life, exacerbations, hospitalizations, and increased mortality, as well as a substantial health care burden and high economic costs.[9]

Due to the negative impact of COPD, the Global Initiative for Chronic Obstructive Lung Disease (GOLD) has highlighted the prevention and treatment of exacerbations as leading priorities for the management of COPD with guidelines supporting the initiation of controller medications for patients with COPD symptoms as well as exacerbations. Inhaled corticosteroid/long-acting β2-agonist combinations (ICS/LABA) are endorsed for maintenance therapy for COPD patients with a history of exacerbations.[4]

Regular treatment with one or more long-acting inhaled bronchodilators is recommended for management of the symptoms of patients with COPD. The agents used for regular treatment of COPD are either β2-agonists administered twice daily or the once-daily anticholinergics.[10] However, to date, it is not clear which combinations of inhaled therapies are the safest and most effective for these patients, hence we designed this study to compare the treatment of combination of salmeterol or formoterol with fluticasone on Quality of life (QOL) of patients suffering from chronic obstructive pulmonary disease (COPD).

Aims & Objectives

Comparison of treatment with salmeterol and formoterol with fluticasone on Quality of life (QOL) of patients suffering from chronic obstructive pulmonary disease (COPD).

METHODS

Procedure

This prospective, randomized, parallel group study was conducted in patients visiting the Out Patient and In Patient Department of Chest and Tuberculosis form October 2011 to January 2012. A total of 85 patients were screened for enrollment in the study. 21 patients did not fulfill the eligibility criteria and 19 patients did not give their consent and hence were excluded for the study. 45 patients suffering from COPD were enrolled in the study after they signed a written informed consent. The study was approved by Institutional Ethics Committee (IEC) and was conducted in accordance with GCP guidelines. The patients who were in the age group of 18-65 years, suffering from COPD and willing to give written informed consent were included in the study. Patients suffering from any other co morbid illness, on drug therapy likely to interfere with pulmonary function or substance abuse were excluded from the study. Pregnant and lactating females were also excluded from the study. The patients were divided in two groups based on the treatment in two groups. Group 1 was on treatment with salmeterol with fluticasone whereas group 2 was on treatment with formoterol with fluticasone. The patients were called for a follow up after 4 weeks, the patients were assessed at baseline and 4weeks.

Parameters

- Patients were subjected to St George Respiratory Questionnaire (SGRQ)[11-13] and WHO – Quality of life (WHO-QOL Bref) Questionnaire at baseline and after four weeks.[14,15]

St George Respiratory Questionnaire

St George Respiratory Questionnaire was administered to patients, which is designed to measure health impairment in patients suffering from asthma and COPD. It consists of two parts, part 1 has symptom score (effect of respiratory symptoms, their frequency and severity), and part 2 has the activity (activities that cause/ are limited by breathlessness) and impacts (social and psychological disturbances) score. The questionnaire is designed for self-administration; the patients should complete the questionnaire in a quiet area, free from distraction and elicits his opinion with a score range of 0 to 100 percent, where 100 represents worst possible health status and 0 indicates best possible health status.[11-13]

The WHOQOL - Bref

The WHOQOL-Bref is a 26-item self-administered generic questionnaire which is a shorter version of WHOQOL -100 scale.[14] It was analyzed from perspective of four domains (physical health, psychological health, social relations, and environment). Four domains are defined for WHO QOL-Bref, based on its 26 items: domain 1, physical health, is on activities of daily living, dependence on medicinal substances and medical aids, energy and fatigue, mobility, pain and discomfort, sleep and rest, and work capacity. Domain 2, psychological health, includes bodily image and appearance, negative feelings, positive feelings, self-esteem, spirituality, religion, personal beliefs, thinking, learning, memory, and concentration. Domain 3, social relationships, covers personal relationships, social support, and sexual activity. Domain 4, environment, assesses financial resources, freedom, physical safety and security, health and social care (accessibility and quality), home environment, opportunities for acquiring new information and skills, participation in and opportunities for recreation and leisure activities, physical environment (pollution, noise, traffic, and climate), and transport. The raw score of each domain was then transferred to standardized score of 4 to 20, in order to maintain uniformity in scores. Higher scores meant better quality of life of patients. The QOL index of each domain and their associations with demographic factors were assessed.[14,15]

Statistical Analysis: The data was tabulated as mean ± standard deviation (SD). Results were analyzed using non

parametric tests (Chi-Square Test), and parametric tests (two tailed student t-test). A $p<0.05$ was considered statistically significant.

RESULTS

45 patients were enrolled in the study and completed the questionnaires.

Patients

All the patients completed both questionnaires. A total of 24 patients in group 1 and 21 patients in group 2 completed the study. Group 1 was on treatment with salmeterol with fluticasone whereas group 2 was on treatment with formoterol with fluticasone. The demographic profile of patients is shown in Table 1, both groups were comparable at baseline. The mean age of patients was 55.67 ±12.45 years. A total of 17 males completed the study in group 1 and 16 males in group 2 completed the study.

Response at 4 weeks in Patients:

Patients in both groups had showed a statistically significant improvement in symptoms score as compared to baseline as is evident by lower scores in SGRQ and high scores in WHO-QOL Bref score as is shown in Table 2. Patients on formoterol and fluticasone had slightly better scores as compared to the other group though it was not statistically significant.

More improvement was seen in both groups in Domain 1, physical health, is on activities of daily living, dependence on medicinal substances and medical aids, energy and fatigue, mobility, pain and discomfort, sleep and rest, and work capacity with slightly higher scores for Group II though it was not statistically significant.

Table 1. Baseline Characteristic of patients in both groups

Characteristic	Group 1 (n=24)	Group 2 (n=21)	p value
Age (Mean ± SD)	54.56 ± 13.59	57 ± 11.05	>0.05*
Sex (M:F)	17:7	16:5	>0.05#
	SGRQ Scores		
Symptom Score (Mean ± SD)	59.47 ± 13.05	54.85 ± 10.23	>0.05*
Activity Score (Mean ± SD)	38.77 ± 11.06	34.43 ± 11.47	>0.05*
Impact Score (Mean ± SD)	38.29 ± 7.33	35.32 ± 7.30	>0.05*
Total Score (Mean ± SD)	41.95 ± 6.88	38.54 ± 5.45	>0.05*
	WHO-QOL Bref Score		
Domain I (4-20) (Mean ± SD)	11.92 ± 1.38	12.48 ± 1.50	>0.05*
Domain II (4-20) Mean ± SD)	11.08 ± 1.80	10.43 ± 1.75	>0.05*
Domain III (4-20) (Mean ± SD)	10.96 ± 1.43	10.86 ± 1.42	>0.05*
Domain IV (4-20) (Mean ± SD)	12.24 ± 2.03	11.62 ± 1.91	>0.05*

*using unpaired student 't' test
#using chi square test

DISCUSSION

Chronic obstructive pulmonary disease (COPD) is major burden for patient's individually, healthcare systems and society in terms of healthcare costs. With progress of disease there is an increasingly impaired health status as the patients suffer from high burden of symptoms with impaired functional capacity and reduced quality of life.[3] It not only takes a toll on patient's health but also impairs the quality of life of the patients. This prospective, randomized, parallel group study was conducted in patients visiting the Department of Chest and Tuberculosis done on 45 patients suffering from COPD and were randomized to receive either salmeterol or formoterol with fluticasone. Patients in both groups showed improvement in symptoms as well as quality of life, although patients on formoterol and fluticasone had slightly better scores as compared to the other group.

The results of our study are in concordance with the study that compared the real-world effectiveness of approved combination of salmeterol or formoterol with corticosteroids treatment among matched cohorts of COPD patients in a large US managed care setting showing no difference in COPD-related exacerbations or pneumonia events. Our study differs from this as we had mainly concentrated on the symptoms score and quality of life of patients and we used fluticasone in both groups while this study used budesonide in one of the groups and we did not look for exacerbations.[4]

Another study done to determine the efficacy and safety of indacaterol compared to twice-daily β2-agonist, salmeterol, as an active control demonstrated that both treatments improved health status (SGRQ total score) and dyspnoea (TDI score) at 4 weeks, 8 weeks and 12 weeks, with differences between them favouring indacaterol. The findings of this study are similar to our study were we also found a significant improvement in SGRQ scores at 4weeks. Our study differs from this study as we limited the study duration to 4 weeks only, we also measured quality of life which improved in both groups.[10]

Few meta-analyses on long acting bronchodilators agents (LABA) have shown them to be safer and more effectively taking care of SGRQ and FEV1 trough than other agents used. Our study also demonstrated that both these agents are quite effective in taking care of symptom scores as measured by SGRQ. We also took quality of life of patients into consideration.[5,16]

There are certain limitations to our study, firstly the study duration is small, and a study of larger duration could have given different results. Secondly, the sample size was small and larger sample size involving hospitals in different location all over the country could help to frame out the national data.

CONCLUSION

To conclude patients in both groups showed improvement in symptoms as well as quality of life after 4 weeks of therapy and a combination of formoterol and fluticasone had slightly better scores as compared to the other group.

Table 2. Comparison of SGRQ scores and WHO-QOL Bref Scores in patients in both groups

Characteristics	Group I (n=24)		Group II (n=21)	
	Baseline	4 weeks	Baseline	4 weeks
	SGRQ Scores (Mean ± SD)			
Symptom Score	59.47 ± 13.05	48.44 ± 11.34*	54.85 ± 10.23	46.32 ± 10.56*
Activity Score	38.77 ± 11.06	31.67 ± 10.05*	34.43 ± 11.47	30.52 ± 11.57*
Impact Score	38.29 ± 7.33	32.46 ± 6.56*	35.32 ± 7.30	31.23 ± 6.77*
	WHO-QOL Bref Scores (Mean ± SD)			
Domain I (4-20)	11.92 ± 1.38	13.67 ± 1.56*	12.48 ± 1.50	13.89 ± 1.46*
Domain II (4-20)	11.08 ± 1.80	12.42 ± 1.68*	10.43 ± 1.75	12.92 ± 1.44*
Domain III (4-20)	10.96 ± 1.43	12.09 ± 1.23*	10.86 ± 1.42	12.67 ± 1.48*
Domain IV (4-20)	12.24 ± 2.03	13.62 ± 1.90*	11.62 ± 1.91	13.68 ± 1.87*

*p<0.05 as compared to baseline using paired student 't' test
Both groups comparable at 4 weeks using unpaired student 't' test

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