Full Length Research Paper

Dyspnea scoring in patients with COPD

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COPD is a progressive disorder diagnosed with recognition of the symptoms and spirometry. The parameters of spirometry are well defined in several guidelines. According to GOLD rearranged at 2004, a post bronchodilator FEV_1/FVC rate smaller than 70% is accepted as a diagnostic criterion for COPD. Symptoms are also important as well as spirometric evaluation. Indeed, these symptoms are the clinical representation of the present inflammation. Among symptoms, dyspnea is the most important one alarming the patient. So, classification of dyspne in a simple and objective way has a great value. In this study, we emphasized the presence of dyspnea in outpatients of our Chest Disease Department who smoked more than 10 pack/yr. Patients are classified into two groups as COPD and non-COPD group according to symptoms and spirometric evaluations. Each individual was expected to carry out a self-administered questionnaire for symptom scoring following spirometry. Presence of a rustling sound (A), preexisting pulmonary disease (B), and short of breath (C) were questioned and scored one by one. A, B, C and total ABC scores were significantly different in groups with and without COPD (p<0.001). Symptom scoring according to staging/stages in COPD group revealed that as COPD worsened A, B, C and total ABC scores increased. There was a significant difference regarding symptom scoring especially among patients without COPD and COPD patients at stage 2B and 3. As the patients reached higher scores, all of the spirometric parameters significantly decreased (p<0.001). It is important to explore and express dyspnea in the best possible way in order to avoid misdiagnosing and maltreatment.Examination of dyspne should not require administration of very complex questionnaires, moreover, with simple questionnaires it is possible to achieve reliable scoring.

Keywords: COPD, dyspnea, dyspnea scoring, symptom scoring, spirometry

INTRODUCTION

COPD is a chronically progressive inflammatory disease

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ABREVIATIONS

COPD: Chronic Obstructive Pulmonary Disease
GOLD: Global Initiative for Chronic Obstructive Lung Disease
FEV_1/FVC: Forced Expiratory Volume 1 second/Forced Vitaly Capacity
MRC: Medical Research Council

which is affected by individual and environmental factors (Gunnar et al., 2006). Various prevalence rates are reported in different age and occupation groups. Introduction of some different criteria is important at this discrepancy (Hidekazu et al., 2005).According to GOLD guidelines rearranged at 2004, a post bronchodilator FEV_1/FVC rate smaller than 70% is accepted as a diagnostic criterion for COPD. Meanwhile, pulmonary function test is a golden standard for the diagnosis of COPD (GOLD 2004).

COPD is becoming an important cause of mortality (Gunnar et al., 2006; Menezes et al., 2005). Causative airway inflammation clinically shows itself with cough, sputum production and dyspnea (Willemse et al., 2005). A significant relationship is demonstrated between these symptoms and mortality (Marrie et al., 2005). Among these symptoms especially dyspnea has critical importance for the patient and the physician. In this study, we emphasized the presence of dyspnea in outpatients of our Chest disease clinic who smoked more than 10 pack/yr. Dyspnea scoring assessments were made for an objective evaluation. FEV_1 presents information about severity of the airway obstruction. It is an important parameter for measuring the severity of COPD but the relationship between restriction of activity and exertional dyspnea is poor. Inspiratory capacity and other hyperinflation parameters are not measured in our department therefore we concluded that spirometric parameters may predict severity of COPD.

In order to determine if dyspnea is the consequence of COPD, the relationship is assessed considering the stages of COPD, spirometric parameters and symptom scoring between patients with and without COPD.

MATERIAL AND METHODS

966 (Female: 233; Male: 733) patients who had a history of smoking at least 10 pcks/yr presenting to the outpatient clinic of Chest disease in Training and Research Hospital between years 2004-2005 were included in the study. The study was approved by the ethical committee of the hospital. The recommendation for dyspnea scoring of GOLD 2004 was accepted as a questionnaire. Having provided an informed consent, name, age, gender, occupation, duration and amount of smoking, symptoms, were recorded. The participants were excluded in case of a thoracic, abdominal or eye surgery within last three months, hospitalization because of a cardiac problem, a gastrointestinal bleeding as well as obesity,active tuberculosis, pregnancy, a neurologic or psychiatric disorder and cooperation failure.

Spirometry was performed in the outpatient clinic with Jaeger 4.0 device for every included patient. Following 6-8 times of forced expiration, highest three values with a difference of maximum 150 ml were recorded and the highest one was accepted. The patients received 200 mcg of salbutamol and rested at a sitting position for 20 minutes and the test was repeated. All of the tests were performed while the patients were sitting erect with a nose clip applied. The reversibility test was performed according to our National Asthma Diagnosis and Treatment Guidelines-2000 in which 200 mcg of salbutamol or 500 mcg of terbutaline is recommended. Although international guidelines recommend the usage of 400 mcg short action beta agonist, the authors preferred to abide the national guidelines (Chronic Obstructive Lung Disease, Guidelines of Diagnosis and Treatment (2000), National Guidelines of Asthma Diagnosis and Treatment, 2000.

Spirometric results of the patients as well as the symptom scoring by the questionnaire derived from GOLD were recorded (Form 1).

One must remember that questionnaires are constructed to obtain requisite and statistically useful information from the respondents. Our patient population has low socio-economic status and education and most of them are illiterate.

In this regard, the questionnaire of GOLD provides satisfactory information for this type of patient. Although this is not a standardized questionnaire, we considered it precious since it is novel, simple, practical and applicable in every condition.

Respiratory Symptom Examination (Form 1)

A. Whistling

Have you ever heard of any rustling or whistling sound at your chest?

B. Any disorder related with a previous respiratory illness

Have you ever had any respiratory illness lasting for a week which limited your physical activities during the past 3 years?

C. Short of breath

1-Do you experience short of breath only at strenuous exercises?

2-Do you get short of breath when walking and/or slightly climbing?

3-Do you get short of breath while walking with your age and weight group? Or are you walking slower than before nowadays?

4-Do you have to rest or stop after walking or jogging on a straight road for a few minutes?

5-Do you get short of breath at simple daily activities like dressing or eating?

If the patient had a rustling respiration (A) or had a history of respiratory disease (B) during the past 3 years, the score was 1 since A and B consisted of a single question. Section C in which short of breath is inquired at the defined physical activities, consisted of five questions. Every affirmative answer for each question was scored as 1. The total score of C was defined according to the total number of affirmative answers. The cumulative total score (ABC) was then figured out.

The individuals who had FEV_1/FVC values less than 70% were diagnosed as COPD according to GOLD guidelines and were classified into 4 groups according to their FEV_1 values . The assessments were made by Oneway ANOVA, Univariate Analysis of Variance, Chi-Square, Independent-T and Pearson-Spearman correlation tests.

RESULTS

452 individuals were included in the COPD group and 514 in the group without COPD. The mean age of the individuals with and without COPD was 58.49±12.33 and 49.94±12.74 years, respectively. There was a statistical difference between two groups (p<0.001). Males were significantly more in the group with COPD.

There was a statistically significant difference regarding A, B, C and total ABC scores and spirometric parameters in patients with COPD. There was a decrease in spirometric parameters in questions scoring 1(p<0.001) (Table 1).

Symptom scoring according to staging/stages in COPD group revealed that as COPD worsened A, B, C and total ABC scores increased (Table 2).

As the patients reached higher scores, all of the spirometric parameters significantly decreased (p<0.001) (Tables 3, 4, 5).

Table 1. Spirometric parameters according to A scores in patients with COPD

	A score=0	A score=1	p
N	87	365	
FVC	3304.94±1122.18	2993.88±935.43	0.021
%FVC	93.39±24.29	83.41±21.83	<0.001
FEV_1	1931.38±803.22	1706.58±705.52	0.009
$\%FEV_1$	67.29±22.63	59.27±20.94	0.001
FEV_1/FVC	56.77±9.24	55.73±9.61	0.368
FEF_{25-75}	2535.68±1372.42	2157.10±1269.35	0.011
$\%FEF_{25-75}$	43.55±35.68	33.24±20.35	0.003

Table 2. All scores according to four COPD stages

	Mild COPD	Moderate COPD	Severe COPD	Very severe COPD	p
A score	0.71±0.46	0.81±0.39	0.87±0.34	0.81±0.40	0.002
B score	0.66±0.48	0.61±0.49	0.72±0.45	0.74±0.44	0.005
C score	2.8±1.21	3.04±1.11	3.53±0.89	3.68±0.79	<0.001
ABC score	4.16±1.62	4.43±1.53	5.12±1.08	5.19±1.08	<0.001

Table 3. Spirometric parameters according to B scores in patients with COPD

	B score=0	B score=1	P
N	155	297	
FVC	3198.39±1001.35	2978.28±962.57	0,028
%FVC	88.48±22.95	83.69±22.34	0.057
FEV_1	1837.23±707.67	1704.25±738.18	0.045
$\%FEV_1$	63.15±21.45	59.59±21.44	0.127
FEV_1/FVC	56.19±9.19	55.80±9.73	0.835
FEF_{25-75}	2380.84±1328.14	2151.23±1275.46	0.064
$\%FEF_{25-75}$	35.84±19.78	34.90±26.46	0.248

Table 4. Correlation with total C scores and spirometric parameters in patients with COPD

	Rs	p
FVC	-0.300	<0.001
%FVC	-0.255	<0.001
FEV_1	-0.347	<0.001
$\%FEV_1$	-0.297	<0.001
FEV_1/FVC	-0.250	<0.001
FEF_{25-75}	-0.345	<0.001
$\%FEF_{25-75}$	-0.309	<0.001

Table 5. Correlation with total ABC scores and spirometric parameters

	Rs	P
FVC	-0.298	<0.001
%FVC	-0.263	<0.001
FEV_1	-0.328	<0.001
$\%FEV_1$	-0.276	<0.001
FEV_1/FVC	-0.189	<0.001
FEF_{25-75}	-0.314	<0.001
$\%FEF_{25-75}$	-0.280	<0.001

DISCUSSION

The clinical presentation of chronic inflammation in COPD is cough, sputum production and dyspnea (Willemse et al., 2005). Dyspnea is an important symptom accompanying lung. It often agitates the patient and causes the physician to be alert. However, dyspnea is a subjective symptom; therefore, perception and expression of dyspnea differs among individuals. It is crucially important for a COPD patient to express dyspnea objectively. Thus, unnecessary anxiety may be prevented, while correct diagnosis and appropriate treatment schedule could be provided (Lareau et al., 1999) .

Relationship between spirometric parameters and dyspnea could not be demonstrated in many clinical trials. Lareau et al followed 34 COPD patients for five years and scored dyspnea. Although there was an important decline in pulmonary functions they could not demonstrate a parallel decline in dyspnea scores (Lareau et al). Ries's clinical trial did not show any correlations between objective pulmonary function values and dyspne scoring (Ries, 2006). Paula et al investigated whether there was a relationship between dyspnea and pulmonary function tests. They both confirmed that DLCO and plethysmographic measurements/values expressed dyspnea in the best objective way (Reishtein, 2005). The study of Jakeways et al demonstrated a relationship between low FEV_1 values and symptoms (Jakeways et al., 2003).

Leidy et al scored the symptoms of dyspnea, cough and sputum production of COPD patients in their study and concluded a relationship between symptom scoring and the severity of illness. This scoring is shown to be reliable (Leidy et al., 2003). Our study also revealed a significant relationship between symptom scoring and both spirometric parameters and severity of illness. We benefited from MRC scores and other reliable scores indeed. (GOLD 2009). Unfortunately inspiratory capacity and other hyperinflation parameters are not measured in our department. So, this is one of the limitations of our study.

The new inquiry form we were looking for our patient group should be reliable, simple and compatible with MRC and other reliable questionnaires. The questions directed should be simple and detailed; provide requisite and useful information from our group of patients. So, this questionnaire form was generally accepted by the authors.

In conclusion, it is important to explore and express dyspnea in the best possible way in order to avoid misdiagnosing and mistreatment. Examination of dyspne should not require administration of obscure questionnaires, moreover, with simple and detailed questionnaires it is possible to achieve reliable scoring. Certainly other reliable and generally accepted questionnaires may be used but different patient populations in different countries may require modified questionnaires. We suggest this questionnaire to be used especially in primary care units of rural areas where spirometric evaluation is inaccessible.

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