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Original research article

Bode index and age: Chronic obstructive pulmonary disease

[1]Dr. Amith A, [2]Dr Sindhu P, [3]Dr. Sachin Lingaraju,[4] Dr. Adheep B Amberker

[1]Assistant Professor, Department of Respiratory Medicine, Kodagu Institute of Medical Sciences, Madikeri, Karnataka, India

[2]Assistant Professor Community Medicine Department SSIMS, Davanagere, Karnataka, India

[3]Assistant Professor, Department of Radiology, Kodagu Institute of Medical Sciences, Madikeri, Karnataka, India

[4]Assistant Professor, Department of Respiratory Medicine, JJMMC, Davangere, Karnataka, India

Corresponding Author:

Dr. Adheep B Amberker
Assistant Professor, Department of Respiratory Medicine, JJMMC, Davangere, Karnataka, India

Abstract
Chronic airways obstructions are also known by terms such as chronic obstructive airway disease (COAD) and chronic obstructive lung disease (COLD). However, the definition of COPD has undergone major revision. According to BTS (British Thoracic Society) it is a slowly progressive disorder characterised by airways obstruction (reduced FEV1, and FEV1/FVC ratio) which does not change markedly over several months. "Direct interview method" of primary source of information technique will be used. Informed consent will be obtained from each study subject. A pre-tested semi-structured and structured questionnaires was used to meet the objectives of the study. Study variables include BODE index components like body-mass index (B), the degree of airflow obstruction (O), dyspnea (D), and exercise capacity (E), measured by the six-minute-walk test. Among the COPD patients, BODE index was found to increase with age with the mild group having a mean age of 54.19 years, moderate group 56.06 years and the severe group with 59.77 years as the mean age. The difference was statistically significant with a p value of <0.0001.
Keywords: Bode index, age, chronic obstructive pulmonary disease

Introduction

Chronic obstructive pulmonary disease (COPD) was initially defined as "a disease state characterized by chronic airflow limitation due to chronic bronchitis and emphysema". Chronic bronchitis has been defined in clinical terms as "the presence of chronic productive cough for at least 3 consecutive months in 2 consecutive years. Other causes of chronic productive cough must be ruled out". Emphysema, on the other hand, has been defined by its pathologic description: "an abnormal enlargement of the air spaces distal to the terminal bronchioles accompanied by destruction of their walls and without obvious fibrosis" [1].

Chronic airways obstructions are also known by terms such as chronic obstructive airway disease (COAD) and chronic obstructive lung disease (COLD). However, the definition of COPD has undergone major revision. According to BTS (British Thoracic Society) it is a slowly progressive disorder characterised by airways obstruction (reduced FEV1 and FEV1/FVC ratio) which does not change markedly over several months. According to GOLD report, a diagnosis of COPD should be considered in any patient who has symptoms of cough, sputum production or dyspnoea, and or history of exposure to risk factors for the disease. The diagnosis is confirmed by spirometry. The presence of post bronchodilator FEV1 < 80% of the predicted value in combination with an FEV1/FVC < 70% confirms the presence of an airflow limitation that is not fully reversible. When spirometry is unavailable the diagnosis of COPD should be made using all available tools, clinical symptoms and signs such as abnormal shortness of breath and increased forced expiratory time [2, 3].

The definition of COPD as defined in GOLD 2017 now reads as "a common, preventable and treatable disease that is characterized by persistent respiratory symptoms and airflow limitation that is due to airway and/or alveolar abnormalities usually caused by significant exposure to noxious particles or gases".

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Compared to the previous definition, it introduces the concept of persistent symptoms, while discarding the putative pathogenic mechanism (i.e., enhanced inflammatory response); exacerbation, progression, and comorbidities are similarly not included in the revised definition of the disease. Overall, the new definition is essentially a description of lung and airways abnormalities following exposure to noxious stimuli and leading to symptoms [4].

Methodology

Source of data

Primary source of information with Direct Interview method on the patients, both with symptoms suggestive of COPD, admitted to Hospital.

Study design: Descriptive cross-sectional study.

Sample size and Sampling method: Using non-probability sampling technique all the patients attending Respiratory Medicine clinic at Hospital during study period. A minimum of 100 patients will be assessed.

Data collection: "Direct interview method" of primary source of information technique will be used. Informed consent will be obtained from each study subject. A pre-tested semi-structured and structured questionnaires was used to meet the objectives of the study. Study variables include BODE index components like body-mass index (B), the degree of airflow obstruction (O), dyspnea (D) and exercise capacity (E), measured by the six-minute-walk test. These variables will be used to construct the BODE index, a multidimensional 10-point scale in which higher scores indicate a severe disease and higher risk of death.

Inclusion criteria

1. Patients with symptoms suggestive of COPD as diagnosed by spirometry in stable condition.
2. Male patients aged between 40-65 years suffering from COPD will be included in the study.
3. Patients who came for master health check-up as controls.

Exclusion criteria

1. Spirometry proved bronchial asthma, cor pulmonale, ILD, TB.
2. Recent myocardial infarction < 4months.
3. Unstable angina.
4. Congestive heart failure.
5. Inability to perform spirometry or six min walk test.
6. Unrelated life-threatening major illness (lung cancer, neurological disease).
7. The term pack years will be improper to apply for our study since majority of Indian population are beedi smokers and Indian cigarette packs are sold 10 in number per packet, where as in pack years 1pack = 20 cigarettes.

Results

A total of 130 patients including 100 patients with COPD as cases and 30 healthy individuals as controls were enrolled in the study. All the cases and controls were males. Among patients with COPD, there were 31 patients who had mild COPD with a BODE score between 0-2. Moderate (BODE score of 3-5) and severe COPD (BODE score more than or equal to 6) groups had 34 patients and 35 patients respectively.

Table 1: Age wise distribution in years

Group	N	Mean	Std. Deviation	Statistical Analysis
Control	30	53. 67	5. 701	
Mild (0-2)	31	54. 19	4. 881	F = 11. 538
Moderate (3-5)	34	56. 06	4. 362	p = <0.000
Severe (≥6)	35	59. 77	3. 789	Significant
Total	130	56. 06	5. 235	

The average age of participants in the study was 56.06 years. Among the COPD patients, BODE index was found to increase with age with the mild group having a mean age of 54.19 years, moderate group 56.06 years and the severe group with 59.77 years as the mean age. The difference was statistically significant with a p value of <0.0001.

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Table 2: Smoking status

Group	Smokers				Total	Pearson chi square test
	YES		No			
	N	%	N	%		
Control	14	%	1 6	53.3	30	2
Mild (0-2)	16	46.6	1 5	48. 31	31	X = 11.4
Moderate (3-5)	23	51.61	11	32. 36	34	P = 0.009
Severe (≥6)	29	67.64	6	17. 15	35	DF= 3
Total	82	82.85	48	36. 93	130	significant

The proportion of smokers was higher in the higher BODE index group compared to the lower index group. There was no significant difference between the control group and the lower BODE score group. Thus smoking status had a positive risk correlation with higher BODE index (P = 0.000).

Discussion

Chronic obstructive pulmonary disease (COPD) is one of the most common causes of disease burden both globally and in India. COPD may account for an estimated burden of about 100 million individuals in India. Prevalence rates varying from 2% to 22% in men and from 1.2% to 19% in women have been shown in different reports. COPD is predicted to be one among the most common killer diseases affecting a large number of individuals by the year 2020. In the recent past, more stress has been given to formulate a simple but effective index for assessing the severity of COPD. Researchers have found that BODE index would fulfil this necessity. But most of the research has been limited to finding the usefulness of the index in predicting the mortality and hospitalization in patients with COPD. In this study we tried to analyse and evaluate the BODE index, and its usefulness in predicating the severity of COPD in terms of hospitalization. The study has brought out many results which would have a significant impact in the management of COPD [5, 6].

Male patients were the only cases included in the study as the COPD is more common among the male patients. This was aimed at making the study group as uniform as possible. Such a selection would negate the differences in the BODE index among various patients studied, by removing the gender related differences in FEV1, BMI and patient perception of dyspnea.

Celli *et al*. [7] and Kian-Chung *et al*. [8] studies has proven that grouping of COPD patients into three groups with BODE scores 0-2 as first group (mild), 3-5 as second (moderate) and 6 or more as the third group (severe) correlates well with severity in terms of hospitalization and mortality. Hence, we accepted the same classification and grouped the cases as described above. Our study individuals were almost equally distributed in the various groups. In the study a total of 100 cases and 30 controls were analysed.

Increase of BODE score with increase with age was proven by Kian-Chung *et al*. and Celli *et al*. in their respective studies. This study also shows a significant increase in the severe and moderate group compared to controls. This could be due to the progression of COPD with age. However, results from a few other studies [9, 10] do not shows significant progression with age. This difference is mainly due to the fact that duration of smoking was not proportional to age in those groups unlike in our study.

Conclusion

Among the COPD patients, BODE index was found to increase with age with the mild group having a mean age of 54.19 years, moderate group 56.06 years and the severe group with 59.77 years as the mean age.

References

1. Mahajan M, Shah A, Francis S, Shah K. Bode index as a predictor of severity in patients with chronic obstructive pulmonary disease.
2. Phaneendra Kumar KS, Yugandhar P, Umesh Varma CA, Frank Mohan V, Satya Sri S. Assessment of Severity of COPD Based on Bode Index. Journal of Evolution of Medical and Dental Sciences. 2015;4(4):530-538.
3. Vijayan VK. Chronic obstructive pulmonary disease. Indian Journal of Medical Research. 2013;137(2):251-269.
4. Bellamy D, Booker R, Connellan S, Halpin D. Spirometry in practice: A practical guide to using spirometry in primary care (2nd Edn). The BTS OPD Consortium, Britsi Thoracic Society, 2005.
5. Global initiative for chronic obstructive lung disease. Pocket guide to COPD diagnosis, management and prevention, 2017 Aug. Available from www.goldcopd.com: accessed.
6. Roversi S, Corbetta L, Clini E. GOLD recommendations for COPD patients: toward a more personalized approach. BMC COPD Research and Practice. 2017;3:5.
7. World Health Organization. Chronic obstructive pulmonary disease (COPD) Fact sheet No 315.

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World Health Organization, 2011. Available from: http://www.who.int/mediacentre/factsheets/fs315/en/index.html.

8. Celli BR, Cote CG, Marin JM, *et al*. The body- mass index, airflow obstruction, dyspnoea and exercise capacity index in chronic obstructive pulmonary disease. N Engl. J Med. 2004;350:1005-12.
9. Davies A, Chua S, Lee C, Basquill C, *et al*. Global and regional estimates of COPD prevalence: Systematic review and meta-analysis. Journal of Global Health. 2015;5(2):020-415.
10. Jindal SK, Gupta D, Aggarwal AN. Guidelines for management of chronic obstructive pulmonary disease in India: a guide for physicians. Indian J Chest Dis Allied Sci. 2003-2004;46:137-93.

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