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"Comparison Between Bode Index and Gold Staging With Respect To Quality of Life And C-Reactive Protein Levels in Copd Patients"

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Abstract: *COPD have widespread systemic effects and affects the quality of life. Classification of severity of airflow limitation in COPD does not represent the clinical consequences of COPD. Hence, multidimensional tools should be preferred for assessment. BODE index has recently been proposed to provide useful prognostic information. Since COPD is associated with widespread systemic inflammation, serum CRP levels are found to be elevated even in stable COPD patients. This study aims to investigate the relationship of severity of airflow limitation as assigned by GOLD staging and BODE index with serum C-reactive protein levels, Quality of life as well as with other prognostic factors.This study was conducted as a longitudinal observational study in 50 stable COPD patients attending the thoracic medicine outpatient department over a period of 6 months. Both GOLD Staging and BODE index showed highly significant correlation with SGRQ total scores (p value <.001**). With respect to CRP levels BODE staging (p value<.001) had a better correlation than GOLD staging (p value<.005**). BODE index (p value<.001**) had a better correlation with number of exacerbations than GOLD staging (p value<.01*)In this study it was found that both BODE index and GOLD staging had highly significant correlation with health related quality of life. Serum CRP levels correlated with BODE indexand GOLD staging of COPD, but BODE index had a stronger correlation.BODE index had a stronger correlation with number of annual exacerbations than GOLD staging for COPD severity.*

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I. Introduction

Chronic obstructive pulmonary disease (COPD) is defined as a disease state characterized by persistent airflow limitation that is not fully reversible"[1.]COPD has been implicated as a leading cause for worldwide mortality and morbidity.Spirometry is essential for diagnosis of COPD. A post bronchodilator Forced expiratory volume in 1 second (FEV_1) / Forced vital capacity (FVC) [FEV_1/FVC] less than 0.70 is essential for the diagnosis of COPD. Global Initiative for Chronic Lung Disease (GOLD) uses FEV_1 based staging system for assessing the severity of the disease. It has been found that FEV_1 basedstaging system correlates poorly with symptoms of the patient, frequency of exacerbation, quality of life and intolerance to exercise. The multidimensional grading system, BODE index (body mass index, airflow obstruction,dyspnoea and exercise capacity) has been shown to be a better predictor for risk of death among COPD patients than FEV_1. BODE index alsoprovides useful prognostic information.

COPD has now been found to be a systemic disease which affects lungs as well as other organ systems. Since COPD has been found to be associated with significant systemic inflammation, widespread research has been held in the field of biomarkers for COPD. Serum CRP levels have been found to be elevated even in stable COPD patients with no recent exacerbations. Basal CRP levels also helps in predicting overall mortality, mortality from cancer and cardiovascular diseases in patients with mild to moderate COPD.

In this study, it has been hypothesized that BODE index is a better predictor of health status of the patient, quality of life as well as systemic inflammation as compared to the FEV_1 based GOLD staging and aims to investigate the relationship of GOLD staging, BODE index with serum CRP levels, Quality of life, as well as prognostic factors in stable COPD patients

II. Materials And Methods

This observational study was carried out on already diagnosed stable COPD patients attending the Thoracic Medicine outpatient department in a tertiary care hospital from April 2015 –September 2015 as an open label Observational study. Totally 50patients were included in the study.

Inclusion criteria:

- COPD patients in stable conditions with no exacerbationsdue to any reason in the last 6 weeks). COPD is defined as a history of smoking and an FEV_1/FVC ratio of less than 70%, 20 minutes after salbutamol administration.

Exclusion criteria:

Patients with history of:

1. Inflammatory diseases (inflammatory bowel disease, rheumatologic diseases,vasculitis),
2. Interstitial lung diseases, or presence of active tuberculosis
3. Presence of atopy,
4. Myocardial infarction in the last 6 months,
5. Decompensated cardiovascular disease and
6. Walking disability.

Procedure Methodology

From COPD patients attending the Thoracic medicine department OPD, selected for clinical study as per inclusion/exclusion criteria the following data are collected: Demographic data, past medical history. Weight, height are measured. Dyspnea severityis assigned by MMRC dyspnea scale. Patients are subjected to the six-minute walking test (6MWT), Spirometryis done.Blood is drawn for estimation of C-reactive protein.Patients are requested to fill up the vernacular version of St George respiratory disease questionnaire to assess the quality of life.Detailed clinical examination is done. BODE index is calculated from BMI, FEV1, 6-minute walking distance, MMRC dyspnea scale. FEV_1 (expressed as percentage of predicted) is used for GOLD staging. BODE index and Gold staging are correlated with CRP levels, SGRQ total score and prognostic factors.

Statistical analysis: The analysis was done using statistical software SPSS 20.0. Statistical analysis within the studywas done using oneway ANOVA test, t test.

III. Result

In the study group of 50 patients, 44 patients were male and6 patients were femaleand the maximum incidence was in the age group of 61-65 yrs.

The analysis of the basic demographic data showed that Mean age of the study group was 62.16 years with minimum of 50 years and a maximum of 70 years. Cumulative smoking pack year was 22.43 with a minimum of 14 and maximum of 30. The mean Body mass index was 20.55kg/m^2. Mean 6-MWD was 221.80 m and post bronchodilator FEV_1 % was 55.53%. The mean SGRQ scores for symptom: 68.18, activity: 68.56, impact: 63.67 and total: 65.83. the mean BODE index score was 4.82 (Table: 1).

Table no1 shows that in the study group, 42 patients had a GOLD stage of 2 and 8 had a GOLD stage of 3. Mean total SGRQ scores increased according to GOLD classes. There was highly significant correlation between SGRQ scores for activity impact and the total scores (p value<.001**) whereas there was still a significant correlation between SGRQ symptom score and GOLD stages (p value<.05). So SQRQ activity and impact score correlated better with GOLD stages than SGRQ symptom score. (Table No: 2)

Table no: 1 Baseline demographic characteristics of the population

Variables	N	Minimum	Maximum
Age in years	50	52	70
Pack Years	44	14	30
Duration of illness	50	3	7
No of Annual Exacerbation	50	1	6
No of Hospitalisation in previous year	50	0	5
Serum CRP Level (Mg/L)	50	4.50	26.70
FEV1 (L)	50	.85	1.64
Post bronchodilator FEV1 %	50	40	71
FVC (L)	50	1.71	3.10
Height (Cms)	50	150	170
Weight (Kgs)	50	45	65
Body Mass Index	50	18.14	30.31
6 Minute Walking Distance (M)	50	120	380
MMRC Dyspnoea Grade	50	1	3

Bode Index Scores	50	0	8
SGRQ - Symptoms	50	32.85	95.71
SGRQ - Activity	50	41.73	92.51
SGRQ - Impact	50	20.75	91.94
SGRQ - Total	50	29.90	92.74

Table no 2: Distribution of SGRQ scores according to GOLD stages

	Gold Stage	N	Mean	Std. Deviation	Std. Error Mean	P value
SGRQ - Symptoms	2	42	66.2836	13.19812	2.03651	<.05*
	3	8	78.1825	11.44631	4.04688	
SGRQ – Activity	2	42	65.5686	8.85070	1.36569	
	3	8	84.3075	7.63144	2.69812	<.001**
SGRQ - Impact	2	42	60.4983	13.46555	2.07778	
	3	8	80.3600	10.30560	3.64358	<.001**
SGRQ – Total	2	42	62.9138	11.20287	1.72864	
	3	8	81.1700	7.80972	2.76115	<.001**

Table no2 shows that on comparing between BODE and SGRQ score SGRQ symptom and activity score increases with increase in BODE index quartiles with maximum score for BODE quartile 4 and there is a highly significant correlation between the SGRQ symptom and activity score with BODE quartiles (Pvalue<.001**). Similarly with SGRQ impact score, it progressively increased with BODE index quartiles, with maximum SGRQ impact score for BODE index quartile 4 and two shows a highly significant correlation (p value<.001**). The SGRQ total score increases with BODE index quartiles and there is a very strong correlation is found between the two(p value<.001**).

Table no: 3 Comparison of BODE index with CRP levels

Variable		Serum CRP levels (mg/L)
Bode Index Scores	Pearson Correlation	.790(**)
	Sig. (2-tailed)	.000
	N	50
P value		<.001**

Table No :4 Comparison Gold stages with CRP levels

Gold Stage	Pearson Correlation	.447(**)
	Sig. (2-tailed)	.001
	N	50
P value	<.005**	

Table no 3 and 4 show that in the study group, on comparing CRP levels with BODE index and GOLD stages both exhibited highly significant correlation with CRPlevel but GOLD staging had a weaker correlation(p value<.005**) compared BODE index.(p value<.001**)

In the studygroup (table no.10) comparison was made between BODE index and GOLD stages with respect to prognostic factors. Both BODE index and GOLD stages had significant correlation with no pack years smoked(p value<.05) but the BODE index correlated better.Both BODE index and GOLD stages had highly significant correlation with the duration of illness(p value<.001**). With respect to the annual exacerbations, both BODE index and GOLD stages had a highly significant correlation, but BODE index exhibited a higher correlation(p value<.001**) than GOLD staging(p value<.005**). On comparing the relation of 6- minute walking distance with GOLD staging and BODE index, both showed a negative correlation.

The decline of 6- MWD was better correlated with increase in BODE scores(p value<.001**) than with increase in GOLD stages(p value<.005**)

Table no: 5 Comparison of BODE index and GOLD stages with prognostic factors

Prognostic factors		Bode Index Scores	Gold Stage
Pack Years	Pearson Correlation	.335(*)	.326(*)
	Sig. (2-tailed)	.028	.033
	N	43	43
P value		<.05*	<.05*
Duration of illness	Pearson Correlation	.731(**)	.550(**)
	Sig. (2-tailed)	.000	.000

	N	50	50
P value		<.001**	<.001**
No of Annual Exacerbation	Pearson Correlation	.685(**)	.376(**)
	Sig. (2-tailed)	.000	.007
	N	50	50
P value		<.001**	<.010*
6 Minute Walking Distance (M)	Pearson Correlation	-.823(**)	-.398(**)
	Sig. (2-tailed)	.000	.004
	N	50	50
P value		<.001**	<.005**

IV. Discussion

In a study conducted by Kian-Chung Ong[2] the male : female ratio of incidence was 9:1 . In our study the incidence in male: female ratio is 7.3:1

Antonelli-Incalzi et al[3] conducted a study in which it was found that GOLD staging in COPD correlated with health related quality of life between stages 2 and 3. In our study mostof the patients belonged to GOLD stages 2 and 3 and there was a highly significant correlation between GOLD stages and health related quality of life.

Sarkar SK et al[4] showed in their study that Higher BODE quartiles were associated with higher (worse) SGRQ scores .In our study also SGRQ scores increased with increase in BODE quartile and the two had a highly significant association.

In study conducted by Alseedi et al[5] it was found that FEV_1 correlated poorly with exacerbation frequency .In this study it is found that even though there an association between FEV_1 and number of exacerbations, it is weaker compared to the association with BODE index quartiles.

The study by NurhanSariogluet al[6] showed thatCRP levels have a weak but statistically significant correlation with BODE index. In this study BODE index is found to have a highly significant correlation with CRP levels.

In the study conducted by Marin et al[7] there was found to be a significant correlation between 6MWD and MMRC, COPD stage according to GOLD and PFT parameters. In this study also 6-MWD was found have a highly significant correlation with COPD staging according to GOLD, but compared to BODE index this association was weaker.

Study conducted by FundaAksuet al[8] showed that,CRP levels are raised even in stable COPD patients independent of smoking behavior. In this study also serum CRP levels are raised and the mean value is 14.17 mg/l consistent with previous studies

In a study conducted by ReshuAgarwalet al[9] it was found that CRP levels correlated well with FEV_1 and hence GOLD staging. In this study there is a highly significant correlation between GOLD stages and serum CRP levels.

Limitation of the study beingthe number of patients included in this study was small, the percentage of female patients was small in this study and it might not reflect the prevalence of COPD in females in India.Presence of depression and anxiety were not assessed in this study, which are major comorbidities associated with COPD

V. Conclusion

In our study it was found that both BODE Index and GOLD staging of COPD had a highly significant correlation with health related quality of life, But BODE index had better correlation. Serum CRP levels were elevated in stable COPD patients and correlated with BODE indexand Gold staging of COPD, but BODE index had a stronger association to CRP levels.BODE index had a stronger correlation with cumulative number of pack years smoked and number of annual exacerbation compared to GOLD staging.So its concluded that BODE index is better than GOLD staging in predicting the exacerbation, disease activity, quality of life of the patient and the degree of sysytemic inflammation in a COPD patient.

References

[1]. (http://www.goldcopd.com/)
[2]. Kian-Chung Ong1Does the multidimensional grading system (BODE) correspond to differences in health status of patients with COPD? International Journal of COPD 2006:1(1) 91–96
[3]. Antonelli- Incalzi R, Imperiale C, Bellia V, Catalano F, Scichilone N, Pistelli R, et al. Do GOLD stages of COPD severity really correspond to differences in health status? EurRespir J 2003;22:444-9.
[4]. Sarkar SK, Basuthakur S, Das SK, Das A, Das S, Choudhury S, et al. Evaluation of correlation of BODE index with health-related quality of life among patients with stable COPD attending a tertiary care hospital. Lung India 2015;32:24-8.
[5]. The effects of inhaled corticosteroids in chronic obstructive pulmonary disease: a systematic review of randomized placebo-controlled trials Am J Med 2002 Vol 113 (59-65)

[6]. Sarioglu N[1], Alpaydin AO, Coskun AS, Celik P, Ozyurt BC, Yorgancioglu A. Relationship between BODE index, quality of life and inflammatory cytokines in COPD patients.MultidiscipRespir Med. 2010 Apr 30;5(2):84-91.doi:10.1186/2049-6958-5-2-84.
[7]. Marin JM, Carrizo SJ, Gascon M, Sanchez A, Gallego B, Celli BR. Inspiratory capacity, dynamic hyperinflation, breathlessness, and exercise performance during the 6- minute-walk test in chronic obstructive pulmonary disease. Am J RespirCrit Care Med 2001;163:1395-1399.
[8]. Funda Aksu1 , Nermin Çapan1 , Kurtuluş Aksu1 , Ruhsar Ofluoğlu1 , Sema Canbakan1 , Bünyamin Yavuz2 , KadirOkhan Akin3 C-reactive protein levels are raised in stable Chronic obstructive pulmonary disease patients independent of smoking behavior and biomass exposureJThorac Dis 2013;5(4):414-421. doi: 10.3978/j.issn.2072-1439.2013.06.27
[9]. Agarwal et al. Multidisciplinary Respiratory Medicine 2013, 8:63

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