SCIE DOI: 10.14744/scie.2024.03525
South. Clin. Ist. Euras. 2024;35(4):329-335

Original Article

Assessing Dyspnea Measurement Methods and Functional Parameters in COPD

Fatma Işıl Uzel,[1] Burak Uzel[2]

[1]Department of Chest Diseases, Koç University School of Medicine, Istanbul, Türkiye
[2]Department of Internal Medicine, Çamlık Hospital, Istanbul, Türkiye

Submitted: 28.05.2024
Revised: 05.09.2024
Accepted: 02.10.2024

Correspondence: Fatma Işıl Uzel, Koç University School of Medicine, Istanbul, Türkiye
E-mail: uzelisil@gmail.com

Keywords: COPD; dyspnea measurement methods; functional assessment.

ABSTRACT

Objective: Dyspnea, a major symptom of COPD, reflects both physiological and psychological factors influencing a patient's health status. This study aimed to evaluate the correlation between clinical methods used to measure dyspnea and physiological measures in stable COPD patients.

Methods: A total of 25 stable COPD patients participated in this cross-sectional study, undergoing detailed pulmonary function tests (PFTs), a six-minute walking test, and dyspnea assessments using both indirect and direct methods. Indirect methods included the Turkish versions of the Oxygen Cost Diagram (OCD), Medical Research Council (MRC) Dyspnea Scale, and Baseline Dyspnea Index (BDI), while the direct method employed was the Turkish version of the Borg Dyspnea Scale. Statistical evaluation was made using Spearman's and Pearson correlation ranks, and r and p values were calculated. $p<0.05$ was considered statistically significant. All results were presented separately and as median±standard deviation (SD) for every patient.

Results: The median age of patients was 65 years. The mean values of PFT were FVC 74%±21, FEV1 53%±22, and FEV1/FVC 56%±11. The mean six-minute walking distance was 398±140 meters. Significant correlations were found between most dyspnea measurement methods and the six-minute walking distance, particularly with OCD ($r=0.659$, $p<0.01$), MRC ($r=-0.538$, $p<0.05$), and various BDI components. FVC also correlated significantly with several dyspnea measures.

Conclusion: We showed that different dyspnea measurement methods in COPD patients correlated well with spirometry and six-minute walking test results. OCD was strongly correlated with 6MWT, whereas mMRC and BDI were moderately correlated. There were moderate/weak correlations between OCD, BDI, Borg2, mMRC, and spirometric measures. Our results indicate that dyspnea measurements are components of COPD severity assessment, along with functional exercise capacity and spirometry, and are in alignment with the Global Initiative for Chronic Obstructive Lung Disease (GOLD) system.

INTRODUCTION

COPD is defined as chronic, slowly progressive airway obstruction, with spirometry being the accepted gold standard for diagnosing the disease. FEV1 measurement from spirometry is generally considered the best single predictor of mortality and is used for staging disease severity. However, the use of FEV1 as the primary evaluation parameter is often questioned. Due to the multidimensional nature of COPD and FEV1's low correlation with symptoms, there has long been a recognized need for better categorization and systematic evaluation of patients with COPD.[1]

On the other hand, dyspnea is the subjective perception of breathing discomfort arising from complex and multidimensional mechanisms. These include abnormalities in the respiratory control system, neurochemical receptors, ventilation, respiratory muscles, gas exchange, and more.[2]

When COPD patients become symptomatic, the major complaints are dyspnea, cough, fatigue, sleep disturbances, and exercise intolerance. Inactivity follows dyspnea, which results in physical deconditioning and worsening quality of life. Although a relationship between dyspnea and measurements of lung function does exist, no single physiological measurement (e.g., FEV1) can efficiently explain the various pathologies that cause dyspnea in patients with COPD.[3] Patients with the most severe airflow obstruction might be expected to experience the worst dyspnea, but patients with comparable levels of FEV1 can exhibit very different levels of dyspnea.[4]

This discrepancy between dyspnea amplitude and disease

severity has led to a growing interest in clinical assessment methods. There are globally three ways to clinically evaluate dyspnea:

1. Measurement of dyspnea during activities of daily living (indirect method).

2. Measurement of dyspnea during exercise testing (direct method).

3. The assessment of the effect of dyspnea on "health-related quality of life" using a disease-specific questionnaire.[5]

The aim of this cross-sectional study was to assess the correlation between clinical methods used to measure dyspnea and functional parameters and exercise testing in stable COPD patients, and to determine which methods better reflect the severity of COPD.

MATERIALS AND METHODS

This prospective cross-sectional investigation, carried out between January 2000 and May 2001, was in alignment with the Helsinki Declaration and Good Clinical Practice Guidelines.

Study Population

Twenty-five patients with known, stable COPD defined by the American Thoracic Society[6] were recruited for the study at the outpatient clinic.

Inclusion Criteria:

1. Smoking history of more than 10 pack-years.

2. No exacerbation history in the last 6 weeks.

3. FEV1/FVC ratio of less than 0.7.

4. No history suggestive of asthma.

5. <200 mL and <12% increase in FEV1 after bronchodilator.

6. Being literate.

7. No known cardiac failure.

Exclusion Criteria:

1. History of any other significant respiratory disease.

2. Recent myocardial infarction or unstable angina.

3. Severe musculoskeletal disorders limiting exercise.

4. Cognitive impairment.

5. Severe comorbidities that could affect study participation.

Measurements

After the diagnostic and differential diagnostic steps were completed, spirometry, lung volume measurements, diffusing capacity, and maximal inspiratory and expiratory pressures were measured with Vmax 22 Sensormedics. Six-minute walking test and evaluation of dyspnea using Turkish versions of indirect and direct methods were also performed. All eligible patients underwent these dyspnea assessment tests on the day of recruitment.

Dyspnea Evaluation Methods

1. Indirect Methods:

a. Oxygen Cost Diagram (OCD): This is a visual analog scale that correlates with oxygen requirements at various activity levels (e.g., sleeping, sitting, rapid walking, shopping). It is reported as a value ranging from zero to 100, with a score of 100 indicating no impairment.[7]

b. Modified Medical Research Council (mMRC) Dyspnea Scale: This is a five-point scale based on degrees of different physical activities that precipitate dyspnea. 0 indicates the best and 4 the worst state according to dyspnea sensation.[8]

c. Baseline Dyspnea Index (BDI): It was created to assess dyspnea at a specific moment. This assessment is conducted through a brief interview and includes evaluations of functional impairment (the extent to which daily activities are hindered), magnitude of effort (the total effort required to carry out activities), and magnitude of task. The BDI quantifies the patient's dyspnea in each dimension on a scale from 0 (no impairment) to 4 (severe).[9]

2. Direct Method:

Modified Borg Dyspnea Scale: This method evaluates dyspnea on a 10-point scale. 0 means no dyspnea, whereas 10 indicates the maximum degree of dyspnea. By applying this scale before (Borg 1) and after (Borg 2) the six-minute walking test, a direct measurement of dyspnea is made.[10]

All functional measurements were performed according to the standards defined by the ATS in 1994.[11] The detailed functional assessment included measurements of static lung volumes, diffusion capacity, and inspiratory and expiratory pressures.

Exercise capacity was evaluated using the six-minute walking test (6MWT) as described by ATS Statement 2002.[12] This test measures the distance that a patient can quickly walk on a flat, hard surface in 6 minutes (6MWD). The self-paced 6MWT evaluates the submaximal level of functional capacity. Most patients do not reach their maximum exercise capacity during the 6MWT. They determine their own exercise intensity and are allowed to stop and rest as needed during the test. Since most daily activities are carried out at submaximal exertion levels, the 6MWD may more accurately represent the functional exercise level required for everyday physical activities.[12]

The patients were asked to walk as much as they could in a 20 m hospital corridor. The test was terminated when severe symptoms such as intolerable dyspnea, chest pain, palpitation, or leg cramps appeared. Dyspnea was measured before and after the test using a modified Borg dyspnea scale. Walking distance was recorded in meters.[10,12] The same physician accompanied all the patients.

The GOLD guideline published in 2001[13] made a classification of COPD by severity depending on lung function test results. Patients were categorized as:

• Stage 0: Normal spirometry.

• Stage I (Mild): FEV1/FVC<70% and FEV1≥80%.

• Stage II (Moderate): FEV1<80% but ≥30%.

o Stage IIA: FEV1≥50% but <80%.

o Stage IIB: FEV1≥30% but <50%.

• Stage III (Severe): FEV1<30%.

Statistical Analysis:

Statistical evaluation was made with the NCSS 2000/PASS 2000 program using Spearman's and Pearson correlation ranks, and r and p values were calculated. p<0.05 was considered statistically significant. All results were presented separately and as median±standard deviation (SD) for every patient.

RESULTS

The median age of patients was 65±9 years, duration of disease was 9±6.6 years, the amount of cigarette smoking was 47.5±28.2 pack-years, and the duration of quitting smoking was 7±5 years. 7 (28%) of COPD patients were still smoking when they were recruited. 21 (84%) of the patients were men and 4 (16%) were women.

The detailed functional measurement results were for FVC 2491±741ml (74±21%), FEV1 1403±548 ml (53±22%), FEV1/FVC ratio 56±11%, DLco (ml/min/mmHg) 13.3±5.3 (55±20%), DLCO/VA (ml/mmHg/l/min) 3.4±0.9 (63±15%), FRC 4235±1162ml (129±30%), RV 3552±1154ml (156±46%), RV/TLC (%) 57±9, TLC 6176±1518ml (104±22%), MIP (cmH2O) 74±17 (78±27%), and MEP (cmH2O) 92±34 (49±15%), respectively.

The maximum and minimum values for FVC were 129% and 43%; for FEV1 108% and 21%; for FEV1/FVC 70% and 31%, respectively.

The patients were evaluated according to GOLD guideline 2001.[13] Three patients had mild (Stage I), 4 patients had severe (Stage III) COPD. The remaining 18 patients were in Stage II. 11 of them were fit for Stage IIA, 7 of them for Stage IIB.

The results of dyspnea measurement methods and exercise capacity are shown in Table 1.

FVC showed significant correlation with OCD (r=0.420, p<0.05), BDI functional impairment part (r=0.428, p<0.05), BDI magnitude of effort part (r=0.492, p<0.05), BDI magnitude of task part (r=0.473, p<0.05), BDI focal score (r=0.458, p<0.05) and Borg 2 (r=-0.544, p<0.01). It seems that while FVC decreases, the patients get more dyspneic according to both indirect and direct dyspnea measurement methods. Only the BDI magnitude of effort part has a positive correlation with FEV1 (r=0.460, p<0.05). As FEV1 declines, the patients get dyspneic in situations where less effort is demanded.

No correlation was detected between direct dyspnea measurement method (modified Borg dyspnea scale) and static lung volumes. The part of BDI that questions the magnitude of effort that causes dyspnea shows negative correlation with RV/TLC (r=-0.694) values. This means that increasing intrathoracic gas volume leads to dyspnea in smaller efforts.

6 minute walking test results have significant correlation with all the dyspnea measurement methods except BDI magnitude of task part and Borg dyspnea scale. OCD, BDI magnitude of effort part and BDI focal score had the most significant correlations. Table 2 shows the functional parameters that have significant correlation with dyspnea measurement methods and walking distance.

DISCUSSION

The most important result from the provided data is that Forced Vital Capacity (FVC) and Forced Expiratory Volume in 1 second (FEV1) show significant correlations with measures of dyspnea and functional impairment in patients. There is a significant correlation with OCD and

Table 1. Results of indirect and direct dyspnea measurement methods and exercise capacity

Parameter	Maximum	Minimum	Median±SD
Indirect Methods			
OCD (0-100 mm)	100	10	49±23
mMRC (0-4)	4	0	2±1
BDI Function (0-4)	4	0	3±1
BDI Task (0-4)	4	0	3±1
BDI Effort (0-4)	4	1	2±1
BDI Focal (0-12)	12	1	8±2
Direct Methods			
Walking Distance (m)	682.5	78	398±140
Borg 1	6	0	1±2
Borg 2	7	0	3±2

Abbreviations: SD: Standard deviation; OCD: Oxygen cost diagram; mMRC: Modified Medical Researc Council; BDI: Baseline Dyspnea Index.

Table 2. Correlation Between Dyspnea Measurement Methods, Functional Parameters, and Walking Distance (r values of correlation; *p<0.05, **p<0.01)

Parameter	FVC	FVC %	FEV1	RV/TLC	Walking Distance (m)
OCD	0.420*	0.408*	0.355	-0.140	0.659**
mMRC	-0.354	-0.188	-0.129	-0.073	-0.538*
BDI Function	0.428*	0.342	0.303	-0.157	0.532*
BDI Task	0.473*	0.309	0.401	-0.473	0.366
BDI Effort	0.492*	0.462*	0.460*	-0.694**	0.615**
BDI Focal	0.458*	0.378	0.407	-0.512*	0.543**
Borg 1	-0.291	-0.188	-0.233	0.289	0.024
Borg 2	-0.544**	-0.411	-0.405	0.136	-0.009

Abbreviations: SD: Standard deviation; OCD: Oxygen cost diagram; mMRC: Modified Medical Researc Council; BDI: Baseline Dyspnea Index.

walking distance and FVC, FVC%. Hajiro et al.[5] compared different dyspnea measurement methods and found the best correlation between OCD result and FEV1. On the other hand, Robinson et al.[14] investigated the relationship of respiratory drives to dyspnea and exercise performance in COPD patients. They used OCD as the only dyspnea measurement method and found no correlation between FEV1% or FVC% and OCD results.

In our study, OCD results failed in providing a clue about flow limitation. The correlation of OCD results and walking distance shows the value of this dyspnea measurement method in predicting exercise performance.

In our study, the Medical Research Council dyspnea scale (mMRC) shows correlation only with the walking distance. Walking distance reflects an aspect of exercise tolerance which plays a significant role in the quality of life. Hajiro et al.[15] compared the level of dyspnea versus disease severity in indicating the health-related quality of life of patients with COPD. They categorized the patients according to the level of dyspnea using the mMRC scale. They concluded that staging the disease based on FEV1 measurements fails in describing the quality of life when compared with staging according to dyspnea level.

This result, achieved in a large group of patients, suggests that breathlessness measured with mMRC and exercise capacity measured with a 6-minute walking test can reflect a better vision about the patients' general condition than FEV1 measurement only. Although we have not performed health-related quality of life measurement, our results are consistent with this view in the literature.

We found significant correlation between all components and focal score of BDI and FVC. BDI magnitude of effort component had correlation with FVC%, FEV1 and RV/TLC. Walking distance has significant correlation with BDI functional impairment, magnitude of effort components and BDI focal score.

Mahler et al.[9] presented BDI and TDI as new clinical indexes in measurement of dyspnea and compared them with older methods. The older methods examine mainly the magnitude of task that incites dyspnea and do not take the accompanying effort into consideration. Additionally, these methods do not evaluate functional impairment.

The visual analog scale as used in OCD measures the degree of dyspnea but is not enough to disclose all the factors that lead to breathlessness. In the study of Mahler et al.,[9] correlation was sought between dyspnea scores, spirometric measurements, and 12-minute walking test results. BDI focal score showed the best correlation with the 12-minute walking test results. It is weakly correlated with FVC and FEV1.

Foglio et al.[16] recruited COPD and asthma patients with chronic airway obstruction in their study. They reported age, hyperinflation expressed as RV/TLC ratio, and dyspnea measured with BDI scale to be three factors that affect exercise performance. They concluded that FEV1 was insufficient in predicting physiologic deterioration.

BDI, questioning the sensation of dyspnea on a larger scale than the other dyspnea measurement methods, has strong correlation with walking distance. It is also the only dyspnea measurement method that shows a correlation with RV/TLC, which reflects hyperinflation.

In our study, the BDI scale seems to be the most detailed method. It minimizes the subjectivity of the patient, as it is applied by the physician, which—in our opinion—strengthens its reliability.

Modified Borg dyspnea scale[10] principally does not differ from the OCD, which also relies on a visual analog scale. When the modified Borg dyspnea scale is used in combination with an exercise test like the 6-minute walking test, it can disclose the dyspnea generated during this exercise. As it measures dyspnea under observation during a particular exercise, it is categorized as a direct dyspnea measurement method.

In our study, no correlation is found between Borg 1, which reflects the dyspnea degree before the walking test, and lung function results as well as blood gas values. There is no correlation between Borg 1 and walking distance. Borg 2, which reflects the dyspnea degree after the walk-

ing test, has the only correlation with FVC. No correlation exists between blood gas values, walking distance, and Borg 2 results.

We would expect Borg 2 to have significant correlations with airway obstruction, inspiratory and expiratory muscle strength, and walking distance, as it is measured directly after completion of the walking test. Similarly, Hajiro et al.[5] found no correlation between the end-of-exercise Borg and all the functional parameters. It is possible that Borg applied after the exercise could reflect a different aspect of breathlessness.

We would expect but did not detect significant correlation between walking distance and modified Borg dyspnea scale results. As previously mentioned, walking distance shows significant correlation with all the indirect dyspnea measurement methods. OCD, BDI magnitude of effort, and BDI focal score have the most significant correlations.

Borg scale applied before the exercise evaluates the patient's breathlessness in a steady state independent from their functional capacity or muscle strength. Therefore, it is reasonable that this measurement has no correlation with the walking distance.

As many studies have shown inconsistent degrees of correlation between lung function parameters (e.g., FEV1) and measures of dyspnea, clinicians look for new relationships that could reflect the overall condition of the patients. As studies assessing dyspnea and quality of life in patients with chronic, stable COPD grow in number, measurement of short-term changes of these parameters following acute exacerbations is also gaining interest.[17]

A study that compares the effects of the degree of dyspnea and disease severity as evaluated by airway obstruction on the 5-year survival rate of patients with COPD ended in favor of dyspnea measurement. The categorization of patients with COPD based on the level of dyspnea was more discerning than staging of disease severity using the ATS guideline with respect to 5-year survival. It is advisable to include dyspnea as one of the parameters, in addition to airway obstruction, for evaluating patients with COPD in terms of mortality.[18]

Chhabra et al.[19] investigated the inter-relationships among commonly used scales to measure dyspnea—the mMRC grading, BDI, and OCD—in COPD patients. They found it to be moderately strong. In their study, the BDI and OCD scales were significantly associated with some of the measures of physiological impairment, while the mMRC grade was not.

This is also in accordance with our results, as mMRC shows the least correlation with lung function parameters. However, the mMRC grade found its place in the current GOLD staging of COPD as it is simple, easy to administer, and validated as a useful marker in COPD.

The Global Initiative for Chronic Obstructive Lung Disease (GOLD) was initiated in 1998 with the aim of producing recommendations for the management of COPD based on the best scientific findings. The first report, Global Strategy for the Diagnosis, Management and Prevention of COPD, was released in 2001.[13]

Growing evidence showed that the global evaluation of COPD patients considering functional status, quality of life, and dyspnea is crucial for the optimal management of disease. So, in the last version of the GOLD report—GOLD 2024,[20] we see the disease as a preventable and treatable lung condition which has many aspects.

Our study showed symptomatology reflected by dyspnea measurement scales in COPD patients correlated well with spirometry results.

Nowadays pulmonary rehabilitation programs are improved for achieving better quality of life for patients with chronic respiratory diseases. The aim of these programs is to improve the lung functions of the patients and to relieve the patient-reported outcomes (PROs). One of the most relevant of these outcomes is dyspnea.

New perspectives divide dyspnea into three dimensions: the impact dimension (ID), perception dimension (PD), and emotional dimension (ED). In the study of Molinier et al.,[21] the impact dimension of dyspnea was evaluated with the mMRC scale and was significantly and negatively correlated with FEV1 and baseline 6MWD. Though it was not associated with the two other dimensions (PD and ED) either at baseline or in terms of evolution of the rehabilitation program.

They concluded that the three dimensions of dyspnea should be taken into consideration when treating and rehabilitating COPD patients. This suggestion further supports our findings, which show the need for detailing and encompassing all the dimensions of symptoms and functional measurements in these patients.

As COPD continues to have progressive morbidity and high mortality, patient-reported outcomes are taken widely into consideration. A recent review by Afroz et al.[22] summarized COPD-specific PROs from randomized controlled trials of approved and widely used COPD drugs. They concluded that incorporating dyspnea measurement methods and quality of life measurement methods should be standardized when designing clinical trials. So the relevant PROs are also becoming more helpful in yielding the best benefits patients can achieve.

The present study has several limitations. First, with only 25 patients, the statistical analysis may not have detected some significant results. Second, the cross-sectional analysis does not consider the responsiveness of each measure over time. Third, the absence of a control group prevents extrapolation of the results to other disease groups.

Conclusion

In conclusion, in patients with lower vital capacity and higher intrathoracic gas volume, dyspnea sensation seems to be more pronounced generally. Exercise capacity of

these patients is also limited. The majority of the functional parameters show no correlation with direct and indirect dyspnea measurement methods. So they fail in giving an idea on how dyspneic a patient gets in daily life.

We saw that exercise tolerance, as evaluated using a 6-minute walking test, has significant correlation with almost all dyspnea measurement methods. This points out that dyspnea measurement methods can give useful information about exercise tolerance of COPD patients and serve as complementary tools in both the assessment as well as management of the disease.

The methods used for measuring dyspnea are promising and valuable tools for staging and monitoring COPD patients, as well as assessing their therapy modalities in relation to exercise tolerance. Although somewhat subjective, these dyspnea measurement methods are easy to perform and can serve as a complementary examination in the evaluation of COPD patients.

This study showed that dyspnea—the major symptom of COPD—and lung function tests, which guide the therapeutic decisions, have no significant correlation with each other. In an era where improving the health-related quality of life is a major target of medicine, there is a need for more prospective studies that focus on symptom relief.

Clinical Implications

The findings suggest that routine use of dyspnea scales can be valuable in the clinical management of COPD patients. These tools are easy to administer and can provide insights into the functional status beyond what is captured by spirometry alone.

Patients with a low vital capacity and a high intrathoracic gas volume experienced more breathlessness and had lower exercise tolerance. Although somewhat subjective, dyspnea measurements are easy to perform and can be used as complementary examinations in the follow-up of COPD patients.

Informed Consent

Retrospective study.

Peer-review

Externally peer-reviewed.

Authorship Contributions

Concept: F.I.U., B.U.; Design: F.I.U., B.U.; Supervision: B.U., F.I.U.; Fundings: F.I.U.; Materials: F.I.U.; Data collection &/or processing: F.I.U., B.U.; Analysis and/or interpretation: F.I.U., B.U.; Literature search: F.I.U., B.U.; Writing: F.I.U., B.U.; Critical review: F.I.U., B.U.

Conflict of Interest

None declared.

REFERENCES

1. Celli BR. The importance of spirometry in COPD and asthma: Effect on approach to management. Chest 2000;117:15S–9.[CrossRef]
2. American Thoracic Society. Dyspnea. Mechanisms, assessment, and management: A consensus statement. Am J Respir Crit Care Med 1999;159:321–40.[CrossRef]
3. Yusen R. What outcomes should be measured in patients with COPD? Chest 2001;119:327–8.[CrossRef]
4. Redelmeier DA, Goldstein RS, Min ST, Hyland RH. Spirometry and dyspnea in patients with COPD. When small differences mean little. Chest 1996;109:1163–8.[CrossRef]
5. Hajiro T, Nishimura K, Tsukino M, Ikeda A, Koyama H, Izumi T. Analysis of clinical methods used to evaluate dyspnea in patients with chronic obstructive pulmonary disease. Am J Respir Crit Care Med 1998;158:1185–9.[CrossRef]
6. American Thoracic Society. Standards for the diagnosis and care of patients with chronic obstructive pulmonary disease. Am J Respir Crit Care Med 1995;152:S77–121.
7. Simon PM, Schwartzstein RM, Weiss JW, Lahive K, Fencl V, Teghtsoonian M, et al. Distinguishable sensations of breathlessness induced in normal volunteers. Am Rev Respir Dis 1989;140:1021–7.[CrossRef]
8. National Health and Medical Research Council (Australia), Committee on Research into Chronic Bronchitis. Instructions for use of the questionnaire on respiratory symptoms. Devon, UK: WJ Holman; 1966.
9. Mahler DA, Weinberg DH, Wells CK, Feinstein AR. The measurement of dyspnea. Contents, interobserver agreement, and physiologic correlates of two new clinical indexes. Chest 1984;85:751–8.[CrossRef]
10. Borg GA. Psychophysical bases of perceived exertion. Med Sci Sports Exerc 1982;14:377–81.[CrossRef]
11. American Thoracic Society. Standardization of spirometry, 1994 update. Am J Respir Crit Care Med 1995;152:1107–36.[CrossRef]
12. ATS Committee on Proficiency Standards for Clinical Pulmonary Function Laboratories. ATS statement: Guidelines for the six-minute walk test. Am J Respir Crit Care Med 2002;166:111–7. Erratum in: Am J Respir Crit Care Med 2016;193:1185.[CrossRef]
13. Pauwels RA, Buist AS, Calverley PM, Jenkins CR, Hurd SS; GOLD Scientific Committee. Global strategy for the diagnosis, management, and prevention of chronic obstructive pulmonary disease. NHLBI/WHO global initiative for chronic obstructive lung disease (GOLD) workshop summary. Am J Respir Crit Care Med 2001;163:1256–76.[CrossRef]
14. Robinson RW, White DP, Zwillich CW. Relationship of respiratory drives to dyspnea and exercise performance in chronic obstructive pulmonary disease. Am Rev Respir Dis 1987;136:1084–90.[CrossRef]
15. Hajiro T, Nishimura K, Tsukino M, Ikeda A, Oga T, Izumi T. A comparison of the level of dyspnea vs disease severity in indicating the health-related quality of life of patients with COPD. Chest 1999;116:1632–7.[CrossRef]
16. Foglio K, Carone M, Pagani M, Bianchi L, Jones PW, Ambrosino N. Physiological and symptom determinants of exercise performance in patients with chronic airway obstruction. Respir Med 2000;94:256–63.[CrossRef]
17. Aaron SD, Vandemheen KL, Clinch JJ, Ahuja J, Brison RJ, Dickinson G, et al. Measurement of short-term changes in dyspnea and disease-specific quality of life following an acute COPD exacerbation. Chest 2002;121:688–96.[CrossRef]
18. Nishimura K, Izumi T, Tsukino M, Oga T. Dyspnea is a better predictor of 5-year survival than airway obstruction in patients with COPD. Chest 2002;121:1434–40.[CrossRef]
19. Chhabra SK, Gupta AK, Khuma MZ. Evaluation of three scales of dyspnea in chronic obstructive pulmonary disease. Ann Thorac Med 2009;4:128–32.[CrossRef]

20. Venkatesan P. GOLD COPD report: 2024 update. Lancet Respir Med 2024;12:15–6.[CrossRef]
21. Molinier V, Moine E, Caille P, Fernandes N, Alexandre F, Heraud N. Relevance of multidimensional dyspnea assessment in the context of pulmonary rehabilitation. Chron Respir Dis 2024;21:14799731241255135.[CrossRef]
22. Afroz N, Gutzwiller FS, Mackay AJ, Naujoks C, Patalano F, Kostikas K. Patient-reported outcomes (PROs) in COPD clinical trials: Trends and gaps. Int J Chron Obstruct Pulmon Dis 2020;15:1789–800. [CrossRef]

KOAH'ta Dispneyi Değerlendiren Yöntemlerin ve Fonksiyonel Parametrelerin Analizi

Amaç: Dispne, KOAH hastalarının en önemli yakınmalarından birisidir. Bu semptom, hastanın fonksiyonel sağlık durumunu gösteren fizyolojik ve psikolojik faktörlerin toplamıdır. Bu çalışmanın amacı, stabil KOAH hastalarında dispneyi ölçmek için kullanılan yöntemler ile fizyolojik ölçümler arasındaki ilişkiyi değerlendirmektir.

Gereç ve Yöntem: Bu kesitsel, prospektif çalışmaya toplam 25 stabil KOAH hastası alındı. Detaylı solunum fonksiyon testleri, altı dakika yürüme testi ve dolaylı ile doğrudan yöntemlerle dispne ölçümleri değerlendirildi. Dolaylı yöntemler, Türkçe versiyonları olan Oksijen Maliyet Diyagramı (OCD), Medical Research Council (mMRC) Dispne Ölçeği ve Başlangıç Dispne İndeksi (BDI) kullanılarak ölçüldü. Doğrudan yöntem olarak Borg Dispne Ölçeği Türkçe versiyonu kullanıldı. İstatistiksel değerlendirme için Spearman ve Pearson korelasyon testleri yapıldı. P<0.05 değeri istatistiksel olarak anlamlı kabul edildi. Tüm sonuçlar ayrı ayrı ve her hasta için medyan±standart sapma (SD) olarak sunuldu.

Bulgular: Hastaların medyan yaşı 65 idi. Ortalama FVC %74±21, FEV1 %53±22, FEV1/FVC %56±11 saptandı. Altı dakikalık yürüme mesafesi ortalama 398±140 metre olarak belirlendi. Çoğu dispne ölçüm yöntemi ile altı dakikalık yürüme mesafesi arasında, özellikle OCD (r=0.659, p<0.01), MRC (r=-0.538, p<0.05) ve çeşitli BDI bileşenleri ile anlamlı korelasyonlar bulundu. FVC çoğu dispne skalası ile anlamlı korelasyon gösterdi.

Sonuç: KOAH hastalarında farklı dispne ölçüm yöntemlerinin spirometri ve 6 dakikalık yürüme testi sonuçları ile iyi korelasyon gösterdiğini belirledik. OCD, 6MWT ile güçlü bir korelasyon gösterirken, mMRC ve BDI orta derecede korelasyon gösterdi. OCD, BDI, Borg2 ve mMRC ile spirometrik ölçümler arasında orta/zayıf korelasyonlar bulundu. Sonuçlarımız, dispne ölçümlerinin fonksiyonel egzersiz kapasitesi ve spirometri açısından KOAH'ın bileşenleri olduğunu ve bunun da Küresel Kronik Obstrüktif Akciğer Hastalığı Girişimi (GOLD) sistemi ile uyumlu olduğunu göstermektedir.

Anahtar Sözcükler: Dispne ölçüm yöntemleri; fonksiyonel değerlendirme; KOAH.