

Respiratory rehabilitation in healing depression and anxiety in COPD patients

Reabilitarea respiratorie în vindecarea depresiei și a anxietății la pacienții cu BPOC

Maria-Mădălina Bodescu¹, Adina Magdalena Turcanu², Maria-Cristina Gavrilăscu¹, T. Mihăescu²

1. Romanian Railways Hospital Iasi, 5th Medical and Geriatric-Gerontology Clinic, University of Medicine and Pharmacy "Gr.T.Popa" Iasi, Romania

2. University of Medicine and Pharmacy "Gr.T.Popa" Iasi, Romania, Clinic of Pulmonary Diseases Iasi, Romania

Corresponding author:
Prof. dr. Traian Mihăescu,
Pneumology Hospital Iasi
E-mail: traian@mihăescu.eu

Abstract

Chronic Obstructive Pulmonary Disease (COPD) is an inflammatory affection of the whole lung, characterized by an accelerated loss of the pulmonary functions, that reduces the patients' independence and stops them from having a normal, active life. The medical rehabilitation is considered "Third class rehabilitation", after preventive medicine and pharmaceutical medicine, and the respiratory rehabilitation recovery represents a complex structure of service addressing to patients with chronic pulmonary illnesses whose aim is to optimize the physical performances, psycho-social and autonomy.

Aim and objectives. The main objective of this study is to show the importance of respiratory rehabilitation that is correctly and timely made, based on the gravity and stage of the illness, the COPD patient's associated illnesses and their importance in improving the patient's mental and physical quality of life. Patients from the study were assigned a complex pulmonary rehabilitation regimen consisting of 10 physical exercise sessions and 10 educational sessions, for two weeks, followed by 3 physical education sessions and medical education per week, for six weeks.

Material and method. The research included 35 COPD patients from the 5th medical Geriatric and Gerontology Clinic during 1.03.2014-30.11.2014. Patients from the study were assigned a complex pulmonary rehabilitation regimen consisting of 10 physical exercise sessions and 10 educational session for two weeks, followed by 3 sessions a week for 6 weeks. The dyspnea evaluation was made by BORG and MRC dyspnea scales, the quality of life was measured by St. George and CAT questionnaires, and anxiety and anxiety and depression were quantified by Hamilton Anxiety Rating Scale (HARS) and Hamilton Depression Rating Scale (HDRS).

Results. The gradation of dyspnea on BORG scale was correlated with the variation of the expiratory capacity that varied at COPD patients, suggesting that hyperinflation has a major role in producing the dyspnea(5). The average score measurement was about 75.25 ± 5.9 . The positive effects of rehab were validated by decreasing the St. George score by 16% to the initial value. Respiratory rehab was an important way of treatment due to effort tolerance increasing and the patient's independence(6). Depression was significantly more pronounced in women ($Z=-1.876; p=0,039$). The little value of maximum respiratory volume per second (VEMS) was correlated to a bigger HARS and HDRS score.

Conclusions. The prevalence and importance of symptoms of anxiety and depression in COPD patients requires a specific questionnaire as routine screening procedure, for detecting early symptoms and preventing their progress.

Keywords: COPD, rehabilitation, physical exercise.

Rezumat

Introducere: Boala pulmonară cronic obstructivă (BPOC) este o patologie inflamatorie a plămânului, caracterizată prin pierderea accentuată a funcției respiratorii, ceea ce duce către scăderea independenței pacientului, împiedicându-l să aibă o viață normală. Reabilitarea medicală este considerată "a treia clasă de reabilitare" după medicina preventivă și cea farmacologică. Reabilitarea respiratorie reprezintă o structură complexă de servicii adresate pacientului cu boală cronică, având ca scop optimizarea performanțelor fizice, psiho-sociale și autonomia.

Scop și obiective: de a demonstra importanța reabilitării respiratorii bazată pe stadiul bolii, a comorbidităților și a importanței reintegrării în societate.

Material și metodă: studiul a inclus 35 de pacienți cu BPOC de la Centrul Geriatric și Gerontologic, Clinica V, din perioada 1.03.2014-30.11.2014. Pacienții din studiu au urmat un program alcătuit din 10 exerciții fizice și 10 ședințe educaționale pentru 2 săptămâni, apoi cu 3 ședințe educaționale pe săptămână, timp de 6 săptămâni. Scara BORG și MRC au fost utilizate pentru evaluarea dispneei, St George și CAT pentru calitatea vieții, Hamilton Anxiety Rating Scale (HARS) și Hamilton Depression Rating Scale (HDRS) pentru depresie și anxietate.

Rezultate: variațiile dispneei pe scala BORG s-au corelat cu capacitatea expiratorie a pacienților, sugerând că hiperinflația joacă un rol esențial în producerea dispneei. Media scorului a fost de $75,25 \pm 5,9$. Efectele pozitive ale reabilitării au fost corelate cu scăderea scorului chestionarului St George cu 16% a valorii inițiale. Prevalența depresiei a fost mai mare în populația feminină ($Z=-1,876; p=0,039$). Valoarea VEMS-ului a fost invers proporțională cu scorul obținut la HARS și HDRS.

Concluzii: prevalența simptomelor respiratorii și a anxietății la pacienții cu BPOC necesită utilizarea unor chestionare specifice ca o procedură de screening de rutină. Reabilitarea pulmonară s-a dovedit o metodă benefică de tratament.

Cuvinte-cheie: BPOC, reabilitare pulmonară, exercițiu fizic

Introduction

COPD is an affection characterized by partial reversible obstruction of the respiratory ways, according to GOLD guide⁽²⁾. The obstruction is usually progressive, with an abnormal inflammatory response to the fumes and gases associated to systemic manifestations^(1,10). Frequent comorbidities in COPD are: cardio-vascular diseases, pulmonary cancer, osteoporosis, depression and anxiety, muscular malfunction of the skeleton, metabolic syndrome.

Respiratory rehabilitation is a multidisciplinary program of treating patients with respiratory chronic disease and whose aim is to make the quality of life better by increasing physical activity, social reintegration and autonomy gaining. The rehabilitation programs can be used up to those with COPD major risk^(3,4,31).

The respiratory rehabilitation has three main components:

- Multidisciplinary –any rehabilitation program has the experience of many medical disciplines adapted to the patient's needs.
- Individual – focusing on the uniqueness of each patient and establishing realistic objectives.
- Psycho-social approach –with physical, psycho-social, emotional, and social implications.

The respiratory rehabilitation needs a multi-disciplinary approach, by using information and diagnosis techniques and therapy from more medical disciplines. The rehabilitation programs must be flexible, personalized for each patient, and also adapted to the patient's disability-individually^(25,26).

Main components of a PRP can be resumed like this: functional status evaluation, physical therapeutic exercise (aerobic exercise for enhancing the strengths and muscular tonicity), dosed training effort, pulmonary rehabilitation and re-education of airway clearance techniques (ACTS)⁽¹²⁾ (Osadmik et al. 2013), prevention and management of respiratory infections, correct use of oxygen-therapy systems, nutritional evaluation and specific interventions, psycho-social support, medical education^(11,32).

Purpose and objectives

The main professional guides used in current pneumology recognise the importance of rehabilitation in modern respiratory therapy^(14,17). The respiratory rehabilitation objective is not to cure the illness, but the patient, and that is extremely important^(19,27).

The challenge of rehabilitation is that it doesn't work on only one parameter, but also on the symptoms, the life quality and effort tolerance, psychological status^(20,22,31). In other words, for the patients it means a change in lifestyle^(15,16). The main positive effects of the rehabilitation are: the reduction of symptoms, the increase of effort tolerance, the improvement of quality of life, the reduction of time spent in hospital, with impact on the costs of healthcare^(18,23,33).

The primary objective of rehabilitation is to quickly return a patient's autonomy. This can be obtained by

making secondary morbidity better, making periferic muscular deconditionalisation reversible, the increase of respiratory force, and the decrease of the dispnea. Respiratory rehabilitation is recommended to any patient that suffers from pulmonary pathology whose quality of life is affected by respiratory symptoms. This is not a substitute for pharmacological therapy or other specific treatment, but acts as a complementary therapy.

Material and method

The research included 35 COPD patients from the 5th Geriatric and Gerontology Medical Clinic, during 1.03.2014-30.11.2014. The clinic and paraclinic parameters were met for each patient before and after the respiratory program.

The initial patient evaluation included: spirometry, body weight (kilos), waist (cm), width (cm), blood pressure, cardiac rate, body mass index (BMI) and BODE Index (BMI, Obstruction, Dyspnea, Exercise capacity). "The BODE Index is a composite marker of disease, taking into consideration the systemic nature of COPD. The evaluation of the dispnea was made by the use of BORG scale"⁽³²⁾.

The quality of life was measured with the St. George and COPD Assessment Test (CAT) questionnaires and anxiety and depression were quantified with Hamilton Anxiety Rating Scale (HARS) and Hamilton Depression Rating Scale (HDRS).

From the study group, patients that were A, B, and C risk classed were assigned a complex pulmonary rehabilitation, combining aerobic and training with resistance for 30-40 minutes. The patients from the D class (VEMS<50%, more than 2 exacerbations per year, with accentuated symptoms) benefited from daily sessions by increasing the length of time from 10 minutes to 20 minutes, with exercises of cough re-education, speaking, physical resistance exercises for the muscles of the arms and legs, and also abdominal breathing exercises^(9,10).

The program was composed of 10 sessions of physical exercise and 10 sessions of education, during 2 weeks that were during the hospitalization period, followed by 3 sessions a week for six weeks. Each patient had his physical exercise program, based on the COPD risk, and pre-program evaluation. The duration of a session was approximately 60 minutes, starting with 10 minutes of medical education, then 10 minutes of muscular training, 20-30 minutes of respiratory exercise and ten minutes of recovery. The therapeutic programme was not accompanied by psychological counseling.

The dates were inserted and compiled with the help of Microsoft Excell (Microsoft Corp) and the statistic programme SPSS17 (SPSS INC.). The results express plus or minus the standard deviation (SD). Statistical significance was considered at $p < 0.05$. Data were analyzed statistically descriptive, by calculating the following parameters: deviation of data from average, medium value of 95%, level of probability that introduced variables are contained. For emphasising the significant values of a parameter was used the T test in the data consisted of numbers.

Table 1 Paired Samples Test for the main studied parameters pre and post respiratory rehabilitation

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. deviation	Std. error mean	95% Confidence interval of the difference				
					Lower	Upper			
Pair 1	BORG before – BORG after	1.60	1.28	0.21	1.15	2.04	7.3	34	0
Pair 2	CAT before – CAT after	4.08	3.76	0.63	2.79	5.38	6.4	34	0
Pair 3	HARS before – HARS after	4.28	4.38	0.74	2.78	5.79	5.7	34	0
Pair 4	HDRS before – HDRS after	8.08	3.84	0.64	6.76	9.40	12.4	34	0
Pair 5	(SGRQ) after – (SGRQ) before	12.11	10.77	1.82	8.43	15.81	6.6	34	0

Results

After the initial spirometry confirmation there were 18 cases in COPD risk class A, 10 cases in COPD risk class B, 4 cases in COPD risk class C, and 3 cases in COPD risk class D. From these, 31 cases had COPD with pronounced chronic bronchitis and 4 cases of COPD with pronounced pulmonary emphysema.

In the studied group, the male patients were 62,4% ($p=0,029$). Analysing the group structure from the activity area perspective there is a significant number of retired people 62,8% (22 cases) ($p=0,008$). The average age was $63,36 \pm 10,2$ years (CI 95% 60.78–64.78; limits 40–72 years old). The maximum COPD incidence was at 60–69 years at about 38% of the cases (13 cases). The age group 40–49 is represented by 8,5% (3 cases) –the weakest represented, the 50–59 group has 28,2% of the patients (10 cases) and 25,4 % were over 70 ($p=0,0049$). We see that the 40–49 group of age is the weakest represented. In our group of patients, there were more COPD bronchitic patients, 88,5% (31 cases) ($p=0,001$).

Medium values of the BORG dyspnea scale for the

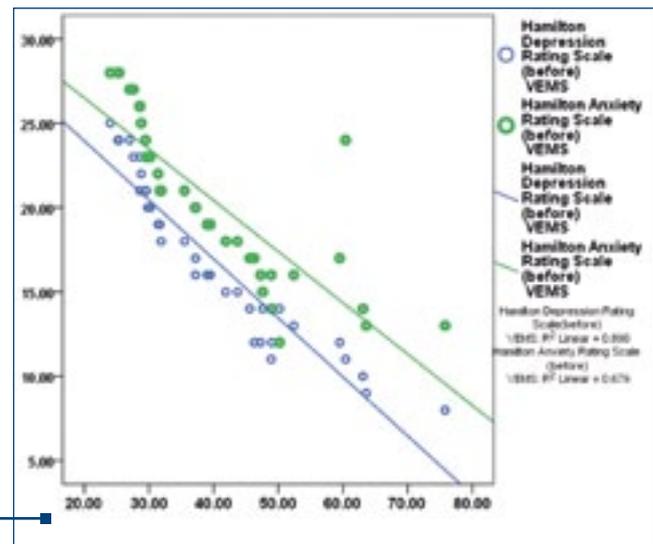
studied patients were between 6 and 8. There weren't identified significant differences at the BORG scale at men and women, or depending on the social medium and also the smokers and nonsmokers ($p=0,79$). The lower of the BORG scale after the rehabilitation sessions was 23,52%. The initial value $6.8 \pm 0,84$ units, the final value $5.2 \pm 0,77$ SD units, the difference being statistically different. ($p<0,001$).

An decrease of over 10 times was observed in the cases with 4 MRC (25 cases, 35.2%). Post rehabilitation there weren't in the 4 MRC grade more than 2 cases (2,8%). The risk that a patient is situated in the MRC pre rehabilitation was in the 4 class was 4,17 times higher compared to post rehabilitation (RR=4,167; 2.3874–7.2721; $p<0,001$).

The medium initial CAT value before rehabilitation was 24.06 ± 2.8 SD units, the value being 16,7% higher than the CAT medium value post rehabilitation, of 20.05 ± 1.8 SD units, the difference between them being significant (CI 95% 2.79 to 5,38; $p<0,001$).

The St George questionnaire was one of the tests

Figure 1. The graphic representation of the correlation between the HARS respectively HDRS and VEMS values before pulmonary rehabilitation.



used for evaluating the health at COPD patients. The measurement of the medium score was $75.25 \pm 1.8SD$ units, post rehabilitation $63.14 \pm 5.9SD$ units. the positive effects of rehabilitation were validated by the decrease of the St. George scale with 16 % to the initial value (CI 95% 8,43 to 15.81), difference validated by a high statistic ($p < 0.001$).

The BODE post rehabilitation dates was predominant in the 2nd class (18 cases-51.42%). The 1st class was predominant to women 55.4% and at men 52%. The respiratory rehabilitation has proved to be an important way of treatment with the effort tolerance increase and the patient's independence.

The medium HARS score was $10.6 \pm 3.8SD$ units (22.5% of the subjects had a scale > 0.17) pre rehabilitation. The positive rehabilitation effects were validated by decreasing the HARS score at an average of $6.3 \pm 1.9SD$ units, difference validated with a significant statistic ($p < 0.001$). the medium HDRS initial score was $19.02 \pm 3.6SD$ units with a significant improvement, the post rehabilitation average being $10.9 \pm 2.7SD$ units (20% of the subjects initial had a score ≥ 17), the difference validated with an important statistic difference ($p < 0.001$).

Depression was significant higher in women ($Z = -1.876; p = 0.039$). The smaller value of the maximum expiratory volume in a second (VEMS) was correlated to a higher HARS score and HRDS also ($p = -0.36, p = 0.032$ respectively $p = -0.621, p = 0.022$). The incidence of the anxiety symptoms and depression is higher at patients with more and longer times spent in hospitals.

The BORG dyspnea scale was one of the instruments that proved the improvement of the dyspnea after effort after a respiratory rehabilitation programme. There were no significant BORG differences for men and women or based on environment or smoking habits ($p = 0,79$). The BORG reduce after rehabilitation sessions was 23.52%.

The CAT questionnaire is a simple quantification test for the BPOC impact on patient and the doctor-patient communication; it's a complex and sensitive easy to make questionnaire that evaluates the impact of the disease on

the pulmonary status. The initial medium value of CAT before rehabilitation was $24.06 \pm 2.8SD$ units, 16.7 % bigger than the CAT value after rehabilitation.

The BODE value after respiratory rehabilitation is bigger in the second class (18 cases-51.42%). The first class has women 55.4% and 52.0% men. Respiratory rehabilitation has proved an important treatment with better tolerance in effort and the independence rate of patients.

Were reflected by the HARS score decrease at $6 \pm 1.9SD$ units difference with an important statistic ($p < 0.001$). the incidence of the anxiety and depression is bigger at patients with many and long stays in hospitals.

The predominance advanced III and IV disease stages shows a late diagnosis of the disease. Patients have 3 and over 3 exacerbation per year without a proper treatment and that requires a respiratory rehabilitation with physical exercise and educative sessions, joined with medicine treatment.

Discussions

COPD is a complex pathology, whose consequences are dyspnea, the reduce of effort capacity, tiredness. As the illness progresses, the patients can't do any physical effort, feel depressed and the self-esteem lowers. This decrease of the quality of life changes the patient's behavior. Almost 40% of the COPD patients suffer from cardiac affections, 10 % have diabetes, 17-42 % have high blood pressure, 2-19 % have osteoporosis –twice more than those with similar ages but without COPD. Anxiety is also frequent more frequent than at women without COPD. Along with the reduce quantity of oxygen at the brain, the negative emotional impact of this chronic, progressive handicaps producing disease has on patients^(22,21). "The symptoms of depression are frequent at BPOC patients, but the impact of affective disturbe on the therapeutic results weren't very studied until now", sais dr.Tze-Pin Ng and his team from the National University of Singapore in the article from

Reuters Health.

The prevalence and importance of the anxiety and depression symptoms at COPD patients requires a specific questionnaire as routine screening procedure, whose aim is to detect affective symptoms and preventing their progress. Education is an important component of each respiratory rehabilitation program that is needed but insufficient if used alone. It has proved the efficiency associated to an adequate program of physical exercises for people with chronic obstructive pulmonary disorders (COPD) that reduce the time spent in hospital, the exacerbation number, enhance compliance to the treatment, reduce dyspnea, anxiety, depression and make the quality of life better. The initial evaluation protocol of BPOC patient for including them in a respiratory rehabilitation is based on: anamnesis, demographic data, BORG dyspnea scale, CAT questionnaires, StGeorge and BODE.

The increase of smoking patients and overweight or obese requires that the rehabilitation work of the bronchitic patient starts with avoiding all external factors that can start, maintain or negatively influence the disease like: allergens, smoking, pollution, colds, eating habits and stopping smoking by special programs^(11,25). Physical exercise increase the effort capacity, improve

the muscular system and increase the survival rate^(8,12). Naji found, in a group of 26 patients with interstitial pulmonary illnesses, that went to rehabilitation for 8 weeks, a significant improvement of the dyspnea, of life quality, anxiety and depression, resistance to exercise, and also a decrease of the number of days spent in hospital. A multi-disciplinary respiratory rehabilitation programme, made ambulatory (3 sessions per week, for 7 weeks), made on a group of 10 patients with restrictive pulmonary disease, made to an important improvement of the dyspnea, effort on tolerance, depression. An ambulatory programme, of 7 weeks of rehabilitation, at patients with pulmonary neoplasm and BPOC associated and had a lung resection, had positive results on symptoms, tolerance and anxiety or depression.

Conclusions

The prevalence and importance of anxiety and depression symptoms at BPOC patients need a specific questionnaire as routine screening procedure, for detecting the symptoms faster and preventing their progress. At patients with BPOC that suffer of depression also was seen a less favorable rate of survival, that suggests that anti depressive treatment or psychologic at these patients can make clinical results better. ■

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