ANALYSIS OF CORRELATION BETWEEN FEV1/FEV6 AND OXYGEN SATURATION DURING SIX-MINUTE WALK TEST (6MWT) IN COPD PATIENTS

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ABSTRACT:

Introduction: COPD is a leading cause of morbidity and mortality worldwide and it has a definite social and economic impact. World Health Organization (WHO) predicted that COPD will be the third leading cause of morbidity. So assessing the disease severity and treating it appropriately is of utmost importance. Methods: The population under study consisted of subjects referred to Chettinad Hospital and Research Institute in Department of Respiratory Medicine. We included male and female patients who were previously diagnosed as COPD by Pulmonary Function Test under the GOLD criteria and who are able to perform the manures. Result: This study shows that there is no significant correlation between the 6MWD and FEV1/FEV6 and there is positive significant correlation between the pre Spo2\% and post Spo2 \% of 6MWD. Conclusion: Six-minute walk test can be used as a simple test and used to assess functional exercise capacity.

Keywords: COPD, 6 minute walk test, lung function test


INTRODUCTION: Chronic obstructive pulmonary disease (COPD) is 3rd leading disease causing death all over the world and 9th most significant cause of life years lost [1]. The major feature of COPD is characterized by airflow limitation. The pathogenesis of COPD is chronic difficulty in airflow, abnormal inflammatory mechanism.
towards inhaled compounds and gases in the lungs. The smokers were more susceptible for inflammation and increases CD8+ T lymphocytes, neutrophils, and macrophages [2]. The CD8+ cells release tumor necrosis factor (TNF-α), perforins, and granzymes to activate the Fas–Fas ligand apoptotic pathway which promotes the apoptosis of alveolar epithelial cells with individuals with emphysema [3]. Hence, spirometry is an important tool for diagnosing and assessing its severity. The GOLD guidelines for assessing severity of COPD, not only considers airflow limitation but also involves assessing the everyday symptoms and exacerbation history. The Objective of the study was to correlate FEV1/FEV6 with 6MWD and to correlate oxygen saturation difference with 6MWD.

**METHODOLOGY:** The population under study consisted of subjects referred to Chettinad Hospital and Research Institute in Department of Respiratory Medicine. We included male and female patients who were previously diagnosed as COPD by Pulmonary Function Test under the GOLD criteria and who are able to perform the maneuvers. The patient’s height, weight and BMI values were calculated and marked. All the parameters and clinical details were recorded in a well prepared Performa. All subjects underwent the spirometry tests, in sitting position. The Six-second spirometry (vitalograph) was performed with Model 4000 COPD-6 device. Variables such as FEV1/FEV6, FEV6 and FEV1 were measured and computed. The patients underwent Six-minute walk test in indoor. The vitals (Spo2, Blood pressure, Pulse rate) were measured and noted before and after the test. The pretest Spo2 value and posttest Spo2 values were compared. The BORG scale (Dyspnea score) was measured. The computed FEV1/FEV6 value was compared with Six-minute walk test distance covered by the patients, pretest oxygen saturation and posttest oxygen saturation were compared in mild, moderate and sever COPD patients. BORG Scale is calculated to check the dyspnea score after the exertion and saturation (Spo2) is measured.

**RESULTS:** A total of 104 previously diagnosed COPD male and female subjects by GOLD criteria, more than 40 years of age, were recruited for this study. There was desaturation when the pre and post Spo2% of six-minute walk test is compared. The subjects had a mean age of 60.3 ± 10.5 years, mean height was 157 ± 9.15 cm, mean weight was 58.2 ± 10.9 kg, mean BMI was 23.5 ± 3.89 kg/m², mean FEV1/FEV6 was 0.69 ± 0.19 %, mean pre saturation was 96.9 ± 1.58 %, mean six-minute walk test distance was 269.28 ± 106.2 m and mean post saturation was 95.4 ± 0.19.

Table 1. The demographic details of participants
Table 2. COPD stage and association with clinical parameters

<table>
<thead>
<tr>
<th>COPD Classification</th>
<th>PRE VITALS- Spo2 (%)</th>
<th>POST VITALS- Spo2 (%)</th>
<th>FEV1</th>
<th>FEV6</th>
<th>FEV1/FEV6</th>
<th>FEV1 %</th>
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<td>Moderate</td>
<td>PRE VITALS- Spo2 (%)</td>
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<td>POST VITALS- Spo2 (%)</td>
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<td>.065</td>
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<td>.028</td>
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<tr>
<td></td>
<td>FEV1</td>
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<td>FEV6</td>
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<td>FEV1/FEV6</td>
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<tr>
<td></td>
<td>FEV1%</td>
<td>.002</td>
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<td>.212</td>
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DISCUSSION: According to GOLD guidelines spirometric measurement of post-bronchodilator FEV1% for assessing the severity of COPD and there by staging the disease and treatment. The spirometric maneuver for FEV6 were performed easily, and it satisfies the standard for repeatability and diagnostic accuracy. Thus, FEV6 could be a valid alternative to FVC for the diagnosis of COPD. Exercise induced desaturation can be measured in the 6MWT and is an index that has prognostic value in COPD and interstitial diseases. A ≥ 4% decrease in Spo2 suggests significant desaturation and is used for assessing the need for oxygen supplementation in patients with chronic lung disease. Another index of functional capacity is the 6MWD, which has prognostic value in COPD. However, hypoxemia were a major problem in respiratory medicine, since it is very common in patients with lung disease and must be rapidly assessed and treated to prevent irreversible organ damage. The use of FEV1/FVC were more time-consuming and more expensive than the use of FEV1/FEV6. Therefore, it is an ideal method for objective, diagnosing and following up respiratory disease in primary care center. This study shows that there is no significant correlation between the 6MWD and FEV1/FEV6 ratio.

CONCLUSION: FEV1/FEV6 showed no significant correlation between 6MWD. However the oxygen desaturation shows positive significant correlation with 6MWD FEV1/FEV6 by vitalograph can be used as a simple, easy, cost effective bedside test to diagnose COPD as an alternative to the conventional spirometry to detect undiagnosed airway obstruction in individuals with low expiratory effort especially in poor resource setting. Six-minute walk test can be used as a simple test and used to assess functional exercise capacity.

REFERENCES: