

## Therapeutic Application of a Cold Chest Pack in Bronchial Asthma

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**Abstract:** In natural medicine, application of a cold chest pack for 30 min daily over a period of time is believed to improve lung functions in bronchial asthmatics. However there has been no scientific evaluation of this treatment. Hence the present study was carried out on 15 medication-free bronchial asthma patients (2 males) with ages from 19 to 42 years. The peak expiratory flow rate (PEFR, in l/min) was recorded before, during and after a 30 min application of a cold chest pack. This treatment was carried on for 21 days, during which the patients received other naturopathy treatments such as fasting, diet changes, hydrotherapy, massage, magnetotherapy, color therapy and application of mud packs, along with yoga therapy. The PEFR and symptom scores of the patients were assessed on Days 1 and 21. The results were analyzed using a two factor ANOVA and paired-t-test, which showed a significant increase in the PEFR recorded on Day 21 compared to Day 1 values, as well as immediately after the chest pack compared to the before values on day 21. Also, the symptom scores have significantly reduced following the 21 days of naturopathy treatment. The results suggest that (i) an application of a cold chest pack increases the PEFR as an immediate effect and (ii) this effect is augmented following 21 days of other naturopathy treatments along with yoga.

**Key words:** Cold chest pack • bronchial asthma • naturopathy • bronchodilation

### INTRODUCTION

The reversible bronchoconstriction which is characteristic of bronchial asthma was observed to respond favorably to changes in diet [1], yoga practices [2-4] and to other non-pharmacological externally applied treatments [5]. The earliest study on yoga suggested that Transcendental Meditation was a useful adjunct in treating bronchial asthma [2]. A later controlled trial with fifty three patients each in yoga and control groups showed greater improvement in for drug treatment, peak flow rate and decreased weekly attacks of asthma following two weeks of yoga [3]. Another study evaluated the effect of a single yoga technique (*kunjla*) and showed definite subjective and objective improvements during the week they practiced yoga as well as improved symptoms after three weeks [4]. Apart from yoga, several non-pharmacological treatments have been shown to be beneficial in the treatment of bronchial asthma. The changes in ventilatory function was examined in 37 patients with steroid-dependent intractable asthma (SDIA) following spa therapy [5]. There were significant improvements in Forced Vital Capacity (FVC), Peak Expiratory Flow Rate (PEFR), which suggested that the spa therapy improves the condition of small airways disorder in patients with SDIA. Another study evaluated the usefulness of Naturopathy intervention (a combination treatments including massage, hydrotherapy, color therapy, fasting and diet therapy, mud

application and yoga therapy) in bronchial asthma patients [6]. The results suggested that there was a significant improvement in PEFR, VC, FVC, FEV1, FEV/FEC%, MVV (Maximum Voluntary Ventilation) and absolute eosinophil count. The patients reported a feeling of well being, freshness and comfortable breathing. Hence it was concluded that Naturopathy and yoga helps in inducing positive health, alleviating the symptoms of disease by acting at physical and mental levels.

A cold chest pack which is used as a treatment of choice in naturopathy along with hot foot and arm bath for bronchial asthma is believed to reduce pulmonary congestion, decrease pulmonary mucus membrane irritation and increase the depth of respiration [7]. Since there are no studies conducted to evaluate the effects of a cold chest pack in isolation on pulmonary functions in bronchial asthma patients, the present study was conducted to evaluate the immediate effect of a cold chest pack on the Peak Expiratory Flow Rate (PEFR) and whether the immediate effect would change after 21 days of treatment with other natural remedies and yogic practices in bronchial asthma patients.

### MATERIALS AND METHODS

**Patients:** 15 patients (2 males) with bronchial asthma diagnosed based on the standard criteria (6) were included in

the study. Their ages ranged from 19 to 42 years (group average $\pm$ SD., 31.1 $\pm$ 4.6 years). None of the patients were on medication during the study. Both seasonal and perennial asthmatics were included.

**Assessments:** The Peak Expiratory Flow Rate (PEFR) was recorded using the Wright peak flow meter (Airmed Clement Clarkes International, England) as per the standard method of Wright and Mckerrow [8]. The subjects were instructed to take a maximal inspiration and blow into the mouth piece of the device rapidly and forcefully, while standing. The values of PEFR achieved in 3 successive attempts were recorded and the highest of 3 values was taken for analysis. Symptom scores were recorded depending upon the presence of (I) breathlessness, (ii) cough with expectoration and (iii) wheezing. The three symptoms were scored as '1 = present' or '0 = absent'. In addition to the baseline record, the PEFR was also recorded before, during and immediately after a cold chest pack applied once daily from Day 1 to Day 21.

**Design of the study:** Assessments were done on the first day (Day 1) and on the last day (Day 21) of a 21 day naturopathy treatment, at a nature cure hospital in South India. Also, the PEFR was recorded before, during and immediately after a cold chest pack daily.

**Specific intervention:** The chest pack, consisted of a cotton cloth, approximately 2.5 m long and 0.5 m wide, which was soaked in water at room temperature and wrung out completely. It was then applied over the chest, covering both front and back, followed by a wrapping of woolen flannel of the same dimensions as the cotton cloth [9]. The pack was removed after 30 min.

**Other treatments:** Apart from a chest pack, various other naturopathy treatments were given such as hydrotherapy [steam bath, arm bath, foot bath, enema, spinal bath and hip bath (90 min)], fasting (3 days with fruit juices) and diet therapy (controlled vegetarian diet twice a day), magnet and color therapy (60 min), acupuncture (15 min), mud packs (90 min) and massage therapy (45 min), along with yoga therapy [yoga postures, voluntarily regulated breathing, cleansing practices and meditation (120 min)] for all the patients during the 21 days of treatment.

**Data analysis:** The data were analyzed using (I) the two factor analysis of variance (ANOVA), for the PEFR readings made before, during and after the chest pack, where Factor A = Day 1 versus Day 21 and Factor B = the 3 assessments (before, during and after the chest pack) and (ii) the t-test for paired data was done for Day 21 versus Day 1 comparisons of PEFR values and symptom scores.

Table 1: PEFR values (l/min) recorded before, during and immediately after a cold chest pack application. (N = 15). Values are group mean $\pm$ SEM

Days	Before	During	After
Day 1	164.70 $\pm$ 17.90	154.70 $\pm$ 19.10	172.70 $\pm$ 19.50
Day 21	180.80 $\pm$ 26.60	225.30 $\pm$ 28.20	247.30*# $\pm$ 28.40

\* p<0.05, paired t-test, after compared to respective before values

# p<0.05, 'after' of Day 21 versus 'after' of Day 1

Table 2: Peak expiratory flow rate (l/min) and symptom scores (out of 3). Values are group mean $\pm$ SEM

Days	PEFR	Symptom scores
Day 1	164.70 $\pm$ 17.90	2.70 $\pm$ 0.23
Day 21	230.00** $\pm$ 84.80	0.50* $\pm$ 0.25

\* p<0.05, \*\* p<0.002, t-test for paired data, Day 21 versus Day 1

## RESULTS

**Two factor analysis of variance (ANOVA):** The two factor ANOVA showed a significant difference between Day 1 and Day 21 values of PEFR, i.e., Factor A. [F = 12.26, the F value for DF = 1, 84 at the 0.002 level (two tailed) = 11.66, hence p<0.002. Here the actual DF = 1, 84 were chosen as the nearest values in the probability table]. The difference between the 3 assessments (before, during and after) was not significant.

**The t-test for paired data:** The PEFR showed a significant increase after 21 days of naturopathy treatments (p<0.02). Also, there was a significant increase in the PEFR immediately after a cold chest on the Day 21. The group mean values $\pm$ SD are detailed in Table 1. The symptom scores have significantly reduced following the 21 days of naturopathy treatment (p<0.05). The group mean values $\pm$ SD are detailed in Table 2.

## DISCUSSION

The present study showed that (I) as an immediate effect an application of a cold chest pack increases the PEFR and (ii) this effect is more following 21 days of various naturopathy treatments. The symptom scores reduced after 21 days of different naturopathy treatments.

Twenty one days of different naturopathy treatments caused an increase in the baseline PEFR and reduced the symptom scores. Also, the increase in PEFR following the application of a cold chest pack was more after the 21 days of treatment. The immediate effect of a cold chest pack application has been related to different factors, viz. (I) circulatory effects, since the application is believed to cause vasoconstriction of blood vessels in the skin over the chest and (ii) the cold stimulation may also increase overall sympathetic tone, hence bringing about bronchodilation. This is especially

important as it is generally understood that there is sympathetic beta receptor hyposensitivity in bronchial asthma, along with a adrenoceptor hypersensitivity and parasympathetic hypersensitivity [10]. In summary, a cold chest pack is useful to relieve symptoms bronchoconstriction both as an immediate effect and over a period of three weeks.

Since chest pack is used as a treatment of choice for bronchial asthma along with other naturopathic treatments at various naturopathy hospitals, it is important to carry on further investigations to understand the underlying mechanisms better. Also, since the present study had no non-intervention control group, it is not possible to ascribe the improved PEFr to the chest pack alone (either as an immediate effect or the result of a 21 day longitudinal follow up) or even to the effect of different naturopathy treatment modalities. Further studies with randomized control trials are required to substantiate these preliminary results.

#### REFERENCES

1. Farrel, K.M., 1985. Gastroesophageal reflex, esophageal disfunction and asthma. In: Weiss, B.E., S.M. Segal and M. Stein (Eds.). *Bronchial asthma-mechanisms and therapeutics*. Boston: Little, Brown and Company Inc., pp: 494-499.
2. Wilson, A.F., R. Honsberger, J.T. Chiu and H.S. Novey, 1975. Transcendental Meditation and asthma. *Respiration*, 32: 74-80.
3. Nagarathna, R. and H.R. Nagendra, 1985. Yoga for bronchial asthma: A controlled study. *British Med. J.*, 291: 1077-1079.
4. Singh, V., A. Wisniewski, J. Britton and A. Tattersfield, 1990. Effect of yoga breathing exercises (pranayama) on air way reactivity in subjects with asthma. *Lancet*, 335: 1381-1383.
5. Tanizaki, Y., H. Kitani, M. Okazaki, T. Mifune, F. Mitsunobu, K. Ochi, H. Harada and I. Kimura, 1992. Spa therapy improves ventilatory function in the small airways of patients with steroid-dependent intractable asthma (SDIA). *Acta Medica Okayama*, 46: 175-178.
6. Sathyaprabha, T.N., H. Murthy and B.T.C. Murthy, 2001. Efficacy of Naturopathy and Yoga in Bronchial Asthma-A self controlled matched scientific study. *Indian J. Physiol. Pharmacol.*, 45: 80-86.
7. Lindlahr, H., 1974. *The practice of nature cure*. Hyderabad: Prakruthi prakashan.
8. Wright, B.M. and C.B. Mckerrow, 1959. Maximum forced expiratory flow as a measure of ventilatory capacity. *British Med. J.*, 2: 1041-1047.
9. Institute of Naturopathy and Yogic Sciences, 1998. *Nature cure treatment*. Bangalore: Institute of Naturopathy and Yogic Sciences.
10. Szentivanyi, A., 1968. The beta adrenergic theory of the atopic abnormality in bronchial asthma. *J. Allergy*, 42: 203-225.