13 - ANALYSIS OF RESPIRATORY FUNCTION IN PATIENTS WITH CHRONIC OBSTRUCTIVE PULMONARY DISEASE SUBMITTED A PROTOCOL PHYSIOTHERAPY

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INTRODUCTION

The consensus of the literature studied patients with COPD require several days of hospitalization for decompensated disease or other conditions associated with it, increasing health care costs for public and private agencies.

To treat these patients, physiotherapy using an arsenal of therapeutic resources including aerobic exercise, that seeks to improve the conditioning of the muscles, increasing respiratory capacity and gas exchange, thereby decreasing muscle fatigue.

The assessment of respiratory function in these patients is necessary, the spirometry the gold standard for detecting the presence of airway obstruction and make definitive diagnosis of asthma and COPD, being a low-cost and non-invasive method. According Jardim (2009) Spirometry with obtaining the volume time curve is mandatory for the diagnosis should be performed in the stable phase of the disease, before and after the use of bronchodilators, where the most important points are observed forced vital capacity (FVC), forced volume in one second (FEV1) and the FEV1 / FVC ratio.

Therefore the objective of this study was to determine the effect of physiotherapy on pulmonary function of chronic obstructive patients by spirometry.

MATERIALS AND METHODS

This study is characterized with uncontrolled clinical trial, which was conducted at São Lucas/FAG Hospital in the city of Cascavel, PR, Brazil in the period June to October 2014.

To participate in this research was defined as inclusion criteria: the minimum age of 35 years and maximum age of 75 years, diagnosis of COPD, score 15 on the Glasgow Coma Scale, using of oxygen therapy or not. Exclusion criteria was established hemodynamic instability, heart disease such angina and atrioventricular block, Borg Scale greater than 7 points and disabling musculoskeletal conditions to perform correctly the proposed aerobic protocol.

When filled the inclusion criteria in this study, patients were informed about their participation, contribution and signature a Free and Clarifield Consent Term, being granted permission to the researcher on completion the work.

Participated in this study 6 patients who underwent rehabilitation for 8 sessions according to the protocol described below:

After hospitalization of patients and being clinically stabilized was given start the protocol of aerobic exercise and performed spirometry according to the technique recommended by the I Brazilian Consensus on Spirometry. Spirometer MICROLAB® model 3300 was used, tested and approved for this study, evaluated the forced vital capacity (FVC), forced expiratory volume in one second (FEV1) and peak expiratory flow (PEF) before and after exercise.

Patients were instructed to rest for five to ten minutes sitting in a chair and after was carefully described all procedures for the exercises. Before the start of the protocol was measured blood pressure, respiratory rate, heart rate, saturation of peripheral oxygen, and subjective effort by the Subjective Effort of Borg Scale. Blood pressure was measured with the patient sitting, feet on the floor and column resting on chair using the stethoscope Littmann Classic II ® and the sphygmomanometer More Fitnes®. Then use of pulse oximetry Oxyn® was measured resting heart rate and saturation of peripheral oxygen.

After the initial data collection, held a series of active stretching of the respiratory chain, being supported by 30-second in flexion, extension, rotation and lateral-flexion in the cervical region, and flexion, extension, adduction, abduction in the shoulder.

Subsequent to stretching, started aerobic exercises in upper limbs, using the dumbbells of 0.5 kg for female and 1 kg for male and lower limbs using shields for 1 kg for female and 2kg for male and for all individuals calisthenics exercises with monitoring of heart rate and saturation of peripheral oxygen.

The exercises had the following sequence of application: in upper limbs, patient in orthostatism and performed flexion/extension of elbow flexion/ extension, adduction/abduction, internal and external rotation of the shoulder. In the lower limbs, patient supine, performed flexion of hip, in lateral decubitus adduction and abduction of hip, in orthostatism extension of hip, in standing extension of knee. How calisthenics exercises was done squat and plantar flexion in orthostatism position, where all performed 2 sets of 10 repetitions, seeking muscular endurance and finally the cycle ergometer was held for a minimum of 2 minutes and maximum 10 minutes, oxygen was supplied to the patient who showed saturation less than 90% but hasn't interrupted exercise.

Patients with airway obstruction due the accumulation of secretions, bronchial hygiene associated with phreno labial were made before starting the protocol.

The end of the last session were all parameters measured in the first session and compared to having conclusion wheter has been improvement in capacity and ventilatory mechanics after the application of the Protocol.

To have an evidence of statistical probability about the protocol, the mean and standard deviation of the data was performed and analyzed using the Student t test for paired data analysis, considering P = <0.05 for statistical significance.

Table 1 presents data for patients evaluated with respect to order, age, sex, height, weight and BMI.

Table 1 - Characteristic of the sample

	AGE	SEX	HEIGHT	WEIGHT	BMI
Média	66	100% male	1,71	71,33	24,54
S.D	6,86		0,07	11,91	3,77

S. D – Standard Deviation

RESULTS

The sample consisted of 6 patients with a diagnosis of chronic obstructive pulmonary disease which had evaluated ventilatory function by spirometry before and after initiation of the protocol proposed aerobic exercises that were part of pulmonary rehabilitation in the hospital phase.

After completion of protocol and data tabulation had the following spirometric values shown below in Table II.

Tabela 2 – espirometric data

	Spirometry PEF		Spirometry CVF		Spirometry VEF1		Spirometry TIFFENAU	
	1° AV.	2° AV.	1° AV.	2° AV.	1° AV.	2° AV.	1° AV.	2° AV.
Mean	42,33	51,67	42,67	50,50	34,77	53,40	16,87	32,56
S.D	8,14	13,46	13,95	12,31	19,37	17,64	22,41	27,02
P value	0,15		0,327		0,11		0,45	

PEF: peak expiratory flow; CVF: forced vital capacity; VEF1: expiratory volume in one second; S.D: standard devitation.

DISCUSSION

Several scholars have developed work over the years, in order to prove the importance of achievement aerobic exercise in hospitals, shortening thus the time hospitalization for chronic obstructive pacients, thereby causing a reduction in spending on health and morbidity caused by the hospitalization.

For Belman, MJ, et al. (1981), patients with chronic obstructive pulmonary disease have on the course of their disease worsening pulmonar capacity and therefore difficult to perform activities of daily living. Therefore the physicaltherapy and exercise, has aimed to improve the functional physical capacity of these patients and is considered the gold standard in the treatment of these patients.

According Jardim J.R, et al. (2009) chronic obstructive pulmonary disease is a serious problem with public health where many people have varying degrees of dyspnea and difficulty to exercises due impaired pulmonary and cardiovascular function, several years suffering from this disease and die of their complications.

According Zuninga, RV and Godoy, I. et al (2004), the exercise intolerance is a common manifestation in patients with COPD. This fact has been attributed exclusively to the respiratory disorder that these individuals present; however, currently it has been shown that peripheral skeletal muscle dysfunction is important for decreasing tolerance exercise in this population. These data corroborate those found in this study, where observe spirometric values below that predicted in this group of patients.

The use of aerobic exercise seeks to improve the conditioning of the muscles, increasing respiratory capacity and gas exchange, reducing muscle fatigue, encompassing the training of the upper limbs, lower limbs, shoulder girdle, being that training of upper limbs requires more cardiovascular work, more associated with dyspnea.

According Lazio, A. (2009), a relationship between the forced expiratory volume in one second (FEV1) on forced vital capacity (FVC) - FEV1 / / FVC -, can be considered as a good indicator of the disease, but not is a good indicator to detect differences after rehabilitation programs. The GOLD criteria is more specific and allows to evaluate the degree of disease severity. The consensus of pulmonary rehabilitation suggest that physical training of patients is based on the improvement in aerobic capacity and are rare exercises evaluating a specific approach on the alterations of the chest and thoracic muscles

In a study by Robinson, SL and Veigas, CA (2002), aimed to determine the correlation between respiratory function test and the walk test for 6 minutes in 45 patients with chronic obstructive pulmonary disease being obtained statistically positive improvement in spirometry where we observe mean FEV1 of 46 ± 22% predicted, ranging between 17% and maximum 121%. The FVC was 70 ± 29% predicted, with a minimum of 26% and a maximum of 178%. In the FEV1 / FVC% ratio, we observe the average value of 54 ± 13%, with a minimum of 32% and maximum 78%. Disagreeing with the data found by Veiga and in our study was the average FEV1 34.77%, the average was 42% FVC and FEV1 / FVC% average was 16%.

To Kunikoshita, L.N. et al. (2006), evaluated three physicaltherapy programs consist of physical training on treadmill or respiratory muscle training physical training and more training of the respiratory muscles, where none of the respiratory therapy program, proposed in this study was effective to provide improvements in measured spirometric variables (FEV1, FVC, PEF and FEV1 / FVC). However, these data are consistent with much of the current literature has reported that despite the spirometry be an important technique for determining the degree of obstruction, it hasn't been effective to detect differences in rehabilitation programs. Corroborate the data found by the above author in our research, where found improvements in spirometric but without statistical significance.

Ribeiro, K.P. et al. (2007) 2 conducted a study in the outpatient of physicaltherapy clinic from the University of Taubaté, with 19 patients in two groups RR (respiratory rehabilitation) and IMT (inspiratory muscle training) which assessed the spirometry and the walk test 6 minutes for six weeks with three weekly sessions, the RR group showed significant increase $p < 0.05$ in FEV1 and PEF variables after the pulmonary rehabilitation program. The group that performed TMI + RR showed no significant improvement in any of the test variables, both obtained a significant increase ($p < 0.05$) of the distance walked during the test, as in our study cant statistically prove this improvement due to sample be bounded.

According to Dourado, V. et al, (2009) in a study of 47 patients of which 35 completed the survey, were divided into two groups, where a group was constituted by muscle strength testing (TF) and the other was muscles strength testing followed walk teste 6-minute (TC). After the end of the protocol no group showed significant changes in body composition, but showed improvement on individual quality of life and improved values of FEV1, PaO2, FEV1/FVC, which in our study we also observed these changes in individual spirometricvalues .

For Paulin, E. et al (2003) in a study conducted over two months with 30 patients divided into two groups, control group where it was oriented and the treated group was subjected to an exercise protocol, showed a statistically significant improvement in FEV1, FVC and peak expiratory flow, where the group that only received oriented showed no striking changes in spirometric values.

Moreira, MAC et.al, (2001), in a study with 23 patients in pulmonary rehabilitation protocol with aerobic activities and strengthening of isolated appendicular skeletal muscle in relation to assessment of the TC6, the results showed that evaluated, respiratory rate and peripheral saturation where no significant difference in pre-and post-training at the beginning and the end of TC6. The RR increased significantly at the end of the test after training ($p = 0.035$). Already in our study, changes of heart rate, respiratory, or even the saturation of peripheral oxygen didn't reach statistical significance, even after the use of aerobic cycle ergometer. Can be considered that the intensity of the training protocol the Moreira et.al. (2001)were established at 60% incremental test, thus requiring more aerobic part the patient.

The authors are chords to tell importance of physical activity in chronic obstructive patients, it helps in rehabilitation, relief of symptoms in the performance of activities of daily living, besides obtain an improvement in the functionality thereby contributing to the maintenance of quality of life.

CONCLUSION

We therefore conclude by analyzing spirometric, improvement in FEV1, PEF, FVC, and relationship Tiffeneau after applying a protocol of aerobic exercise in patients with chronic obstructive pulmonary disease, however these changes in the variables weren't statistically significant.

REFERENCES

BELMAN, M.J, KENDREGAN B.A. Exercise training fails to increase skeletal muscle enzymes in patients with chronic obstructive pulmonary disease.AmRevRespirDis1981;123:256-261. Acesso em 21 setembro de 2014.

CARNEIRO, João. E. Reabilitação pulmonar e qualidade de vida em pacientes DPOC. Disponível em<www.sociedadeclementeferreira.org.br/.../REABILITACAO_PULMONAR_E_QUALIDADE _DE_VIDA_EM_PACIENTE_ DPOC>. Acesso em 21 julho de 2014.

DOURADO, Vitor, GODOY, I. Fatores associados a diferença clinicamente significativa da qualidade de vida relacionada a saúde após condicionamento físico em pacientes com DPOC. 2009 Disponível em <http://www.scielo.br/pdf/jbpneu/v35n9/v35n9a05.pdf>. Acesso em 23 agosto de 2014

DOURADO, Vitor. Recondicionamento muscular na DPOC: principais intervenções enovas tendências. Disponível em <http://www.scielo.br/pdf/rbme/v10n4/22049.pdf> Acesso em 7 junho de 2014.

JARDIM, JOSE.R. Doença pulmonar obstrutiva crônica. Disponível em <http://www.moreirajr.com.br/revistas.asp?id_materia=4195&fase=imprime> Acesso em 2 junho de 2014.

JHONSON, Sérgio A. Treinamento em musculatura respiratória. Disponível www.scielo.oces.mctes.pt/scielo.php?pid=S087321592009000600008&script=sci_arttext Acesso em 15 julho de 2014.

KUNIKOSHITA, L.N. Efeitos de Três Programas de Fisioterapia Respiratória (PFR) em Portadores de DPOC.Disponível em: <http://www.scielo.br/pdf/rbfis/v10n4/13.pdf.> Acesso em 16 de janeiro de 2014.

LAZIO, A. Doença pulmonar obstrutiva crónica – Uma revisão. Revista Portuguesa de Pneumologia, Vol XV N.º 6 nov/dez 2009. Acesso em 20 agosto de 2014.

MOREIRA, M.A.C.Teste da caminhada de seis minutos em pacientes com DPOC durante programa de reabilitação. Disponível em <http://www.scielo.br/pdf/jpneu/v27n6/a02v27n6.pdf>. Acesso em 18 de janeiro de 2014.

NEDER, José. A. Reabilitação pulmonar: fatores relacionados ao ganho aeróbio de pacientes com DPOC. Disponível em <HTTP://jornaldepneumologia.com.br/audiencia_pdf.asp?aid2=236>. Acesso em 18 de julho de 2014.

PAULIN, Eliane; BRUNETTO, Antonio. F; CARVALHO, Celso.R.F. Efeitos de programa de exercícios físicos direcionado ao aumento da mobilidade torácica em pacientes portadores de doença pulmonar obstrutiva crônica 2003. Disponível em <http://www.scielo.br/pdf/jpneu/v29n5/v29n5a07.pdf>. Acesso em 20 de julho de 2014

RIBEIRO, Karla. P. Treinamento muscular inspiratório na reabilitação de pacientes com DPOC. Disponível em <http://www.unimep.br/phpg/editora/revistaspdf/Saude22.pdf#page=39>. Acesso em 2 de junho de 2014.

RODRIGUES, S.L. Estudo de correlação entre provas funcionais respiratórias e o teste de caminhada de seis minutos em pacientesportadores de doença pulmonar obstrutiva crônica. Disponível em <http://www.scielo.br/pdf/jpneu/v28n6/a05v28n6.pdf.> Acesso em 15 janeiro de 2014.

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ANALYSIS OF RESPIRATORY FUNCTION IN PATIENTS WITH CHRONIC OBSTRUCTIVE PULMONARY DISEASE SUBMITTED A PROTOCOL PHYSIOTHERAPY

ABSTRACT

Introduction: Chronic pulmonary disease (COPD) is characterized by the destruction of tracheobronchial tree which leads to damage in pulmonar and peripheral muscles, where the physical training of these patients are generally focused on improvement in aerobic fitness which provides improvement in activities of daily living and decreased sensation of dyspnea. Objective: To analyze by spirometry respiratory function of patients hospitalized with chronic obstructive pulmonary disease before and after performing a protocol of aerobic exercise on respiratory and peripheral muscles. Methods: This is uncontrolled clinical trial, a sample composed of 6 hospitalized patients submitted to a protocol of physiotherapy rehabilitation being evaluated hemodynamic parameters (systolic and diastolic blood pressure, heart rate, respiratory rate, subjective Borg scale, distance/time on the cycle ergometer and saturation peripheral oxygen) and spirometric variables (FVC, forced vital capacity, peak expiratory flow - PEF, forced expiratory volume in one second- FEV1 and Tiffenau index with the FEV1/FVC ratio. Results: After the implementation of the protocol and tabulation of data, can demonstrate an improvement in hemodynamic and spirometricvalues, but wasn't found statistically significant changes. Conclusions:It,s therefore concluded that despite not achieving statistical significance protocol resulted in improved data on population.

KEYWORDS: Respiratory, spirometry, exercise.

RÉSUMÉ

Introduction: la maladiepulmonairechronique (MPOC) estcaractérisée par la destruction de l'arbretrachéo-bronchique qui estpréjudiciable à pulmonaires et périphériques muscles, où la formation physique de ces patients estgénéralementorientéeversl'amélioration de la condition physique qui apporteuneaméliorationdans les activités de la vie quotidienne et diminution de la sensation de dyspnéeObjectif: analyser par spirométriefonctionpulmonaire des patients hospitalisésatteints de maladiepulmonaire obstructive chroniqueavant et après l'exécution d'un protocoled'exerciceaérobiesur les muscles respiratoires et périphériques.Méthodes: essaiclinique participants incontrôlée avec un échantillon de six patients, qui a évalué les paramètreshémodynamiques (pressionsystolique et la pressionartérielle diastolique, fréquencecardiaque, fréquencerespiratoire, échelle subjective Borg, distance / temps dans la bicycletteergométrique et la saturation périphériqueenoxygène) donnéesspirométriques (CVF, capacitévitaleforcée, débitexpiratoire de pointe - DEP, volume expiratoireforcéenuneseconde et FEV1 indiceTiffenau avec le rapport FEV1 / FVC Résultats: après l'application du protocole et de la totalisation des données, c'est possible. prouveruneaméliorationhémodynamique et les valeursspirométriques, maisn'a pas ététrouvéchangementsstatistiquementsignificatifs.Conclusions: Nousconcluonsdonc que, malgré ne pasatteindre protocole de significationstatistique a permis d'améliorerlesdonnées de lapopulation de l'étude.

MOTS-CLÉS: Spirométrie, respiratoires, exercice.

RESUMEN

Introducción: La enfermedad pulmonar crónica (EPOC) se caracteriza por ladestrucciónde lárboltraqueobronquial que es perjudicial para lospulmones y los músculos periféricos, donde elentrenamiento físico de estos pacientes por lo general se orienta hacialamejora de lacapacidad aeróbica que proporciona una mejoraenlasactividades de la vida diaria y disminución de lasensación de disnea Objetivo: Analizarlafunción pulmonar por espirometría de pacientes hospitalizados conenfermedad pulmonar obstructiva crónica, antes y después de realizar un protocolo de ejercicio aeróbico enlos músculos respiratorios y periféricos. Métodos:Ensayo clínico participantes no controlada con una muestra de seis pacientes, que

evaluólosparámetroshemodinámicos (presión arterial sistólica y diastólica, frecuenciacardiaca, frecuenciarespiratoria, la escala subjetiva Borg, distancia / tiempoenelcicloergómetro y lasaturación periférica de oxígeno), variablesespirométricas (CVF, capacidad vital forzada, elflujoespiratorio máximo - PEF, volumenespiratorioforzadoenun segundo y FEV1 índice Tiffenauconlarelación FEV 1 / FVC RESULTADOS: después de aplicar el protocolo y latabulación de losdatos, se puede. demostrar una mejoríaenlahemodinámica y los valores espirométricos, pero no se encontrócambiosestadísticamente significativosConclusiones: concluimos, pues, que a pesar de no lograr protocolo de significación estadística se tradujoenmejoresdatosenlapoblación de estudio.

PALABRAS CLAVE: Respiratorias, espirometría, elejercicio.

ANÁLISE DA FUNÇÃO RESPIRATÓRIA EM PORTADORES DE DOENÇA PULMONAR OBSTRUTIVA CRÔNICA SUBMETIDOS A UM PROTOCOLO FISIOTERÁPEUTICO

RESUMO

Introdução: a doença pulmonar obstrutiva crônica (DPOC) é caracterizada pela destruição da árvore traqueobrônquica a qual acarreta prejuízos na musculatura pulmonar e periférica, onde o treinamento físico desses pacientes é geralmente voltado para a melhora no condicionamento aeróbico o qual proporciona melhora nas atividades de vida diária e diminuição da sensação de dispnéia. Objetivo: analisar através da espirometria a função respiratória dos pacientes hospitalizados portadores de doença pulmonar obstrutiva crônica antes e após a realização de um protocolo de exercícios aeróbicos em musculatura respiratória e periférica. Métodos: trata-se do ensaio clinico não controlado composto por uma amostra de 6 pacientes hospitalizados submetidos a um protocolo de reabilitação fisioterapêutica sendo avaliados dados hemodinâmicos (Pressão arterial sistólica e diastólica, frequência cardíaca, frequência respiratória, escala subjetiva de Borg, distancia/tempo no cicloergômetro e saturação periférica de oxigênio) e as variáveis espirométricas (capacidade vital forçada-CVF, pico de fluxo expiratório – PFE, volume expiratório forçado no primeiro segundo- VEF1 e o índice Tiffenau com a relação VEF1/CVF. Resultados: após a aplicação do protocolo e tabulação de dados, pode-se comprovar uma melhora nos valores hemodinâmicos e espirométricos, porêm não foi encontrado alterações estatisticamente significativas. Conclusão: Conclui-se portanto que a realização apesar de não apresentar significância estatística o protocolo resultou em melhora dos dados na população estudada.

PALAVRAS-CHAVE: espirometria, exercício, respiratória