Study to find out the efficacy of 6 minute walk test in assessing response to medical intervention in chronic obstructive pulmonary disease patients

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Abstract

Background: Chronic obstructive pulmonary disease (COPD) is a lung condition which is a result of long term inflammation of the lung tissues, especially the airways. COPD manifests with respiratory symptoms like breathlessness, effort intolerance, cough with expectoration and in severe cases respiratory arrest, respiratory failure or heart failure.

Methods: We included 50 patients with stable COPD attending the outpatient department in the stipulated study period and diagnosis of COPD was established by clinical symptoms and spirometric data of ratio of FEV_1 and forced vital capacity (FVC) ≤ 0.7.

Results: The 6 minute walk distance (6MWD) of the patients were assessed once the health status of the patients have been stabilized. This was done under strict monitoring, just before discharge of the patient from the hospital. Participants aged less than 60 years had a 6MWD of 344 m while those aged above 60 years clocked 288 m. With regards to gender, males had significantly higher 6 MWD when compared to females.

Conclusions: 6MWT can be a useful replacement of spirometry in assessment of severity of COPD.

Keywords: Chronic obstructive pulmonary disease, six-minute walk test, spirometric indices, severity

Introduction

Chronic obstructive pulmonary disease (COPD) is a lung condition which is a result of long term inflammation of the lung tissues, especially the airways. COPD manifests with respiratory symptoms like breathlessness, effort intolerance, cough with expectoration and in severe cases respiratory arrest, respiratory failure or heart failure. The pathognomonic feature of COPD is the irreversible airway inflammation which is represented by a forced expiratory volume in 1 second/forced vital capacity ratio of less than 0.7. COPD is mostly caused by excessive smoking and often results in deterioration of the quality of living of the patients. [1]

Smoking cessation is the most important modality involved in control of COPDsymptoms. The mainstay of long term management is bronchodilators, and the choice between long acting adrenergic agents and anticholinergics depends on the patients' perception of

improvement in symptoms. Inhaled corticosteriods are used as adjuvant therapy if the symptoms persist even after adequate use of bronchodilators. Pulmonary rehabilitation through behavioral changes and increase in exercise capacity is also a priority in management of chronic obstructive pulmonary disease. [2] The accurate diagnosis of COPD has always been difficult due to the subjective nature of most investigations. Spirometry has been traditionally used as a method for diagnosis of COPD and also assessing the progression of disease and response to treatment. But American College of chest physicians and American thoracic society has recommended that spirometry should be used only in patients with respiratory systems and not for screening in apparently normal people.[3] Spirometry is also considered as a hugely subjective test with low reproducibility. The spirometry results depend heavily on the quality of the equipment, cooperation of the patient and also skill of the technician performing the test. Also, spirometry is a medical test and it may not indicate the patients' ability to perform activities of daily living and therefore, this test may not accurately reflect the improvement following treatment.[4] Other studies have shown that chronic obstructive pulmonary disease (COPD) is under diagnosed in primary care and the main reason is the under-utilization of spirometry. Cost of equipment, cumbersome testing procedure, lack of trained personnel and absence of a mobile testing equipment are cited as the main reasons for underutilization of spirometry in primary care settings. All this results in a delay in diagnosing the condition, making an early and effective intervention impossible.[5]

Methods

This was cross-sectional observational study. We included 50 patients with stable COPD attending the outpatient department in the stipulated study period and

diagnosis of COPD was established by clinical symptoms and spirometric data of ratio of FEV_1 and forced vital capacity (FVC) ≤ 0.7.

We excluded patients who had clinical or radiological evidence of pneumonia, blood pressure $\geq$ 180/100mmHg, and resting heart rate > 120/min prior to 6MWT, evidence of left ventricular failure (LVF), ischemic heart disease (IHD), or any major cardiac disease, neuromuscular disease of the lower extremities, peripheral vascular disease, and those who refused to give informed written consent for the study. The 6 minute walk test (6 MWT) was performed in a secured 30 meter straight corridor, situated inside the hospital campus. The patients were instructed to walk from end to end at their own pace, attempting to cover as much distance as possible. The 6 minute walk distance (6 MWD) was the primary measurement during the test, and dyspnea as measured using modified BORG scale was the secondary measurement. Later spirometric evaluation was done for all participants, with measurement of forced expiratory volume in 1 second (FEV1) and forced vital capacity (FVC), before and after administration of an inhaled bronchodilatory agent. The respiratory health and health linked quality of life of the patients were assessed using St. George's respiratory questionnaire (SGRQ), an international accepted tool designed for this specific purpose.

Results

Table 1: Socio-demographic variable

Socio-demographic variable	No of patients	Percentage
Age		
<60 Yrs	15	30.00
≥60 Yrs	35	70.00
Gender		
Male	38	76.00
Female	12	24.00

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A total of 50 patients admitted with primary diagnosis of chronic obstructive pulmonary disease (COPD) were included in the study. A majority (70.00%) of the participants were aged 60 years and above, and around 76.00% were males.

Table 2: Factor effected 6 minute walk distance

Variable	6 MWD	P-value
<60 Yrs	344±22.8 m	0.001
≥60 Yrs	288±21.4 m	
Male	310±20.76 m	0.001
Female	252±19.1 m	

The 6 minute walk distance (6MWD) of the patients were assessed once the health status of the patients have been stabilized. This was done under strict monitoring, just before discharge of the patient from the hospital. Participants aged less than 60 years had a 6MWD of 344 m while those aged above 60 years clocked 288 m. With regards to gender, males had significantly higher 6 MWD when compared to females.

Discussion

The study was done on patients with chronic obstructive pulmonary disease (COPD) who had achieved cardiopulmonary stability. The 6 minute walk distance (6MWD) was the primary modality which was measured. Age was a significant factor which determined the 6 MWD, with participants below 60 years of age performing significantly better than those aged 60 or above. A similar trend was observed in other studies also, with a report from Japan showing poor performance indicators as age progress.[6] A study done in Turkey also showed similar findings.[7]

Conclusions

6MWT can be a useful replacement of spirometry in assessment of severity of COPD

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