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Original Research Article

TO ASSESS THE USEFULNESS OF 6 MWT & SPIROMETRY FOR ASSESSMENT OF SEVERITY IN COPD PATIENTS.

Dr. Vinod Kumar Kurmi[1] (Senior Resident) & Dr. Kshitiz Chourasia[2] (Assistant Professor)

Department of Pulmonary Medicine, LNMC & JK Super Speciality Hospital Kolar Road, Bhopal, MP[1]

Department of Pulmonary Medicine, Venkateshwara Institute of Medical Sciences, Near Rajabpur, Gajraula, Distt. Amroha (U.P)[2]

Corresponding Author: Dr. Kshitiz Chourasia

Abstract

Background & Methods: The aim of the study is to assess the usefulness of 6 MWT & Spirometry for assessment of severity in COPD patients. In this study all patients of age >20 years are taken. The 6 Minute Walk Test is a sub-maximal exercise test used to assess aerobic capacity and endurance. The distance covered over a time of 6 minutes is used as the outcome by which to compare changes in performance capacity.

Results: The association between COPD Severity and 6MWT Grade of the respondents which found to be significant (P<0.05). It implies that of COPD Severity of patients differ significantly with the 6MWT Grade they had. Patients belonging to COPD Severity Group-A show highest percentage 58.8% for 6MWT Grade >=401 while, none for Grade <101. Patients belonging to COPD Severity Group-B show higher percentage 48.7% for 6MWT Grade 301-400 while, none for Grade <101. Patients belonging to COPD Severity Group-C show higher percentage 83.3% for 6MWT Grade 201-300 while, 16.7% for Grade 301-400. On the other hand, patients belonging to COPD Severity Group-D show higher percentage 59.1% for 6MWT Grade 101-200 while, none for Grade >=401.

Conclusion: On correlating 6 Minute walk test and Spirometry findings, it was found that patient with Mild COPD (GOLD group A), mean 6MWD was 385.29m. In Moderate COPD (GOLD group B) patients, mean 6MWD was 340.51m. In Severe COPD (GOLD group C) patients, mean 6MWD was 273.33m. In very severe COPD (GOLD group D) patients, mean 6MWD was 202.59m. On multiple comparisons, it was found that correlation between 6MWT and spirometry is statistically significant (p Value <0.05).

1. Introduction

Chronic Obstructive Pulmonary Disease is the fourth leading cause of death and therefore a disease of increasing public health importance around the world. Estimations of Global Initiative for Chronic Obstructive Lung Disease (GOLD) suggest that COPD will rise to the third most common cause of death worldwide by 2020. Not only a leading cause of death,

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following a late diagnosis of COPD, majority of the patients experience a temporary or permanent decrease in the quality of life.[1]

In this modern era smoking rate is high among young generation, still women using chulla in homes, industrial workers working unprecautionally in industries lead to early age Chronic Obstructive Pulmonary Disease (COPD) and increase the prevalence and mortality rate of COPD. [2]

Pathological changes characteristic of COPD are found in the central and peripheral airways, lung parenchyma and pulmonary vasculature. Chronic airflow limitation is attributed to the narrowing of the small airway lumen due to morphological changes and a decrease in lung elastic recoil due to parenchyma destruction[3].

At present, although pulmonary function testing (PFT) is still the accepted standard for the confirmation and clinical grading of COPD, the results can be affected by a patient's age and other health factors, and PFT is associated with a relatively large margin of error[4]. Furthermore, PFT may be normal in some patients in whom there are already abnormalities in small-airway function (diameter < 2 mm), especially in the early stage of the disease.

2. Material and Methods

Present study was conducted on 100 patients in the Department of TB and CHEST at Index Medical College, Research centre and Hospital, Indore, and all the tests will be perform with due permission from the Institutional Ethical Committee and informed consent from the subjects or their legal relatives. In this study all patients of age >20 years are taken. The 6 Minute Walk Test is a sub-maximal exercise test used to assess aerobic capacity and endurance. The distance covered over a time of 6 minutes is used as the outcome by which to compare changes in performance capacity.

INCLUSION CRITERIA

1. All confirmed cases of COPD.
2. Willing to participate and willing to give written consent.
3. Age >20 year.

EXCLUSION CRITERIA

1. Patient with very severe COPD cases who are not able to perform 6MWT and SPIROMETRY.
2. Patient with tuberculosis, and other secondary pulmonary infections.
3. Patient refusing to participate in the study.

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3. Result

Table 1: Age Distribution

Age Group	Frequency	Percent
30-40 Years	8	9.5
40-50 Years	25	29.8
50-60 Years	14	16.7
60-70 Years	21	25.0
>=70 Years	16	19.0
Total	**84**	**100.0**
MEAN ± SD	56.75 ± 13.82	

The above table shows the distribution of patients based on the their Age group. The majority of patients are of 40 years and above, with highest percentage of respondents i.e. 29.8% belonged to 40-50 years followed by 25% of respondents who belonged to 60-70 years, 19% belonged to >=70 years and 16.7% belonged to 50-60 years. Less number of patients are 9.5% in 30-40 Years which are of age of less than 40 years. The mean age of patients is 56.75 with SD of 13.82 years.

Table 2: Distribution on Basis of COPD Severity Group

COPD SEVERITY GROUP	Frequency	Percent
Group A	17	20.2
Group B	39	46.4
Group C	6	7.1
Group D	22	26.2
Total	**84**	**100.0**

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The above table shows the distribution of respondents based on the COPD Severity Group they belong to. The highest percentage of respondents i.e. 46.4% belonged to Group B followed by 26.2% of respondents who belonged to Group D, 20.2% belonged to Group A while, only 7.1% were of Group C.

Table 3: Distribution on Basis of 6MWT Grade

6MWT Grade	Frequency	Percent
<101	1	1.2
>=401	17	20.2
101-200	16	19.0
201-300	24	28.6
301-400	26	31.0
Total	84	100.0

The above table shows the distribution of respondents based on their 6MWT Grade. The highest percentage of respondents i.e. 31% had 6MWT Grade 301-400 followed by 28.6% of respondents who had Grade 201-300, 20.2% for Grade >=401 while, only 1.2% had Grade <101.

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Table 4: Association of 6MWT Grade and COPD Severity Group

6 MWT Grade		COPD SEVERITY GROUP				Total
		Group A	Group B	Group C	Group D	
<101	Count	0	0	0	1	1
	%	0.0%	0.0%	0.0%	4.5%	1.2%
101-200	Count	1	2	0	13	16
	%	5.9%	5.1%	0.0%	59.1%	19.0%
201-300	Count	3	11	5	5	24
	%	17.6%	28.2%	83.3%	22.7%	28.6%
301-400	Count	3	19	1	3	26
	%	17.6%	48.7%	16.7%	13.6%	31.0%
>=401	Count	10	7	0	0	17
	%	58.8%	17.9%	0.0%	0.0%	20.2%
Total	Count	17	39	6	22	84
	%	100.0%	100.0%	100.0%	100.0%	100.0%
Pearson Chi-Square		Value	Df	P Value	Result	
		61.017*	12	0.000	Significant	

The above table shows the association between COPD Severity and 6MWT Grade of the respondents which found to be significant (P<0.05). It implies that of COPD Severity of patients differ significantly with the 6MWT Grade they had. Patients belonging to COPD Severity Group-A show highest percentage 58.8% for 6MWT Grade >=401 while, none for Grade <101. Patients belonging to COPD Severity Group-B show higher percentage 48.7% for 6MWT Grade 301-400 while, none for Grade <101. Patients belonging to COPD Severity Group-C show higher percentage 83.3% for 6MWT Grade 201-300 while, 16.7% for Grade 301-400. On the other hand, patients belonging to COPD Severity Group-D show higher percentage 59.1% for 6MWT Grade 101-200 while, none for Grade >=401.

4. Discussion

Assessment of disease severity is important in the management of COPD. Presently severity is assessed by post-bronchodilator FEV1 (%predicted) as per GOLD guidelines. 6MWT can be a helpful tool in assessing severity of disease where spirometry is not available. The

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present study showed significant correlation of 6MWD and % 6MWD with spirometric and clinical indices (PEFR, FEV1, %FEV1, FVC) [5]

So assessing the disease severity and treating it appropriately is of utmost importance. GOLD advocated spirometric measurement of post-bronchodilator FEV1 for assessing the severity of COPD and thereby staging the disease and treatment as per staging. Spirometric test is costly and is not available in many resource-poor ends of India. Many studies conducted worldwide showed definite correlation between 6MWT with different spirometric indices. The 6MWT is a practical, simple, and easy to perform tool that provides a global assessment of functional capacity in patient with COPD[6]. It is also used for pre and postoperative evaluations in lung transplantation and lung volume reduction surgery. In addition, 6MWT is used to monitor the response to therapy and to predict the mortality and morbidity of patients with chronic respiratory disease like idiopathic pulmonary fibrosis, pulmonary artery, hypertension, and COPD.

The BODE index includes four variables (BMI, airway obstruction, dyspnea, and exercise capacity) that characterize the major alterations found in such patients. The BODE index contains a component each that quantifies obstructive disorder by FEV1 and that detects the perception of dyspnea. In addition there are two independent components which reflect the systemic consequences of COPD, and they are the distance covered on the 6MWT and the BMI. We found a significant negative correlation of 6MWT with BODE index in our study which implies that with increasing BODE index (i.e. with increasing severity of disease) there was decease in 6MWD. There in this way 6MWT also was able to predict severity of COPD[7].

Though BMI correlates well with severity of COPD as shown by Landbo *et al*., in their study, we did not find a strong correlation between BMI and 6MWD and this finding was comparable with the study done by Santana *et al*.[8]

In this study we demonstrated that 6MWT significantly correlated with absolute values of FEV1, and also with the BODE index. Thus, we conclude that 6MWT can replace spirometry in assessment of severity of COPD. But there are few limitations in our study such as no healthy person was taken as control and we could not compare 6MWD of study population with healthy control, post-bronchodilator 6MWT was not done in our study, but a previous study suggested that using inhaled bronchodilators prior to the 6MWTmight improve the results, episodes of COPD exacerbations were not considered during study as it may have effect on 6MWT.[9]

5. Conclusion

On correlating 6 Minute walk test and Spirometry findings, it was found that patient with Mild COPD (GOLD group A), mean 6MWD was 385.29m. In Moderate COPD (GOLD group B) patients, mean 6MWD was 340.51m. In Severe COPD (GOLD group C) patients, mean 6MWD was 273.33m. In very severe COPD (GOLD group D) patients, mean 6MWD was 202.59m. On multiple comparisons, it was found that correlation between 6MWT and spirometry is statistically significant (p Value <0.05).

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