Med Clin (Barc). 2016;146(7):301–304

MEDICINA CLINICA

www.elsevier.es/medicinaclinica

Brief report

Physical therapy intervention during hospitalization in patients with acute exacerbation of chronic obstructive pulmonary disease and pneumonia: A randomized clinical trial☆

Adelina Martín-Salvador, Gloria Colodro-Amores, Irene Torres-Sánchez, M. Paz Moreno-Ramírez, Irene Cabrera-Martos, Marie Carmen Valenza*

Departamento de Fisioterapia, Universidad de Granada, Granada, Spain

ARTICLE INFO

Article history:
Received 12 July 2015
Accepted 5 November 2015
Available online 19 June 2016

Keywords:
Pneumonia
Chronic obstructive pulmonary disease
Hospitalization
Physical therapy modalities

ABSTRACT

Background and objective: Respiratory infections involve not only hospitalization due to pneumonia, but also acute exacerbations of COPD (AECOPD). The objective of the present study was to evaluate the effectiveness of a physical therapy intervention during hospitalization in patients admitted due to community-acquired pneumonia (CAP) and AECOPD.
Material and method: Randomized clinical trial, 44 patients were randomized into 2 groups: a control group which received standard medical therapy (oxygen therapy and pharmacotherapy) and an experimental group that received standard treatment and a physical therapy intervention (breathing exercises, electrostimulation, exercises with elastic bands and relaxation).
Results: Between-groups analysis showed that after the intervention (experimental vs. control) significant differences were found in perceived dyspnoea ($p = 0.041$), and right and left quadriceps muscle strength ($p = 0.008$ and $p = 0.010$, respectively). In addition, the subscale of "domestic activities" of the functional ability related to respiratory symptoms questionnaire showed significant differences ($p = 0.036$).
Conclusion: A physical therapy intervention during hospitalization in patients with AECOPD and CAP can generate skeletal muscle level gains that exceed the deterioration caused by immobilisation during hospitalization.

Intervención fisioterápica durante la hospitalización en pacientes con exacerbación aguda de la enfermedad pulmonar obstructiva crónica y neumonía: un ensayo clínico aleatorizado

Palabras clave:
Neumonía
Enfermedad pulmonar obstructiva crónica
Hospitalización
Modalidades de fisioterapia

RESUMEN

Fundamento y objetivo: Las infecciones respiratorias suponen no solo los ingresos por neumonía, sino también la mayoría de las exacerbaciones agudas de EPOC (EAEPOC). El objetivo de este trabajo fue evaluar la efectividad de una intervención fisioterápica durante el período hospitalario en pacientes ingresados por EAEPOC y neumonía adquirida en la comunidad (NAC).
Material y método: Ensayo clínico aleatorizado, con 44 pacientes distribuidos en 2 grupos: un grupo control que recibió el tratamiento médico estándar (oxigenoterapia y farmacoterapia) y un grupo experimental que recibió el tratamiento estándar y una intervención fisioterápica (reeducación ventilatoria, electroestimulación, ejercicios con bandas elásticas y relajación).

☆ Please cite this article as: Martín-Salvador A, Colodro-Amores G, Torres-Sánchez I, Moreno-Ramírez MP, Cabrera-Martos I, Valenza MC. Intervención fisioterápica durante la hospitalización en pacientes con exacerbación aguda de la enfermedad pulmonar obstructiva crónica y neumonía: un ensayo clínico aleatorizado. Med Clin (Barc). 2016;146:301–304.

* Corresponding author.
E-mail address: cvalenza@ugr.es (M.C. Valenza).

Resultados: Al comparar ambos grupos tras las intervenciones (experimental frente a control) se encontraron diferencias significativas en la disnea percibida (p = 0,041), así como en la fuerza muscular de los cuádriceps derecho e izquierdo (p = 0,008 y p = 0,010, respectivamente). Adicionalmente, la subescala «actividades domésticas» del cuestionario de capacidad funcional relacionada con sintomatología respiratoria mostró diferencias significativas (p = 0,036).
Conclusión: Una intervención fisioterápica durante el período hospitalario en pacientes con EAEPOC y NAC puede generar mejoras a nivel musculoesquelético que superen el deterioro causado por la inmovilización durante la hospitalización.

Introduction

Respiratory diseases are the second leading cause of hospitalisation; they not only represent admission because of community-acquired pneumonia (CAP), but also the most acute exacerbations of chronic obstructive pulmonary disease (AECOPD), both generating mortality figures associated with hospitalisation >15%.[1]

The impact of hospitalisation on patients with respiratory disease has been analysed,[2] relating it to rest and a long hospital stay, which implies, after hospitalisation, relocation to residencies, caregiver syndrome and increased health-related costs.[3]

Interventions have been proposed[4,5] to reduce the impact of hospitalisation, focusing on the deterioration of muscle strength as an indicator of loss of autonomy and functionality. Given the similarity of patients with COPD and CAP, and the similar duration of their hospitalisation, the purpose of this study was to evaluate the effectiveness of physiotherapy on muscle strength and functional capacity affected by respiratory symptoms, during the hospitalisation period of patients admitted for AECOPD and CAP.

Methodology

Design and patients

This was a randomised clinical trial. Randomisation was performed by a team member who assigned patients to an experimental or control group according to a randomisation list generated by a computer program.

Patients were selected upon admission to the Respiratory Units of Granada hospitals during October 2014 to May 2015; follow-ups were performed upon hospital discharge (8–9 days later). The collection process was terminated upon reaching the intended sample size.

Inclusion criteria were: patients admitted because of AECOPD or CAP, included on the first day of admission, aged between 65 and 90 and a with predicted *forced vital capacity* (FVC) value of <60%.

Patients were excluded because of: significant cognitive impairment, effusion, pneumothorax or haemoptysis, cancer, skin problems or venous insufficiency, having osteosynthesis material, not being able to perform the evaluation, or being in isolation (with tuberculosis and influenza A), or having been admitted in the last 2 weeks.

Patients were informed of the study and signed a consent prior to inclusion. The study was approved by the hospital's Ethics Committee. The study was registered at clinicaltrials.gov NCT02515565, NCT01826682.

Evaluation

Patients were assessed when they were admitted and discharged from the hospital. The examiner was blinded to the intervention and the assessments. The sociodemographic and anthropometric data were taken at the start.

Main variables. Muscle strength was assessed using a dynamometry, quadriceps with a dynamometer, the Lafayette Manual Muscle Testing System (Model 01163, Lafayette Instrument Company, Lafayette, IN, USA), according to protocol.[6] The functionality related to respiratory symptoms was assessed with the London Chest Activity of Daily Living Scale (LCADL).[7]

Secondary variables. The patient's nutritional status *(Mini Nutritional Assessment)*, levels of dependence (Barthel index) and quality of life *(St. George Respiratory Questionnaire)* were assessed. The respiratory function was assessed by spirometry with a portable spirometer Micro Spirometer™ (CareFusion, Basingstoke, UK) and according to the Spanish Society of Pneumology and Thoracic Surgery regulations; saturation, with Konica-Minolta Pulsox®-1 oximeter (Konica Minolta Sensing Inc., Osaka, Japan), and dyspnoea, with modified Borg Scale.

Intervention

The control intervention consisted of standard medical treatment according to medical prescription (in most cases oxygen therapy, antibiotics and bronchodilators). The experimental intervention consisted of standard treatment and a physiotherapy programme of one hour per day during hospitalisation. The sessions included 10 min ventalory re-education (relaxation exercises, breathing with pursed lips and active breathing), 30 min electrostimulation in both quadriceps (asymmetric biphasic current, pulse 400 ms, 50 Hz frequency with cycles of 8 s contraction and 20 s of rest) 15 min exercise with elastic band (2 sets of 10 repetitions of various exercise sets) and 5 min relaxation. The programme was the same for all patients and adapted to their levels of dyspnoea and fatigue.

Statistical analysis

The SPSS® program was used. Data were presented as mean ± standard deviation. Initially, to compare the characteristics between groups, Student's *t* test or the Mann–Whitney test were used. The effect of the intervention on the strength and functional

Table 1
Characteristics of subjects included in the study.

	Control group (n = 20)	Experimental group (n = 24)	*p*
Sex (% male)	78	83.2	0.726
BMI (kg/m^2)	28.86 (5.2)	27.60 (3.8)	0.318
Age (years)	77.40 (5.2)	78.82 (6.3)	0.345
Days hospitalised	9.49 (4.3)	8.39 (3.3)	0.437
FVC, % predicted	50.29 (23.5)	52.95 (25.8)	0.688
FEV_1, % predicted	41.84 (25.2)	41.41 (20.6)	0.947
SGRQ symptoms	53.66 (20.2)	60.09 (20.9)	0.296
SGRQ activity	74.36 (28.1)	69.44 (22.3)	0.536
SGRQ impact	50.97 (16.1)	52.31 (12.9)	0.769
SGRQ total	58.61 (17.2)	58.75 (13.4)	0.976

FEV_1: forced expiratory volume in one second; FVC: forced vital capacity; BMI: body mass index; SGRQ: St. George's Respiratory Questionnaire.