KARYA JOURNAL OF HEALTH SCIENCE

ATTACK PROFILE IN CHRONIC OBSTRUCTIVE PULMONARY DISEASE: A RETROSPECTIVE STUDY

KRONİK OBSTRÜKTİF AKCİĞER HASTALIĞINDA ATAK PROFİLİ: RETROSPEKTİF ÇALIŞMA

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ABSTRACT

Objective: Chronic obstructive pulmonary disease (COPD) is characterized by progressive airflow limitation and exacerbations causing severe mortality and morbidity. The aim of this study is to examine the various clinical characteristics and attack markers of patients who were hospitalized with the diagnosis of COPD exacerbation and followed up in the ward by a physiotherapist.

Method: 91 patients were included in the study, which was planned retrospectively. Sociodemographic and clinical characteristics of the patients, Modified Medical Research Board Dyspnoea Scale (mMRC), COPD Assessment Test (CAT), and COPD Combined Assessment Score (GOLD) values were obtained from the physiotherapy registry files.

Results: 73 of total 91 patients were male (80.2%) and 18 (19.8%) were female. The mean age of the patients was 72.49±10.10 years. The mean smoking level of the patients was 46.34±39.00 cigarette packs/year. According to GOLD, 34 were group B patients and 57 were group D patients. The mean CAT score was 23.05±8.22 and the mean mMRC score was 2.93±1.01. When the CAT and mMRC scores of the patients in Group B and D were analyzed, a statistically significant difference was found between the two groups (p<0.05). When the relationship between the diagnosis of COPD exacerbation and hospitalized patients' ages and duration of illness was analyzed with Pearson correlation analysis, no statistically significant correlation was found (p>0.05). When the relationship between the CAT and mMRC scores of the patients was analyzed, a statistically significant positive moderate correlation was found (p<0.05, r=0.669).

Conclusion: Sociodemographic, physical, and clinical characteristics are the factors that affect the attack profile of COPD, but disease duration and stage, CAT and mMRC score, and long-term oxygen therapy were found to be the main components of attack profile. We think that multidisciplinary approach is required for symptom control with close follow-up in patients who have attack.

Key Words: Chronic obstructive pulmonary disease, Hospitalization, Treatment, Rehabilitation

ÖZ

Amaç: Kronik obstrüktif akciğer hastalığı (KOAH), ciddi mortalite ve morbiditeye neden olan ilerleyici hava akımı kısıtlaması ile karakterize alevlenmelerle seyreden bir hastalıktır. Bu çalışmanın amacı KOAH alevlenme tanısı ile hastaneye yatışı yapılan, fizyoterapist tarafından serviste takibe alınan hastaların çeşitli klinik özelliklerinin ve atak belirteçlerinin incelenmesidir.

Yöntem: Retrospektif olarak planlanan çalışmaya 91 hasta dahil edildi. Hastaların sosyodemografik ve klinik özellikleri, Modifiye Medikal Araştırma Kurulu Dispne Skalası (mMRC), KOAH Değerlendirme Testi (CAT) ve KOAH Birleşik Değerlendirme Skoru (GOLD) değerleri fizyoterapi kayıt dosyalarından alındı.

Bulgular: Çalışmaya dahil edilen 91 hastanın 73'ü erkek (%80.2), 18'i (%19.8) kadındı. Hastaların yaş ortalaması 72.49±10.10 yıldı. Hastaların sigara tüketimi ortalama 46.34±39.00 paket/yıldı. GOLD'a göre 34'ü B grup hasta, 57'si ise D grup hastaydı. CAT skoru ortalaması 23.05±8.22 ve mMRC skoru ortalaması 2.93±1.01 olarak hesaplandı. Grup B ve D hastalarına ait CAT ve mMRC skorları incelendiğinde iki grup arasında istatistiksel olarak anlamlı fark saptandı (p<0.05). KOAH alevlenme tanısı ile yatan hastaların yaşları ve hastalık süreleri arasındaki ilişki Pearson korelasyon analizi ile incelendiğinde istatistiksel olarak anlamlı bir ilişki görülmedi (p>0.05). Hastaların CAT ve mMRC skorları arasındaki ilişki incelendiğinde istatistiksel olarak anlamlı pozitif yönlü orta düzeyde korelasyon saptandı (p<0.05, r=0.669).

Sonuç: Sosyodemografik, fiziksel ve klinik özellikler KOAH atak profilini etkileyen faktörler arasında yer alsa da; hastalık süresi ve evresi, CAT ve mMRC skoru ve uzun süreli oksijen tedavisinin atak profilini oluşturan temel bileşenler olduğu görülmüştür. Atak geçiren hastalarda yakın izlem ile semptom kontrolünün sağlanmasında multidisipliner yaklaşımın gerektiğini düşünmekteyiz.

Anahtar Kelimeler: Kronik obstrüktif akciğer hastalığı, Hospitalizasyon, Tedavi, Rehabilitasyon

INTRODUCTION

Chronic obstructive pulmonary disease (COPD) is a preventable and treatable disease that has high morbidity and mortality. It results in permanent obstruction depending on long-term exposure to harmful gases and particles due to abnormalities in the airway and alveoli [1]. The chronic inflammatory process that restricts the airflow develops because of toxic gases and particles, especially smoking [2]. When the etiology of COPD is analyzed, the multifactorial structure formed by factors that negatively affect the genetic predisposition, age, gender, atopic diseases, lung diseases such as chronic bronchitis, dust exposure, and intrauterine lung development takes attention [1]. According to the guideline published by the World Health Organization (WHO) in 2017, COPD ranks the 3rd among diseases that cause mortality [3]. In addition, it is reported that the prevalence of COPD in individuals over the age of 40 is approximately 20% and there are more than 65 million patients with a severe COPD diagnosis [4]. Around 3 million people die each year from COPD worldwide. It is predicted that the prevalence of the disease will increase due to the widespread smoking habits in developing countries and the increase in the geriatric population in developed countries, and deaths from COPD and related causes will exceed 4.5 million annually by 2030 [3].

Typical complaints seen in patients with COPD are dyspnea, cough, sputum and wheezing, and various methods are used in the diagnosis and clinical evaluation of the disease. The diagnosis of COPD is made by detailed examination of the patient's history, evaluation of symptoms, physical examination, radiological imaging, laboratory findings, and spirometric tests [5]. The Modified Medical Research Board Dyspnoea Scale (mMRC) and the COPD Assessment Test (CAT) are widely used worldwide to evaluate symptoms associated with COPD. According to the Global Initiative for Chronic Obstructive Lung Disease (GOLD) guideline, a unified assessment system based on the individual's symptoms and exacerbation history is recommended to guide treatment [6]. For this reason, the patient should not be evaluated only with spirometric values, but the present symptoms, exacerbation risk and the presence of comorbidities should be examined [7].

When the pathophysiology of COPD is examined, it is seen that exacerbations have a very important place in the prognosis of the disease. Exacerbations lead to sudden worsening of pulmonary symptoms and the need for additional medication. The exacerbations also cause an additional burden on the health system by negatively affecting the general health status and disease prognosis of the individual. Treatment options play a primary role in the classification of exacerbation severity. A patient, who is admitted to the emergency room or hospitalized due to exacerbation, is defined as a "severe exacerbation". It was stated in the GOLD 2020 report that exacerbations have an important place in the management of COPD [8]. In addition, exacerbations seriously affect the patient's quality of life and survival [1].

Each exacerbation in COPD increases both the frequency and severity of attacks by making the airways more sensitive. In patients with COPD, hospitalization with two or more exacerbations or at least one exacerbation increases the risk of exacerbation in the following years [9].

Because the disease affects many systems, a multidisciplinary approach is adopted in the treatment of COPD. Physiotherapists, who are members of this team, apply treatment approaches with pulmonary rehabilitation to reduce the respiratory workload of patients, alleviate their symptoms, increase their quality of life and physical/emotional participation in daily life activities [10]. It is thought that determining effective and applicable strategies in reducing the number of exacerbations and process management will help both to control the prognosis of the disease and alleviate the economic burden on the health system. The present retrospective study was planned to examine the various clinical characteristics and attack markers of patients who were hospitalized with a diagnosis of COPD exacerbation and included in the physiotherapy and rehabilitation program.

METHOD

The population of this descriptive and retrospective study consisted of patients with a diagnosis of COPD exacerbation who were hospitalized at the Chest Diseases Department of Muğla Sıtkı Koçman University Training and Research Hospital between July 2019 and July 2020. The patients which are being intubated, having a diagnosis of COPD and being hospitalized at the service other than exacerbation, discontinuing the physiotherapy program, being discharged before the clinical condition stabilized and the evaluation was completed, and exitus were excluded from this study. The study was completed by retrospectively examining the physiotherapy and rehabilitation records of patients kept by physiotherapists, and data obtained from the records of 91 patients who met the inclusion and exclusion criteria.

Outcome Measures

Data on the physical and sociodemographic characteristics of the patients such as gender, age, height, body weight, body mass index, occupation, occupational exposure histories, exercise and smoking habits were taken from the patient evaluation records made by physiotherapists. Within the scope of clinical evaluation, respiratory types, use of respiratory assistive devices, cough-sputum complaints, and perception of dyspnea via Visual Analog Scale (VAS) were examined. Other clinical features of the patients included in the routine evaluation processes before the physiotherapy program and the mMRC and CAT scores recommended by the GOLD guide to evaluate the symptoms of the patients were recorded.

The modified Medical Research Council (mMRC) Dyspnea Scale: This scale, which is used to evaluate the dyspnea level of the patient, was developed by Fletcher et al [11]. In this scale recommended for use by the GOLD and other national guidelines, the individual describes the difficulty experienced during breathing between 0-4, according to the expression corresponding to each score. An increase in the score indicates that the respiratory distress experienced is getting worse. It is a very easy-to-apply scale used in grading the dyspnea experienced by the individual in daily life activities [12].

COPD Assessment Test (CAT): The validity and reliability of this 8-question scale, which is used to evaluate the current health status of patients with COPD, has been shown in many languages [13]. In this scale, which evaluates the patient's cough, sputum, respiratory symptoms, sleep quality, fatigue and self-confidence in leaving home, each item is scored between 0-5 and the total score is obtained. Higher scores indicate the worsening of the clinical situation. One of the advantages of the scale is that it is very sensitive to changes in the patient's clinical condition. The Turkish validity and reliability of the scale was conducted by Yorgancıoğlu et al. in 2012 [14].

GOLD combined COPD assessment: According to the GOLD 2017 report in COPD staging, the severity of the disease is arranged according to the number of exacerbations and symptom levels. In combined assessment, mMRC or CAT score is used to examine the symptoms. In the light of the clinical data obtained, patients are divided into classes as A-B-C and D groups. The group of patients is determined according to their characteristics such as mMRC or CAT scores, number of exacerbations, and hospitalization history. For example, patients with COPD, whose symptoms have a distinct mMRC score of 2 and above or CAT score of 10 and above, constitute the B or D group in the combined evaluation [15]. In addition, group A means low risk, less symptoms; group B means low risk, more symptoms; group C means high risk, less symptoms and group D means high risk, more symptoms.

Statistical Analysis

Data were analyzed using the Statistical Package for the Social Science (SPSS) (version 22.0 for Windows). Quantitative variables were

described as mean±standard deviation, and qualitative variables as number and percentage (%). The Kolmogorov-Smirnov test was used to determine whether data were normally distributed or not. While relationship between continuous variables were analyzed by Pearson's correlation coefficient, relationship between categorical variables were analyzed by Spearman correlation. The correlation coefficient between 0.3 and 0.7 accepted a moderate correlation was indicated [16]. The Mann-Whitney U test was used to analyze the mean rank differences between categories of different variables, and the chi-square test was used to examine the relationship and dependency between the clinical features of Group B and Group D [9]. Statistical significance was set at 95% confidence interval (CI) and p<0.05.

Ethical Approval

Ethical approval was obtained from the Ethical Committee of Muğla Sıtkı Koçman University with the number of 18 (date: 10.21.2020).

RESULTS

Ninety-one patients (18 women and 73 men) with a mean age of 72.49±10.10 years were included in this study. The mean height of the patients was 1.67±0.07 m, the mean weight was 70.28±16.34 kg and the mean body mass index was 25.18±5.81 kg/m². When other characteristics of the patients were examined, it was seen that 59.3% were retired, 20.9% were working, 42.9% had occupational exposure history and 68.1% quit smoking. Smoking was calculated as a mean of 46.34±39.00 packs/year. It was determined that none of the 91 patients had exercise habits, 52.7% had a decrease in body weight, and 45.1% had nutritional problems.

It was observed that 73.6% of the patients hospitalized with the diagnosis of COPD exacerbation had acute lung infection and 54.9% of the infection was caused by pneumonia. It was determined that 64 of the patients did not have the pneumococcal vaccine. It was recorded that 50.5% of them used a nebulizer during the hospitalization process. When the respiratory types were examined, it was seen that 48.4% of them performed combined respiration. It was recorded that 93.4% of the patients had dyspnea and 94.5% of dyspnea perception occurred during activity. It was observed that 52 patients had orthopnea and used at least 2 pillows at night. When the cough and sputum complaints of the patients were examined, it was found that 68.1% had a productive cough and 72.5% increased at night. It was recorded that 74 patients had sputum complaints. When the type and amount of sputum were examined, it was determined that it was 40.7% mucoid type and approximately 1 tablespoon. The evaluation results of the patients based on inspection and palpation are presented in Table 1.

Table 1. Clinical characteristics of the patients

Physical examination findings	Positive n (%)	Negative n (%)
Peripheral cyanosis	12 (13.2)	79 (86.8)
Central cyanosis	6 (6.6)	85 (93.4)
Nasal flaring	16 (17.6)	75 (82.4)
Pursed-lipbreathing	28 (30.8)	63 (69.2)
Flapping tremor	25 (27.5)	66 (72.5)
Frog eyes	8 (8.8)	83 (91.2)
Auxiliary respiratory muscles activation	74 (81.3)	17 (18.7)
Barrel chest	23 (25.3)	68 (74.7)
Intercostal retraction	24 (26.4)	67 (73.6)
Respiratory alternans	19 (20.9)	72 (79.1)
Pretibial edema	22 (24.2)	69 (75.8)
Tracheal tug	23 (25.3)	68 (74.7)
Clubbing	21 (23.1)	70 (76.9)

All parameters presented in 95% confidence interval.

When the scales used for symptom evaluation in COPD were examined, it was seen that the mean CAT score was 23.05±8.22 and the mean mMRC score was 2.93±1.01.

When the functional staging of the patients included in the study was examined according to GOLD, it was seen that 34 (37%) were group B patients and 57 (63%) were group D patients.

When the CAT and mMRC scores of the patients in Group B and D were analyzed, a statistically significant difference was found between the two groups (p<0.001). Group D patients had higher both CAT and mMRC scores. Similarly, it was recorded that the disease duration was statistically longer in group D patients (p=0.021). Although the annual smoking level (pack count) of the patients in group D was higher, the difference was not statistically significant (p=0.28). It was observed that the need to use long-term oxygen therapy (LTOT) at home was statistically significant and higher in patients in group D (p=0.015). When the groups were compared with the chi-square test according to whether the vaccine was given, no statistically significant difference was found between the groups (p=0.52). The clinical characteristics of the two groups are given in Table 2.

Table 2. Examination the differences between the clinical characteristics of the groups

Clinical features	Group B (n)	Group D (n)	p value
Getting pneumococcal vaccine (x^2)	12	15	0.364
Getting flu vaccine (x^2)	8	22	0.139
Cough (x^2)	30	49	0.757
Sputum (x^2)	26	48	0.359

x^2: Chi-square

When the distribution of the ages of the patients by groups was examined, the mean age of the patients included in group B was 35.51 years, while this value was calculated as 52.25 years in group D. A statistically significant difference was found between the groups according to age factor (p=0.003).

When the relationship between the ages of the patients hospitalized with a diagnosis of COPD exacerbation and the duration of the disease was examined with Pearson correlation analysis, no statistically significant relationship was found (p=0.096, r=0.176). When the relationship between the CAT and mMRC scores of the patients was analyzed, a statistically significant positive modarate correlation was found (p<0.001; r=0.669).

When the perception of dyspnea of the included patients during rest and activity was questioned, the mean values were 1.63±1.68 and 6.29±2.38, respectively. When the relationship between the activity dyspnea perceptions and rest dyspnea perceptions of the patients was examined with Pearson correlation analysis, a statistically significant correlation was found (p<0.00; r=0.517).

There was no correlation between smoking level (pack count) and dyspnea perception of the patients (p=0.091; r=0.389).

DISCUSSION

Our retrospective study, which was planned to determine the attack profiles of patients admitted to the chest diseases service due to COPD exacerbation, was completed with data from 91 patient files. When the sample characteristics of our study were examined, it was seen that the majority of the population was composed of male patients. Smoking and occupational exposure, one of the strongest factors in the etiology of COPD, are more common in men [17].

In the literature, in a randomized controlled study hospitalized due to COPD exacerbation, it was reported that women hospitalized for

exacerbation were less [18]. Torres et al. stated that the mortality due to attacks was less in female gender in patients with COPD in their study [19]. The fact that the majority of the individuals, who were hospitalized in our study, were male, is similar to the literature.

It has been reported in the literature that many occupational groups with exposure to dust or smoke are associated with the development of COPD. However, there are limited studies on this subject in our country. In a study, COPD was detected in 18.7% of 219 workers over the age of 20 working in a cement factory [20]. The fact that the majority of the patients included in our study had a history of occupational exposure is similar to the literature.

Advanced age is indicated as a risk factor for hospitalization in severe exacerbations [21]. Soler Cataluna et al. conducted a research with 304 male patients, and reported that the severity of COPD attacks showed a significant correlation with the age of the patient in their study [22]. Patil et al. evaluated 71130 COPD attack cases and stated that advanced age had an important place among the patient characteristics determining the attack severity in their study [23]. Similarly, there are many studies in the literature emphasizing that a patient's age is important in relapse prognosis [24].

It has been reported that low BMI in patients with COPD is a risk factor for re-hospitalization [25]. Mitja Lainscak et al. in their study of 968 patients hospitalized with COPD exacerbation, they examined the mortality status of the patients. It has been reported that mortality is higher in patients with a BMI value below 25.08 [26]. In the study of Hyun Kim et al., it was observed that hospitalization was more frequent in patients with a BMI below 18.5 [27]. The mean BMI value of the patients included in our study was calculated as 25.18 ± 5.81 kg/m^2 and in this respect, it is in parallel with the literature.

It was observed that there was a change in the bodyweight of the patients included in the study towards weight loss. Although the reason for the change in the bodyweight of the patients is not certain, it can be explained as a result of the negative energy balance caused by the disruption of energy consumption mechanisms that develop in parallel with the increase in respiratory workload. In a study conducted in 2014, it was emphasized that many inflammatory markers were investigated to reveal the relationship between body composition changes and systemic inflammation. Although it is seen that the markers investigated may cause weight loss, it has been stated that it is not possible to fully explain weight loss [28].

When the relationship between smoking and COPD exacerbation is examined, it is believed that quitting smoking may prevent further damage because it causes irreversible changes in epithelial cells. The fact that the group who quit smoking constituted a large part of the sample in our study suggested that the patient education and lifestyle modification approach applied to these patients, who were in follow-up, was effective. When the literature is reviewed, it has been shown that the smoking cessation program applied provides a significant reduction in all-cause mortality in individuals with mild and moderate airway obstruction in a 5-year follow-up [29]. The higher amount of smoking in Group D patients in our study revealed that smoking was effective in the prognosis of the disease. In a study conducted in 2017, exacerbation risk factors were investigated and it was emphasized that smoking of patients with COPD is an important marker in predicting exacerbation [30].

In a multicenter ALPHABET study investigated in Turkey, according to the distribution of COPD patients of the GOLD unified evaluation group, it was seen that Group A patients were the most, followed by Group D patients [31]. In our study, it was found that there were more patients in Group D. This result can be explained by the fact that only patients hospitalized due to COPD exacerbation were included in our study and the risk of hospitalization in advanced-stage patients was higher.

Hacıevliyagil et al. examined the causes of COPD exacerbation in their study and found that the presence of pneumonia was an important factor [32]. Similarly, Rajesh et al. stated in their study that lower respiratory tract infections are important in determining the severity of attacks and the need for hospitalization in patients admitted to the emergency department with COPD attacks [33]. In another study in which 29 patients with COPD were included, it was found that the lower respiratory tract infection in 51.7% of the patients actually caused an exacerbation in the stable clinical Picture [34]. Papi et al. suggested that lower respiratory tract infections help predict COPD attack and exacerbation severity [35]. According to the results of our study, the vast majority of patients hospitalized with a diagnosis of COPD exacerbation had an acute lung infection and most of these patients had been diagnosed with pneumonia, which is similar to the literature.

It can be said that COPD exacerbation is defined as the period of dyspnea, cough and increased sputum in a clinically stable patient. It is noteworthy that the majority of patients during the attack period included in our study had a productive cough. In addition, 93.4% of the patients reported that they experienced shortness of breath, which is quite suitable for the determinants of COPD attack.

In our study, it was observed that mMRC and CAT scores used in symptom determination of patients with COPD showed a modarate relationship with each other. In a study conducted in 2013, the relationship between mMRC and CAT scores of 89 COPD patients was examined and a statistically significant strong correlation was found between them [36]. Similarly, in another study including 757 COPD patients, a statistically significant positive strong correlation was found between mMRC and CAT scores [37]. This result we obtained from our study is in parallel with the literature.

It has been reported that exacerbations are more severe in individuals who use LTOT at home and have concomitant diseases [38]. The fact that Group D patients had higher LTOT needs in our study showed that this finding is compatible with the literature. Similarly, findings indicating that the patient had respiratory distress during the physical examination are among the severe attack findings [39]. According to the results of our study, the use of auxiliary respiratory muscles by 74 patients proves that it is one of the attack markers.

According to the results of our study, advanced age, smoking, occupational exposure, duration and stage of the disease, CAT score, acute respiratory system infections, the need for use of respiratory assist devices, activation of auxiliary respiratory muscles, cough, sputum and dyspnea level were seen as the main markers of attack profile.

Limitations

Limitations of our study include that the patients' comorbidity, respiratory function test, arterial blood gas analysis, laboratory and radiological findings were not able to be addressed. Other limitations of our study are that it was performed as a single-centre study and that a relatively small sample group was included.

CONCLUSION

COPD exacerbations are one of the important reasons that play a role in the hospitalization of patients. Determining the clinical characteristics of patients hospitalized due to exacerbations will guide the development of applicable treatment strategies to reduce the frequency of attacks and the effects of attacks on patients. We consider that the main purpose of treatment should be to control the symptoms of individuals by reducing exacerbations, thus increasing independence, functionality and quality of life in daily life and reducing mortality and burden on the health system.

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