Complementary Therapies in Clinical Practice 20 (2014) 276–279

Contents lists available at ScienceDirect

Complementary Therapies in Clinical Practice

journal homepage: www.elsevier.com/locate/ctcp

Physiotherapy in asthma using the new Lotorp method

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Keywords:
Asthma
Dysfunctional breathing
Lung function test
Asthma symptoms
Physiotherapy

A B S T R A C T

Background: Physiotherapy in bronchial asthma has given various results.
Aim: To test a new method focusing on breathing exercise and massage of the thoracic muscles.
Patients and methods: Twenty-eight adult patients with a physician-diagnosed asthma were studied during 6 weeks. All patients were prescribed asthma medication. The new method [active group, $n = 17$) was compared with physical training (control group, $n = 12$).
Results: PEF was significantly improved ($p = 0.001$) in the active group, however, FEV_1 showed no significant change. The symptoms "tightness of the chest", "difficult breathing in", "air hunger", and the individually dominating symptom ($p = 0.001$) were significantly reduced in the active group. Exercise-induced breathing troubles and chest expansion were also significantly reduced.
Conclusion: Physiotherapy including breathing exercise and massage of the thoracic muscles (the Lotorp method) in patients with physician-diagnosed asthma resulted in significantly reduced respiratory symptoms during rest and exercise and increased chest expansion. The improvements may be due to an increased mobility of the chest and diaphragm.

1. Introduction

Asthma is a chronic airway disease with a prevalence of 7–10% in the Western world, with the highest percentage among younger people. Four cornerstones characterize the disease, airway inflammation, hyperresponsiveness, reversible bronchial obstruction and symptoms [1–3]. The symptoms listed in international guidelines are breathlessness, wheezing, cough, tightness of the chest, and shortness of breath [3,4]. The disease occurs in various forms, commonly called phenotypes or endotypes [5–9]. In most cases, the prescribed asthma medication is efficient, however, in some cases the usual medication has no or only a slight effect despite the presence of symptoms [10–15]. Follow-up studies have also shown that physician-diagnosed asthma cannot be verified in a large proportion of investigated patients [16–18]. As many non-asthma patients still have symptoms there must exist other operating mechanisms than bronchial obstruction. Thus, there is a need for new theories to explain the high proportion of treatment failure and miss-diagnosis. Other possible mechanisms may be related to sensory mechanisms, small airways disease, abnormal breathing pattern and decreased chest mobility [19]. These mechanisms may be confused with or coexist with "classic" asthma [7,11,18,20–22]. A way to test different mechanisms is to treat asthmatic patients with physiotherapy. The value of physiotherapy in the treatment of asthma has been debated and some promising effects have been reported [2].

2. Aim

In the present study, a new physiotherapeutic method was tested in adult physician-diagnosed asthma, the Lotorp method, which focuses on daily breathing exercises in combination with intermittent massage of thoracic muscles.

3. Patients and methods

The criteria for including patients in the 6-week controlled study were physician-diagnosed asthma. Baseline data are given in Table 1. Twenty-eight adult patients, ages 20–52, were recruited. All had been prescribed bronchodilators, and all, except for two, were also prescribed inhaled corticosteroids. Exclusion criteria were respiratory infection and other disorders that could affect heart and lung function. Current medication was not changed during the study. The active group, ($n = 17$, mean age 32, range 20–52) was given physiotherapy at two clinics. The control group, ($n = 12$, mean age 43, range 23–50) was treated in a third similar

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http://dx.doi.org/10.1016/j.ctcp.2014.07.004
1744-3881/

Table 1
Baseline values. Duration of asthma, prescribed medication, chest expansion, lung function, dominating trigger factors and symptoms.

	Active group	Control group
Number of patients (*n*)	17	12
Age, mean (range)	32 (20–52)	43 (23–50)
Female/male (*n*)	11/6	9/3
Duration in years, mean (range)	15 (1–35)	18 (1–49)
Inhaled corticosteroids (*n*)	17/17	10/12
Inhaled bronchodilators (*n*)	17/17	12/12
Chest expansion, mean (cm)	5.6	6.7
FEV_1 % predicted, mean (range)	84 (42–106)	104 (85–124)
PEF % predicted, mean (range)	107 (84–139)	121 (107–134)
Trigger factors		
Exercise (*n*)	9/17	6/12
Allergens (*n*)	7/17	8/12
Scents (perfume) (*n*)	10/17	7/12
Dominating symptom		
Tightness of the chest (*n*)	6/17	4/12
Heavy breathing (*n*)	8/17	3/12
Wheeze (*n*)	0/17	0/12
Air hunger/difficult breath in (*n*)	3/17	5/12

clinic. These patients were instructed to carry out a physical exercise program recommended by the Swedish National Board of Health and Welfare [23].

Before the study period all patients had to fill in a questionnaire about medical history, current symptoms, and trigger factors, asthma medication, smoking habits, etcetera. After the last treatment the patients reassessed their symptoms and trigger factors, without seeing the pre-study assessments. The objective measurements before and after the study period included lung function tests (PEF, FEV_1, FVC), peripheral oxygen saturation (pulse oximeter), maximum expansion of the chest (at the level of xiphoideus), pulse, and blood pressure. Because the patients reported different dominating airway symptoms (tightness, heavy breathing, difficult breathing in, air hunger), the most dominant one was selected as a separate study variable (Table 1).

The Lotorp method (website www.lotorpsmetoden.se) has not previously been published in the school medical literature. Lotorp is a community in Sweden where the physiotherapist Jan Karlsson found that a patient with back pain was “cured” of his asthma by massaging the thoracic muscles with the aim of improving the chest mobility to reduce the back pain. In this case, it was likely that the increased mobility of the chest was “the cure” for the respiratory problems. This was the starting point for the “the Lotorp method”, which nowadays consist of a combination of breathing exercises and massage. The massage techniques used are based on classical Swedish massage. The breathing exercises are similar to other methods, but massage specifically aimed at treating respiratory muscles has not previously been reported. The clinical experience is that hundreds of patients with asthma or asthma-like symptoms have been improved by this method.

To get permission to work with the method clinically a special license is required. It is a two-part therapy involving daily breathing exercises and massage of thoracic muscles at the clinic every third week. The treatment at the clinic is performed for a time of about 60 min. It starts with massage based on classic Swedish massage, combined with trigger point treatment if the therapist finds specially tense points in the muscles. On the larger muscles are performed a little faster rubbing movement. The patient lies on his/her stomach when the back is treated. Back muscles and tendons treated with deep massage are: Erector spinae (the sacro spinal system), Romboideus major and minor, Quadratus lumborum, and external intercostal muscles. Then, the patient lies on his/her back. Muscles and tendons treated are: Pectoralis major, Pectoralis minor, external intercostal muscles, Sternum (several muscles attach to the sternum, and a rubbing movement is used to stimulate these attachments), Subclavius, Serratus anterior (upper parts), Scalenes, Sternocleidomastoideus, Diaphragm (external front part), abdominal muscles (tranversus abdominis, obliquus internus abdominis, obliquus externus abdominis and rectus abdominis). After this exhalations are manually assisted during exhalation by pressing the chest, slowly but powerfully. The hands are placed along the side of the chest and deep exhalations are performed 10 times. Then the hands are moved to the upper parts of the chest. A similar manual pressure during exhalation is performed 5 times. After this the patient is instructed to breathe in and out so that the thorax is moving as much as possible. Deep breathing using both intercostal muscles and the diaphragm is emphasized. These breathing exercises will also be the patient's daily homework.

The rigidity of the chest is measured by assessing the chest expansion at the level of xiphoideus. The expansion is expressed as the increase in the circumference from maximum expiration to maximum inspiration. The normal expansion at this level is 5–8 cm, biggest in males (unpublished data). In patients with breathing problems the expansion may be as little as 1–2 cm.

The treatment given in the control group included daily exercise, walking up stairs or equivalent exercise for at least 30 min. In addition the patients had to perform cardiovascular training for 20–60 min 3–5 times per week (running, aerobics, ball sports or similar) [23]. An experienced physiotherapist supervised the treatment. To minimize the risk of subjective influence, in both the active and control group, the treating therapist did not perform the subsequent measurements.

This controlled study was preceded by a pilot study comprising 14 adult patients (12 women and 2 men, mean age 57, range 43–66) with a physician-diagnosed adult asthma. All had been prescribed asthma medication. The differences in symptom, trigger factors, lung function, and chest expansion between the start and the end of the trial were calculated. The patients were instructed to continue daily breathing exercises and were followed up 4–6 months after the end of the trial.

4. Ethic

The local ethics committee in Göteborg approved the study (No. 187-07). The patients were informed both orally and written. All patients signed consent forms.

5. Statistics

Symptoms and trigger factors were assessed subjectively on a visual scale, from 0 = never to 10 = daily problem for symptoms, and 0 = no to 10 = severe breathing problems for trigger factors. PASW Statistics 18.0 was used for non-parametric tests of the differences between the two groups. First the difference before-after study was calculated for each parameter and each group. After that the differences between the groups (difference of difference) was calculated. $P < 0.05$ was considered as statistically significant. The null hypothesis is that there is no difference between this new method and physical exercise.

6. Results

All patients except for two in the control group fulfilled the study. The dropouts were caused by social reasons. No adverse events were reported. Baseline values are shown in Table 1. When changes in lung function values, before and after treatment, were compared there was a significant improvement in PEF in the active group ($p < 0.005$) but no significant improvement in FEV_1 ($p = 0.45$)