IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)
e-ISSN: 2279-0853, p-ISSN: 2279-0861.Volume 16, Issue 9 Ver. VIII (Sep. 2017), PP 32-35
www.iosrjournals.org

Myths about Usage of Beta-Blockers

[*]Dr.K.Muralidharan M.D.[1], Dr.C.Sanjay[2]
[1]*Assistant Professor Of General Medicine*
[2]*Compulsory Rotatory Residential Internship(CRRI)*
Madha Medical College And Research Institute Affiliated to Tamil Nadu Dr. M.G.R. Medical University
*Corresponding Author: *Dr.K.Muralidharan M.D.*

Abstract
Background: *Beta-blocker therapy has a proven benefit in patients with hypertension, heart failure and Coronary Artery Disease (CAD) and have been considered contraindicated in patients with Chronic Obstructive Pulmonary Disease (COPD). Although beta-blockers improve cardiovascular outcomes, COPD patients not receive them because possible adverse pulmonary effects. We aimed to identify factors associated with beta-blocker used in this setting and to determine whether their use is associated with decreased in-hospital mortality.*
Methods*: Randomised, blinded, controlled trials of single dose or one year duration that studied the effects of cardioselective beta-blockers on the FEV1 or symptoms in patients with COPD. We reviewed data with acute exacerbation of COPD as primary diagnosis or as secondary diagnosis with a primary diagnosis of acute respiratory disease. Demographics, co-morbidities, and medication use were recorded and patients receiving beta-blockers were compared to normal patients. Multivariate regression analysis was done to determine predictors of in-hospital death.*
Results*: Of the 325 patients (mean age, 66 ± 12 yr; 73% male), 68(31%) received cardioselective beta-blockers at their initial hospitalization (Table1).b-blockers used were bisoprolol at 50% (162), atenolol at 15% (49), and metoprolol at 32% (104). The percentage of b-blocker use was (mild COPD, 39%; moderate COPD, 35%; and severe COPD, 33%). In multivariate analysis, beta-blocker use was associated with reduced mortality.*
Conclusions*: Beta-blocker use among inpatients with exacerbations of COPD is well tolerated and may be associated with reduced mortality.The potential protective effect of beta-blockers in this population warrants further study.*

Date of Submission: 01 -09-2017 Date of acceptance: 22-09-2017

I. Introduction

COPD is the fourth leading cause of death in the United States and the only major cause that is rising in frequency [1]. Although many patients with COPD die from respiratory failure, cardiovascular disease is consistently the 1st or 2nd leading cause of death depending on the severity of the participants' underlying lung disease and the individual study population [2-6]. After review of the articles and bibliographies, 40 trials of beta-blockers in patients with COPD were found. 90 gave information on single-dose studies. .Of the trials of longer duration, 5 were used for FEV1 analysis and 8 for symptoms. The purpose of this study was to examine the use of beta-blockers (both cardioselective and non-cardioselective) in patients admitted to a university hospital with acute exacerbations of COPD and to determine whether the administration of these drugs was associated with in-hospital mortality. Beta blocker is a class of medications that are particularly used to manage cardiac arrhythmias, and to protect the heart from a second heart attack (myocardial infarction) after a first heart attack (secondary prevention).They are also widely used to treat hypertension, although they are no longer the first choice for initial treatment of most patients. Although beta blockers were once contraindicated in congestive heart failure, as they have the potential to worsen the condition due to their effect of decreasing cardiac contractility, studies in the late 1990s showed their efficacy at reducing morbidity and mortality. Beta blockers are contraindicated in patients with asthma as stated in the British National Formulary 2011. They should also be avoided in patients with a history of cocaine use or in cocaine-induced tachycardia. Beta blockers should not be used as a first-line treatment in the acute setting for cocaine-induced acute coronary syndrome (CIACS). No recent studies have been identified that show the benefit of beta blockers in reducing coronary vasospasm, or coronary vascular resistance, in patients with CIACS. In the multiple case studies identified, the use of beta blockers in CIACS resulted in detrimental outcomes, and the discontinuation of beta blockers used in the acute setting led to improvement in clinical course.

Atenolol is a selective β_1 receptor antagonist, a drug belonging to the group of beta blockers, a class of drugs used primarily in cardiovascular diseases.
Metoprolol, is the selective β_1 receptor blocker type.
Bisoprolol is a medication most commonly used for heart diseases.This specifically includes high blood pressure, chest pain from not enough blood flow to the heart, and heart failure.Table 2 compares concomitant medication use in the two groups. No significant interactions were found.

II. Methods

A diagnosis of COPD was based on post-bronchodilator spirometric values in conjunction with a history of cough, sputum production, and/ or dyspnea. COPD was defined according to the guidelines of the Global Initiative for Chronic Obstructive Lung Disease (GOLD) (FEV1 to FVC ratio less than 70%. Disease severity was classified into three groups: I mild COPD (FEV1/FVC , 0.70 and FEV1 > 80% of the predicted FEV1), II moderate COPD (FEV1/FVC , 0.70 and FEV1 >50% < 80% of the predicted FEV1), and III severe COPD (FEV1/FVC , 0.70 and FEV1 >30% <50% of the predicted)Very severe (FEV1/FVC<0.7 and FEV1 >30% predicted0. We used the equation of Quanjer and colleagues (7), adjusted for age, sex, and height, to calculate the predicted FEV1 value, which has been demonstrated to make an accurate prediction (8). The equation for males is 4.30×3 height (m) age ×0.029-2.49 and for women is 3.95×height (m)-age×0.025-2.60 (7).The patients without a pulmonary function test were classified as having no COPD if they were free of pulmonary complaints (cough and dyspnea), and not currently receiving pulmonary medications (i.e., bronchodilators and corticosteroids) and demonstrated normal arterial blood gases on room air (PCO2<48mmhg and Po2>80).

Table 1. Baseline Characteristics According To Chronic Obstructive Pulmonary Disease And - B Blocker Use

	COPD n=126		P Value	No COPD n=199		P value
	β-Blockers n=46	No β-Blockers n=80		β-Blocker n=56	no β-Blocker n =142	
Demographics	68	68	0.61	64	62	0.01
Mean age,yr						
Male Sex,%	81	76	0.07	69	67	0.30
Cardiovascular disease ,%						
Myocardial infarction	32	20	<0.001	30	13	<0.001
Heart failure	6	4	0.22	4	3	0.29
Angina	25	10	<0.001	22	8	<0.001
Stroke or TIA	23	19	0.14	34	34	0.76
Clinical Characteristics%						
Hypertension	48	35	<0.001	53	27	<0.05
Diabetes mellitus	16	11	<0.05	17	13	0.08
Hypercholesterolaemia	25	10	<0.001	27	13	<0.001
Renal dysfunction	8	7	0.43	9	3	<0.001
Body Mass Index	25	24	<0.05	25	24	<0.05
Current Smoking Status	34	32	0.41	26	23	0.21
Cardiac medications						
ACE Inhibitors	31	18	<0.001	33	17	<0.001
Diuretics	27	18	<0.05	22	10	<0.001
Statins	48	10	<0.001	45	13	<0.001
Aspirin	46	29	<0.001	57	36	<0.001
Calcium Antagonist	27	21	<0.05	32	15	<0.001
Nitrates	16	10	<0.05	17	6	<0.001
Pulmonary Medications%						
Bronchodilators	12	17	<0.05	0	0	0.85
Corticosteroids	23	9	<0.001	1	1	0.88

Table 2 compares concomitant medication use in the two groups

Treatment	**β-Blockers Number(%) N=102**	**No β-Blockers Number(%) N=223**	**P Value**
Systemic steroid	36(36.72)	206(459)	0
Inhaled Steroid	83(84.66)	15(33.45)	0
Antibiotic	92(93.84)	191(425.93)	0.258
Short acting β-agonist	96(97.92)	213(474.99)	0.589

Long acting β-agonist	6(6.12)	11(24.53)	0.718
Short acting anticholinergic	95(96.9)	211(470.53)	0.596
Long acting anticholinergic	9(9.18)	9(20.07)	0.080
Methylxanthine	114(116.28)	90(200.7)	0

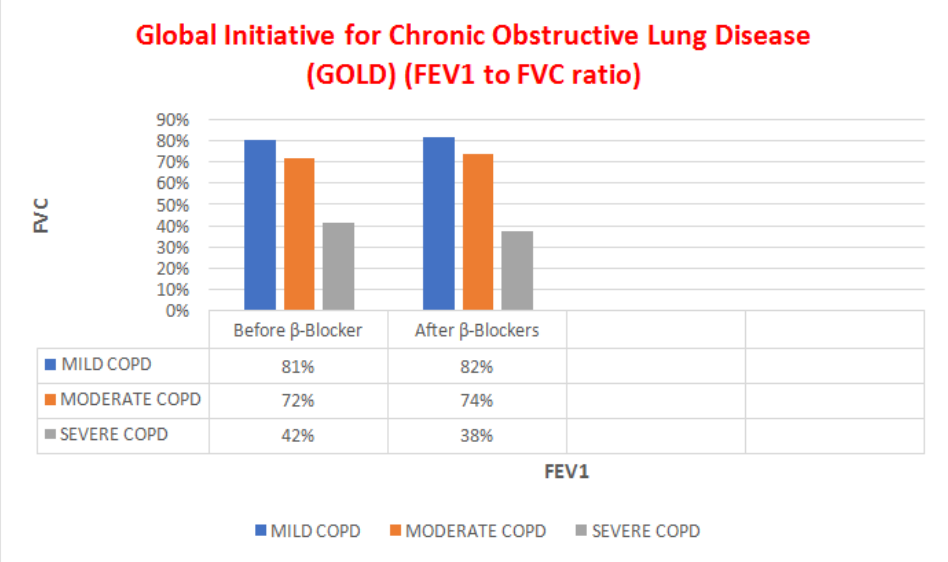
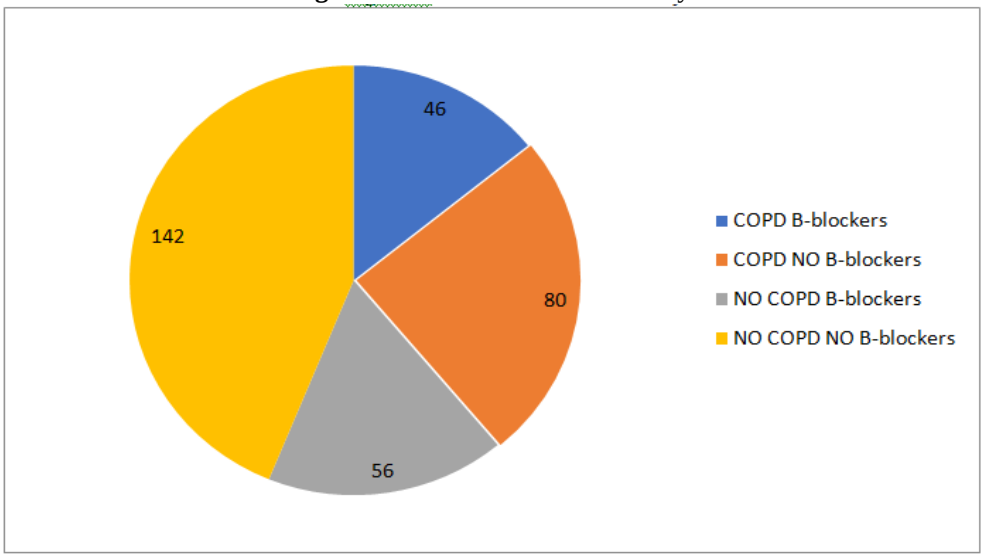


Figure 1. Patients taken for the study



III. Discussion

Beta-blockers are often withheld from COPD patients due to the perception that their use is relatively contraindicated [9,10]. This is despite the fact that cardioselective beta-blockers have no demonstrable effect on lung function regardless of disease severity or bronchodilator reversibility [11] and that COPD patients with cardiac disease appear to derive the same benefits from these drugs as does the general population.

The present study demonstrated that cardioselective b-blockers were associated with reduced 30-day and long-term mortality in patients with COPD. We also found that an intensified dosing regimen appeared to be superior to low-dose therapy in terms of its impact on 30-day mortality.

These findings are consistent with other studies that demonstrated the beneficial effects of b-blockers in patients with COPD who had recently experienced myocardial infarction (12,13,14)

Why b-blockers would be effective in COPD is largely unknown; however, it is well established that CVD is an important comorbidity in COPD. In the Lung Health Study, for instance, which studied 5,887 smokers, aged 35 to 60 years, with GOLD stage 1 and 2 disease (FEV1 > 50% predicted), CVDs were primarily responsible for 22% of all deaths (15) and cardiovascular events accounted for 42% of the first hospitalizations

and 48% of the second hospitalizations (16). The increased CVD risk in COPD may, in part, be related to excess adrenergic activity. Using microneurography of the peroneal nerve, Heindl and colleagues showed that patients with COPD have a marked increase in peripheral sympathetic discharge compared with control subjects (17), which was inversely related to the patients' oxyhemoglobin saturation (r 5 0.54) (18). Patients with COPD also demonstrate reduced cardiac accumulation of meta-iodobenzylguanidine, an analog of guanetidine, a higher washout rate from the heart, and increased plasma norepinephrine levels than control subjects, indicating excess activity of the sympathetic nervous system with increased norepinephrine turnover than do control subjects (19). In patients who demonstrate excess sympathetic nervous activity, such as those with chronic heart failure or previous myocardial infarction, the use of b-adrenoceptor blockers, which attenuate sympathetic nervous activity, improves cardiac function and reduces CVD morbidity and mortality (20).

IV. Conclusion:

In summary, the results of this study suggest that the use of beta-blockers in patients admitted with acute exacerbations of COPD is not deleterious and may be associated with a beneficial effect on mortality. These results have direct implications for the use of beta-blockers in patients hospitalized for acute exacerbations of COPD and suggest that they can be safely continued in this setting. The strength of these and other observational data supporting the safety and potential efficacy of beta-blockers in patients with COPD now support the pursuit of randomized trials in the outpatient setting. If our results are confirmed, prospective trials among inpatients with acute exacerbations should also be considered. These trials demonstrated that cardioselective beta-blockers, given as a single dose or for longer durations, produced no change in FEV1 or respiratory symptoms compared to placebo, and did not effecttheFEV1treatment response to beta-2 agonists.

References

[1]. Mannino, DM COPD: epidemiology, prevalence, morbidity and mortality, and disease heterogeneity. Chest 2002; 121(suppl):121S-126S

[2]. Vilkman S, Keistinen T, Tuuponen T, Kivela SL. Survival and cause of death among elderly chronic obstructive pulmonary disease patients after first admission to hospital. Respiration 1997; 64:281-284

[3]. Kuller LH, Ockene JK, Townsend M, Browner M, Meilahn E, Wentworth DN. The epidemiology of pulmonary function and COPD mortality in the multiple risk factor intervention trial. Am Rev Respir Dis 1989; 140:S76-S81

[4]. Tockman MS, Comstock GW. Respiratory risk factors and mortality: longitudinal studies in Washington County, Maryland. Am Rev Respir Dis 1989; 140:S56-S63

[5]. Almagro P, Calbo E, Ochoa de Echagiien A, et al. Mortality after hospitalization for COPD. Chest 2002; 121:1441-1448

[6]. Anthonisen NR, Skeans MA, Wise RA, et al. The effects of a smoking cessation intervention on 14.5-year mortality: a randomized clinical trial. Ann Intern Med 2005; 142:233-239

[7]. Quanjer PH, Tammeling GJ, Cotes JE, Pedersen OF, Peslin R, Yernault JC. Lung volumes and forced ventilatory flows. Report Working Party Standardization of Lung Function Tests, European Community for Steel and Coal. Official Statement of the European Respiratory Society. Eur Respir J Suppl 1993;16:5–40. 8. Subbarao P, Lebecque P, Corey M, Coates AL. Comparison of spirometric reference values. Pediatr Pulmonol 2004;37:515–522.

[8]. Gottlieb SS, McCarter RJ, Vogel RA. Effect of beta-blockade on mortality among high-risk and low-risk patients after myocardial infarction. N Engl J Med 1998; 339:489-497

[9]. Egred M, Shaw S, Mohammed B, et al. Under-use of beta-blockers in patients with ischaemic heart disease and concomitant chronic obstructive pulmonary disease. QJM 2005; 98:493-497

[10]. Salpeter S, Omiston T, Salpeter E. Cardioselective beta-blockers for chronic obstructive pulmonary disease. Cochrane Database Syst Rev 2005; 4:CD003566

[11]. Gottlieb SS, McCarter RJ, Vogel RA. Effect of beta-blockade on mortality among high-risk and low-risk patients after myocardial infarction. N Engl J Med 1998;339:489–497.

[12]. Chen J, Radford MJ, Wang Y, Marciniak TA, Krumholz HM. Effectiveness of beta-blocker therapy after acute myocardial infarction in elderly patients with chronic obstructive pulmonary disease or asthma. J Am Coll Cardiol 2001;37:1950–1956.

[13]. Dransfield MT, Rowe SM, Johnson JE, Bailey WC, Gerald LB. Use of beta blockers and the risk of death in hospitalised patients with acute exacerbations of COPD. Thorax 2008;63:301–305.

[14]. Anthonisen NR, Skeans MA, Wise RA, Manfreda J, Kanner RE, Connett JE. The effects of a smoking cessation intervention on 14.5-year mortality: a randomized clinical trial. Ann Intern Med 2005;142:233–239.

[15]. Anthonisen NR, Connett JE, Enright PL, Manfreda J. Hospitalizations and mortality in the Lung Health Study. Am J Respir Crit Care Med 2002;166:333–339

[16]. Heindl S, Lehnert M, Criee CP, Hasenfuss G, Andreas S. Marked sympathetic activation in patients with chronic respiratory failure. Am J Respir Crit Care Med 2001;164:597–601.

[17]. Wieland DM, Wu J, Brown LE, Mangner TJ, Swanson DP, Beierwaltes WH. Radiolabeled adrenergi neuron-blocking agents: adrenomedullary imaging with [131I]iodobenzylguanidine. J Nucl Med1980;21:349–353.

[18]. Sakamaki F, Oya H, Nagaya N, Kyotani S, Satoh T, Nakanishi N. Higher prevalence of obstructive airway disease in patients with thoracic or abdominal aortic aneurysm. J Vasc Surg 2002;36:35–40.

[19]. McMurray JJ, Pfeffer MA. Heart failure. Lancet 2005;365:1877–1889.

*Dr.K.Muralidharan M.D. "Myths about Usage of Beta-Blockers." IOSR Journal of Dental and Medical Sciences (IOSR-JDMS) 16.9 (2017): 32-35.