

A Cross-Sectional Study of 100 Patients with Chronic Obstructive Pulmonary Disease and Their Relationship to Bronchodilators

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Abstract: COPD is a progressive respiratory condition characterized by airflow limitation and breathing difficulties, primarily involving chronic bronchitis and emphysema. The paper highlights the importance of bronchodilators in managing COPD by improving lung function, reducing symptoms, and enhancing quality of life. Due to that, our study presented a cross-sectional study that analyses and assesses the outcomes of 100 patients with chronic obstructive pulmonary disease (COPD) and their relationship to bronchodilators in different hospitals in Iraq. Also the study also assessed the impact of bronchodilators on the quality of life of COPD patients using the St. George's Respiratory Questionnaire (SGRQ-C) which our study depended on bronchodilators are medications commonly used to treat COPD patients by relaxing the muscles in the airways, allowing for improved airflow and easier breathing. Combination therapy (bronchodilators) with other medication classes, such as inhaled corticosteroids, is often used for the comprehensive management of COPD. The study found that combination therapy with bronchodilators and inhaled corticosteroids showed better outcomes in terms of symptom control and preventing exacerbations. Our results enrolled that combination therapy with bronchodilators and inhaled corticosteroids showed better outcomes in terms of symptom control and preventing exacerbations. In addition, the use of inhaled corticosteroids (ICS) in early-group patients was associated with lower symptoms, such as shortness of breath and headache, compared to patients who in late-group patients. According to the results, our study showed that bronchodilators improved lung function, reduced symptoms, and enhanced the quality of life of COPD patients.

Keywords: Chronic obstructive pulmonary disease; bronchodilators, LABA, and LAMA.

INTRODUCTION

Chronic obstructive pulmonary disease, also referred to as represents a progressive respiratory disorder characterized by decreased airflow and difficulty breathing. It is primarily caused by two conditions: chronic bronchitis as well as emphysema. [Guarascio, A. J. *et al.*, 2013- Dolovich, M. B. *et al.*, 2005]

Bronchodilators are a kind of medicine that is often used to treat COPD. They act through relaxing the smooth muscles that line the airways [Turner, M. O. *et al.*, 1997; Bollu, V. *et al.*, 2003], allowing the bronchial tubes to expand. Bronchodilators increase airflow reduce shortness of breath, as well as total breathing capacity in people with COPD [Drescher, G. S. *et al.*, 2008- Colice, G. L. *et al.*, 2005]. Bronchodilators are classified into two types: short-acting bronchodilators versus long-acting bronchodilators. Short-acting bronchodilators give instant relief and are normally used only when acute bouts of dyspnea occur. They are frequently inhaled using a portable inhaler or nebulizer. [Lindenauer, P. K. *et al.*, 2014- Lange, P. *et al.*, 2012]

Long-acting bronchodilators, on the other hand, provide sustained relief and are typically used daily to control symptoms and prevent exacerbations. They are available in various forms, including inhalers and nebulizers. Long-acting bronchodilators are categorized into two subtypes - long-acting beta-agonists (LABAs) and long-acting muscarinic antagonists (LAMAs). Some medications combine both LABA and LAMA properties and are referred to as dual bronchodilators. [Lange, P. *et al.*, 2012- Berry, R. B. *et al.*, 1989]

PATIENTS AND METHODS

The paper utilizes a cross-sectional study design to analyse and assess the outcomes of 100 patients with chronic obstructive pulmonary disease (COPD) and their relationship to bronchodilators. This paper contributes to the understanding of chronic obstructive pulmonary disease (COPD) and its relationship to bronchodilators. It provides insights into the outcomes of COPD patients and the impact of bronchodilators on their lung function, symptoms, and quality of life. The data

characteristics were collected from different hospitals in Iraq between 17th July 2021 to 26th October 2022. The study includes data collection on patient characteristics, such as age, sex, smoking status, BMI, comorbidities, and level of education, which were determined and analysed by the SPSS program.

Furthermore, the paper emphasizes the importance of bronchodilators in managing COPD by improving lung function and reducing symptoms. This is also highlighting the need for combination therapy with other medication classes, such as inhaled corticosteroids, for comprehensive management of the disease. Bronchodilators work to alleviate breathing difficulties in COPD patients by relaxing and widening the airways in the lungs, allowing for improved airflow and easier breathing. This is achieved through their mechanism of action, which varies depending on the specific type of bronchodilator used. Short-acting bronchodilators, such as beta2-agonists and anticholinergics, act by binding to specific receptors in the airway smooth muscles, leading to the relaxation of these muscles and dilation of the airways. In addition, long-acting bronchodilators, including long-acting beta2-agonists (LABAs) and long-acting muscarinic antagonists (LAMAs), provide sustained bronchodilation over an

extended period. LABAs work by stimulating beta2 receptors, while LAMAs block the action of acetylcholine, a neurotransmitter that causes airway constriction. By improving bronchial muscle relaxation and reducing airway constriction, bronchodilators help to improve lung function, reduce symptoms such as shortness of breath and coughing, and enhance the overall quality of life for COPD patients.

The study examines the outcomes of inhaled corticosteroids (ICS) and, long-acting beta2-agonist (LABA), and long-acting muscarinic antagonist (LAMA) in COPD patients, providing valuable information for healthcare professionals in selecting appropriate treatment options. The paper also discusses the adverse events associated with bronchodilator use, such as headache, muscle pain, and bronchitis, which can help healthcare professionals monitor and manage potential side effects. Additionally, the correlation analysis between quality and LABD cohort using the St. George's Respiratory Questionnaire (SGRQ-C) provides insights into the impact of bronchodilators on the quality of life of COPD patients.

RESULTS

Table 1: Describe the characteristics and results of patients.

Variables	Early (60)	Late (40)
Age		
30-40	9 (15%)	4 (10%)
41-50	11 (18.33%)	9 (22.5%)
51-60	18 (30%)	12 (30%)
61-70	22 (36.67%)	15 (37.5%)
Sex		
Men	40 (66.67%)	25 (62.5%)
Women	20 (33.33%)	15 (37.5%)
Smoking status		
Smoker	35 (58.33%)	23 (57.5%)
Non-smoker	25 (41.67%)	17 (42.5%)
BMI (Kg/m2)		
<24	11 (18.33%)	8 (20%)
25-30	23 (38.33%)	15 (37.5%)
>30	26 (43.33%)	17 (42.5%)
Other		
Hypertension	44 (73.33%)	28 (70%)
Diabetes	16 (26.67%)	12 (30%)
heart rate	104 [85-113]	97 [85-113]
Systolic blood pressure	157 [130-170]	151 [130-170]
Level of education		
Primary school	14 (23.33%)	7 (17.5%)
High school	21 (35%)	15 (37.5%)
University	25 (41.67%)	18 (45%)

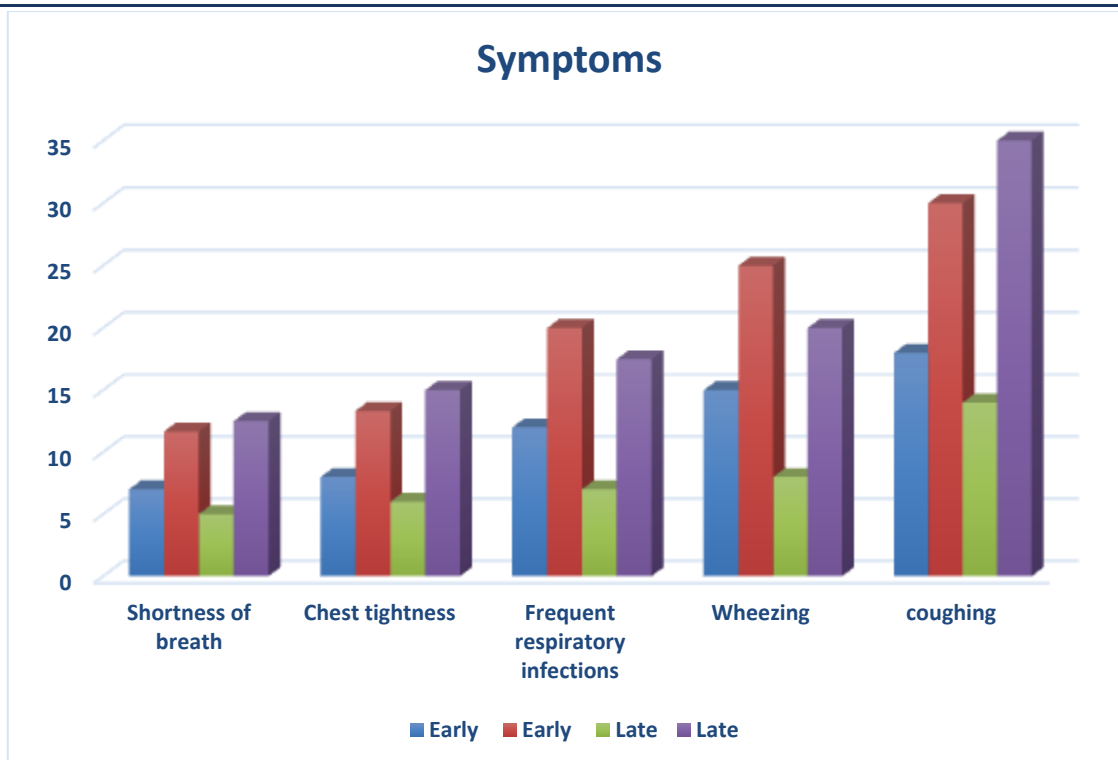


Figure 1: Distribution of patients according to frequency of symptoms

Table 2: Compare between groups according to outcomes of inhaled corticosteroid (ICS)

ICS	Early (60)	Late (40)
Fluticasone	70%	24%
100 µg twice daily	6 (10%)	3 (7.5%)
250 µg twice daily	12 (20%)	9 (22.5%)
500 µg twice daily	24 (40%)	12 (30%)
Budesonide	21.67%	12%
80 µg twice daily	3 (5%)	2 (5%)
160 µg twice daily	4 (6.67%)	4 (10%)
320 µg twice daily	6 (10%)	6 (15%)
Mometasone	8.33%	4%
100 µg twice daily	1 (1.67%)	1 (2.5%)
200 µg twice daily	1 (1.67%)	1 (2.5%)
220 µg twice daily	3 (5%)	2 (5%)

Table 3: Outcomes of long-acting beta2-agonist (LABA) and long-acting muscarinic antagonist (LAMA) of the early group

Variables LABA	F, %	Variables LAMA	F, %
Salmeterol	13 (21.67%)	Tiotropium	20 (33.33%)
Formoterol	27(45%)	----	----
Total	40 (66.67%)	20(33.33%)	60 (100%)

Table 4: Outcomes of long-acting beta2-agonist (LABA) and long-acting muscarinic antagonist (LAMA) of the late group

<i>Variables LABA</i>	<i>F, %</i>	<i>Variables LAMA</i>	<i>F, %</i>
<i>Salmeterol</i>	9 (22.5%)	Tiotropium	14 (35%)
<i>Formoterol</i>	17 (42.5%)	----	---
<i>Total</i>	26 (65%)	14 (35%)	40 (100%)

Table 5: Describe adverse events of the study

<i>Adverse events</i>	<i>Early, 60 (%)</i>	<i>Late, 40 (%)</i>
<i>headache</i>	1 (1.67%)	2 (5%)
<i>wheezing</i>	1 (1.67%)	2 (5%)
<i>shortness of breath</i>	3 (5%)	3 (7.5%)
<i>Total</i>	5 (8.33%)	7 (17.5%)

Our study enrolled that shortness of breath was the high scored on patients' number, which found 3 (5%) in the early group and 3 (7.5%).

Table 6: Correlation coefficient between quality and LABD cohort

<i>SGRQ-C</i>	<i>Adverse events</i>	
	<i>r</i>	<i>P-value</i>
<i>Total score</i>	0.31	>0.05
<i>Symptoms score</i>	0.37	>0.05
<i>Activity score</i>	0.46	>0.05
<i>Impact score</i>	0.47	>0.05

The outcomes of correlation coefficients noticed that bronchodilators with ICS had improved of activity and symptoms particularly, although the (R) coefficient showed an SGRQ-C of activity score with 0.46 and symptoms 0.37.

Table 7: Subgroup analysis between univariate and multivariate models

Variable	Category	Univariate analysis OR (CI 95 %)	Multivariate analysis OR (CI 95 %)
Gender	Women	-----	
	Men	0.50 (0.17–1.48)	
Age	(30-50) years	-----	
	(50-70) years	0.48 (0.20–1.11)	
BMI		1.00 (0.92–1.08)	
BMI classification	<24	-----	
	25-30	1.37 (0.49–3.82)	
	>30	0.87 (0.31–2.49)	
Smoking no		1.15 (1.07–1.24)	1.15 (1.07–1.24)
Yes		5.34 (3.4–9.8)	3.2 (2.2-4.8)
Comorbidities	Hypertension	0.48 (0.14-1.82)	
	Diabetes	0.42 (0.11–1.65)	
Headache	----	1.07 (0.91–1.08)	
Shortness of breath	-----	-----	1.057 (0.75-1.12)

DISCUSSION

Bronchodilators are medications commonly used to treat patients with chronic obstructive pulmonary disease (COPD). They work by relaxing the muscles in the airways, thus widening them and making it easier for the patient to breathe. [Jasper, A. C. et al., 1987]

bronchodilators' effects on patients with COPD is significant and beneficial, where improved airflow: Bronchodilators help open up the airways, allowing more air to flow in and out of the lungs. This can alleviate symptoms like shortness of breath, wheezing, and coughing.

Although bronchodilators are generally safe and well-tolerated, they may have some side effects,

such as increased heart rate. It's important for patients to discuss any concerns or side effects with their healthcare provider. In more advanced cases of COPD, bronchodilators may be prescribed in combination with other medications like inhaled corticosteroids. This combination therapy has shown better outcomes in terms of symptom control and preventing exacerbations.

It is important to note that bronchodilators do not alter the underlying disease process or halt disease progression. Therefore, they are used to alleviate symptoms and improve daily functioning in COPD patients. Based on our study, our results noticed that adverse events were lowered by ICS where shortness of breath was 3 (5%) in the early group while 3 (7.5%) in the late group, headache got 1(1.67%) in the early and 2 (5%) in late group. Due to that, our study proved that inhaled corticosteroid (ICS) has lowered the symptoms of patients.

Smoking is strongly linked to the development and progression of chronic obstructive pulmonary disease (COPD), which is a chronic lung condition characterized by persistent airflow limitation. Smoking is the primary cause of COPD. British studies confirmed with around 80-90% of COPD cases occurring in individuals who smoke or have a history of smoking [Summer, W. et al., 1989]. The risk increases with the number of cigarettes smoked, as well as the duration of smoking. Also, smoking causes inflammation and damage to the airways and lungs. This leads to a progressive decline in lung function over time. Smoking-related COPD typically worsens at a faster rate compared to other forms of COPD. The French studies show smokers with COPD are more likely to experience frequent exacerbations, which are episodes of increased symptoms and respiratory distress. These exacerbations can be severe and may require hospitalization. [Barrons, R. et al., 2011]

Furthermore, bronchodilators and inhaled corticosteroids are commonly used medications for the treatment of chronic obstructive pulmonary disease (COPD), including in smokers who have this condition. Although our study improved symptoms of almost all patients with smoking or non-smoking in both groups, 5.34 (3.4–9.8) which early and late groups. However, it is important to note that not all smokers with COPD will necessarily benefit from inhaled corticosteroids. The decision to use these medications should be made by a healthcare professional, taking into

consideration the severity of the disease, symptoms, lung function, and other individual factors. In some cases, the use of inhaled corticosteroids may be reserved for patients with more severe COPD or those who have frequent exacerbations.

CONCLUSION

In conclusion, our study showed about combination therapy (bronchodilators and ICS) has shown better outcomes in terms of symptom control and preventing exacerbations. Due to that, our outcomes found the rate of symptoms or adverse events was less in the early-group patients in comparison with the late-group patients.

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