Original Research Paper

Volume - 11 | Issue - 04 | April - 2021 | PRINT ISSN No. 2249 - 555X | DOI : 10.36106/ijar

Pulmonary Medicine

A COMPARATIVE STUDY ON THE EARLY BRONCHODILATOR ACTION OF GLYCOPYRONIUM / FORMETEROL / BUDESONIDE IN MODERATE TO SEVERE COPD PATIENTS :A RANDOMIZED STUDY (SYMPTOM AND PULMONARY FUNCTION IN THE MORNING)

Suresh Kumar*	PG, Resident Doctor, Dept of Respiratory Medicine, Govt Medical College, Kota, Rajasthan.*Corresponbding Author
Babulal Bansiwal	Assistant Professor, Dept of Respiratory Medicine, Govt Medical College, Kota, Rajasthan.
Anil Saxena	Senior Professor , Dept of Respiratory Medicine, Govt Medical College, Kota, Rajasthan.
Suman Khangaro	Senior Professor and HOD, Dept of Respiratory Medicine, Govt Medical College, Kota, Rajasthan.
Atal Bihari meena	PG, Resident Doctor ,Dept of Respiratory Medicine, Govt Medical College, Kota, Rajasthan.

ABSTRACT

BACKGROUND: COPD is a progressive disease which impairs lung function resulting in breathlessness and ultimately affecting the quality of life.[1,2] These symptoms can be more severe in the morning, compromising the ability to perform even simple tasks and may be associated with an increased frequency of exacerbations.[2-4]

AIMS AND OBJECTIVES: To compare the safety and efficacy of inhaled glycopyronium versus formeterol versus budesonide in copd patient.

METHODS: This was an cohort study was conducted in the New Medical College and Hospital, Kota over a period of one year from March 2019 to feburary 2020 On 150 subjects.

RESULTS: In our study, the mean Age of patients in glycopyronium group was 59.78±8.99 and the mean age of patients in formeterol group was 58.78±8.36 and , the mean age of patients in budesonide group 59.28±9.40. The mean FEV1/FVC value for glycopyronium group was 53.86±10.22 , for formeterol group it was 53.70±10.65 and 54.16±11.36 for budesonide group. %. The mean values of FEV1/FVC in formeterol group increased to 59.66% at 4 weeks as compared to baseline value (53.70%)

CONCLUSION: Glycopyronium is found to be more efficacious for spirometric value when compared formeterol or budesonide in the treatment of Grade 2-3 COPD(GOLD Criteria).

KEYWORDS : COPD , Glycopyronium , Formeterol, FEV1/FVC

INTRODUCTION

- COPD is a progressive disease which impairs lung function resulting in breathlessness and ultimately affecting the quality of life.[1,2] These symptoms can be more severe in the morning, compromising the ability to perform even simple tasks and may be associated with an increased frequency of exacerbations.[2-4]
- Global Initiative for Chronic Obstructive Lung Disease (GOLD) defines Chronic Obstructive Pulmonary Disease (COPD) as a common preventable and treatable disease, characterized by persistent airflow limitation that is progressive and associated with an increased chronic inflammatory response in the airways and lungs to noxious particles or gases.
- Accurate prevalence information is necessary for various reasons suchas documentation of COPD's impact on quality of life, costs and disability and it also helps in public health planning[5]. It is important to find out prevalence rates at the baseline that would help researchers to monitor trends in success or failure of control efforts. The physiological case definition for COPD was obstruction of airflow. This was the most common case definition that is being used in prevalence studies[6,7].
- Long-acting bronchodilators with a fast onset of action may relieve these morning symptoms and thus improve treatment compliance while decreasing dosing frequency.[5,6]
- Inhaled bronchodilators like the long-acting muscarinic antagonist (LAMA) are central to the management of symptomatic patients with COPD as they improve lung function, reduce hyperinflation (both at rest and during exercise), and improve exercise performance.[1]Glycopyrronium (GLY) is a once-daily LAMAs approved for the maintenance treatment of patients with COPD.[7]
- Glycopyrronium bromide (GLY) is a competitive and potent LAMA that has a relative inhibitory effect predominantly on M3 muscarinic acetylcholine receptors.
- Formeterol is long acting β2-agonists. it is significant research has been performed to investigate the efficacy, safety and tolerability of formoterol in the therapeutic field of COPD.
- Budesonide is a corticosteroid used to prevent breathing difficulties, chest tightness and wheezing caused by respiratory disorders, such as asthma and COPD.

AIMS AND OBJECTIVES :

- To compare the safety and efficacy of inhaled glycopyronium versus formeterol versus budesonide in copd patient.

MATERIALS AND METHOD:

- Cohort study
- Number of patients-150(3 group:- 50 patients each group)

CRITERIA OF INCLUSION :

- All patients above 40 yrs age and irrespective of their sex who presented with clinical and radiological sign and symptoms with spirometry suggestive of COPD.
- Ex-smoker and current smoker ,passive smoker.
- No rapidly fatal underlying disease.

Criteria of Exclusion :

- Patients less than 40 years age.
- patients with non-smoker.
- Patients without complete records.
- Patient not willing for spirometry.
- Pregnant and lactating mother
- Patient sensitive with drug
- Presence of any other acute illness

Data Collection:

- After taking an informed consent thorough history was taken
- Physical examination and necessary laboratory investigations was done to rule out other comorbidities.
- The Patient was evaluated radiologically with chest x-ray,as well as serial spirometry for FEV1 after Post-bronchodilator.
- COPD assessment test were performed for every patient.
- Blood was sent for complete haemogram and biochemical tests.
- each group was randomized using computerized randomized tables and divided into three subgroup.

TREATMENT GROUP-1	TREATMENT GROUP-2	TREATMENT GROUP-3
GLYCOPYRONIUM 50MG ONCE DAILY	FORMETEROL 9 MG TWICE DAILY	BUDESONIDE 200 MCG TWICE DAILY
FOLLOW UP VISIT AT 2 WEEKS AND 4 WEEKS		

- All three group were on treatment duration of 4 week & inhaler short acting beta- 2 agonist salbutamol for resque use.
- Patient were instructed to attend medicine clinic fortnightly to receive drugs for 14 days and they were instructed to report immediately in case of any adverse event.
- Clinical response was assessed all three group patient at every visit.

RESULTS :

Table 1

Variables	VISITS	Group 1 P value	Group 2 P value	Group 3 P value
FEV1	BASELINE	-	-	-
	2 WEEKS	0.204	0.334	1.739
	4 WEEKS	0.00089	0.0076	1.551
FVC	BASELINE	-	-	-
	2 WEEKS	0.598	2.254	2.384
	4 WEEKS	0.005	0.041	1.876
FEV1/FVC	BASELINE	-	-	-
	2 WEEKS	0.117	0.618	2.568
	4 WEEKS	0.0001	0.041	2.552

Table 2

VARIABLES	GLYCOPYRONIUM		FORMETEROL		BUDESONIDE		P-VALUE 1 &2	P-VALUE 1&3	P-VALUE 2&3
	MEAN	STD	MEAN	STD	MEAN	STD			
FEV1	67.44	20.42	63.20	21.03	58.16	25.29	1.033	0.119	0.784
FVC	87.12	25.08	78.42	27.13	79.00	22.48	0.251	0.318	2.723
FEV1/FVC	58.34	10.72	56.74	12.52	53.62	13.98	1.567	0.181	0.639

Table 3

VARIABLES	GLYCOPYRONIUM		FORMETEROL		BUDESONIDE		P-VALUE 1&2	P-VALUE 1&3	P-VALUE 2&3
	MEAN	STD	MEAN	STD	MEAN	STD			
FEV1	74.90	16.76	69.74	17.97	58.78	26.74	0.661	0.000	0.030
FVC	96.04	20.96	88.48	16.52	75.72	19.81	0.152	0.000	0.003
FEV1/FVC	63.34	11.30	59.66	12.62	53.60	18.38	0.613	0.002	0.112

TABLE 1: COMPARISON OF FEV1 AND FVC FROM BASELINE 2 WEEKS 4 weeks IN All three group (WITHIN GROUP)

TABLE 2: COMPARISON OF CHANGE IN SPIROMETRIC VARIABLES AMONG GLYCOPYRONIUM, FORMETEROL AND BUDESONIDE AT 2 WEEKS.

TABLE 3: COMPARISON OF CHANGE IN SPIROMETRIC VARIABLES AMONG GLYCOPYRONIUM, FORMETEROL AND BUDESONIDE AT 4 WEEKS.

DISCUSSION:

- In glyopyronium group mean FEV1 was 60.1, which further increase to 67.44 and 74.9 at 2 weeks and 4 weeks respectively. The relationship between baseline FEV1 and 4 weeks FEV1 was statistically significant (P=0.000).
- In this group baseline FVC was 81.08, which increase to 87.12 and 96.04 at 2 weeks and 4 weeks respectively. The relationship between baseline FVC and 4 weeks FVC was statistically significant (P=0.005).
- In glyopyronium group mean FEV1/FVC was 53.86, which further increase to 58.34 and 63.34 at 2 weeks and 4 weeks respectively. The relationship between baseline FEV1/FVC and 4 weeks FEV1/FVC was statistically significant (P=0.000).
- In formeterol group mean FEV1 was 57.34, which further increase to 63.2 and 69.74 at 2 weeks and 4 weeks respectively. The relationship between baseline FEV1 and 4 weeks FEV1 was statistically significant (P=0.007).
- In this group baseline FVC was 76.92, which increase to 78.42 and 88.48 at 2 weeks and 4 weeks respectively. The relationship between baseline FVC and 4 weeks FVC was statistically significant (P=0.041).
- In formeterol group mean FEV1/FVC was 53.70, which further increase to 56.74 and 69.66 at 2 weeks and 4 weeks respectively. The relationship between baseline FEV1/FVC and 4 weeks FEV1/FVC was statistically significant (P=0.041).
- In budesonide group mean FEV1 was 57.32, which further increase to 58.16 and 58.78 at 2 weeks and 4 weeks respectively. The relationship between baseline FEV1 and 4 weeks FEV1 was statistically insignificant (P=1.551).
- In this group baseline FVC was 77.86, and at 2 weeks and 4 weeks was 79.00 and 75.72 respectively. The relationship between baseline FVC and 4 weeks FVC was statistically insignificant (P=1.876).
- In budesonide group mean FEV1/FVC was 54.14 and at 2 weeks and 4 weeks was 53.62 and 53.60 respectively. The relationship between baseline FEV1/FVC and 4 weeks FEV1/FVC was statistically insignificant (P=2.552).
- In glycopyronium, formeterol and budesonide group baseline FEV1 was 67.44, 63.20 and 58.16 respectively at 2 weeks. In glycopyronium, formeterol and budesonide group baseline FVC was 87.12, 78.42 and 79.00 respectively at 2 weeks. In glycopyronium, formeterol and budesonide group baseline FEV1/FVC was 58.34, 56.74 and 53.62 respectively at 2 weeks.
- In glycopyronium, formeterol and budesonide group baseline FEV1 was 74.90, 69.74 and 58.78 respectively at 4 weeks. The relationship between FEV1 and glycopyronium and budesonide group was statistically significant and the relationship between FEV1 and formeterol and budesonide group was also statistically significant.
- In glycopyronium, formeterol and budesonide group baseline FVC was 96.04, 88.48 and 75.72 respectively at 4 weeks. The relationship between FVC and glycopyronium and budesonide group was statistically significant and the relationship between FVC and formeterol and budesonide group was also statistically significant at 4 weeks.
- In glycopyronium, formeterol and budesonide group baseline FEV/FVC was 63.34, 59.66 and 53.60 respectively at 4 weeks. The relationship between FEV1/FVC and glycopyronium and budesonide group was statistically significant but the relationship between FEV1 and formeterol and budesonide group was also statistically insignificant.

CONCLUSION

- Glycopyronium is found to be more efficacious for spirometric value when compared formeterol or budesonide in the treatment of Grade 2-3 COPD(GOLD Criteria).
- Glycopyronium has a better safety and tolerability profile when compared to formeterol or budesonide .
- Formeterol also more safety and efficacy compare to budesonide but less from glycopyronium.

REFERENCES

1. Global Initiative for Obstructive Lung Disease . GOLD; 2011. Global strategy for the diagnosis, management and prevention of chronic obstructive pulmonary disease. Available from: http://www.goldcopd.com. Accessed July 11, 2012. [PubMed] [Google Scholar]
2. Partridge MR, Karlsson N, Small IR. Patient insight into the impact of chronic obstructive pulmonary disease in the morning: an Internet survey. Curr Med Res Opin. 2009;25(8):2043–2048. [PubMed] [Google Scholar]
3. Partridge MR, Miravitlles M, Ståhl E, Karlsson N, Svensson K, Welte T. Development and validation of the Capacity of Daily Living during the Morning questionnaire and the Global Chest Symptoms Questionnaire in COPD. Eur Respir J. 2010;36(1):96–104. [PubMed] [Google Scholar]
4. Kessler R, Partridge MR, Miravitlles M, et al. Symptom variability in patients with severe COPD: a pan-European cross-sectional study. Eur Respir J. 2011;37(2):264–272. [PubMed] [Google Scholar]
5. Mathers CD. Uncertainty and data availability for the global burden of disease estimates 2000–2002. In: Evidence and Information for Policy Working Paper. Geneva, Switzerland: WHO,2005.Available:http://www.who.int/healthinfo/global_ burden disease/en/index.html. Accessed: 25 November 2015.
6. Ferrer M, Alonso J, Morera J, et al. Chronic obstructive pulmonary disease stage and health-related quality of life. Ann Intern Med 1997; 127: 1072–1079.
7. Buist AS, Vollmer WM, Sullivan SD, et al. The Burden of Obstructive Lung Disease initiative (BOLD): rationale and design. J COPD 2005; 2: 277–283.
8. Iqbal A, Schloss S, George D, Isonaka S. Worldwide guidelines for chronic obstructive pulmonary disease: a comparison of diagnosis and treatment recommendations. Respirology 2002; 7: 233–239.
9. Global Initiative for Chronic Obstructive Lung Disease. Global Strategy for the Diagnosis, Management, and Prevention of Chronic Obstructive Pulmonary Disease. http://www.goldcopd.com/Guidelineitem.asp?l152&l251&intId5989 Date last updated: August 2005. Date last accessed: June 2006.
10. Celli BR, Halbert RJ, Isonaka S, Schau B. Population impact of different definitions of airway obstruction. Eur Respir J 2003; 22: 268–273.
11. R.J. Halbert*,#, J.L. Natoli*,", A. Gano*, E. Badamgarav*, Global and regional estimates of COPD prevalence: Systematic review and meta–analysis. Eur Respir J 2006; 28: 523–532