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ORIGINAL ARTICLE

Role of laser acupuncture in chronic respiratory diseases



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KEYWORDS

Chronic respiratory diseases;
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Abstract *Background:* Use of laser makes efficient acupuncture application without the use of stainless steel needles. Irradiation with laser of acupuncture points can produce effects of diminishing inflammation, relieving pain, enhancing metabolism, improving tissue regeneration and immunity.

Objectives: To discuss its efficacy as non-pharmacological intervention that may provide a valuable adjunctive or alternative treatment for chronic respiratory diseases.

Subjects and methods: Indications were 31 patients suffering from chronic respiratory illness (asthma, COPD, bronchiectasis and ILD). They were subdivided into a control group that received conservative treatment with medication and a study group that received a 10 day course of LLL in addition to medication. All patients were subjected to full history taking, Plain Chest X-ray and HRCT chest. Parameters assessed before and after 10 days: BMI, flow/volume loop and treadmill 6MWT.

Main results: There was no statistically significant difference in the mean value of age, BMI and sex difference between both groups. Also there was no statistically significant difference regarding baseline spirometric data and 6 MWD between both groups. There was a statistically significant improvement in FVC, FEV1, FEF 25–75% and 6 MWD after 10 days of laser when compared with baseline data within the study group, while within the control group there was a statistically

Abbreviations: COPD, chronic obstructive pulmonary disease; ILD, interstitial lung disease; HRCT, high resolution computed tomography; BMI, body mass index; 6 MWD, 6-min walk distance; FVC, forced vital capacity; FEV1, forced expiratory volume in first second; FEF 25–75%, forced expiratory flow at 25–75% of FVC; TCM, traditional Chinese medicine; ATP, adenosine triphosphate; LLL, low level laser; LPS, lipopolysaccharide; TNF-alpha, tumor necrosis factor-alpha; FGF-2, fibroblast growth factor-2; IGF-1, insulin-like growth factor 1; ATS, American Thoracic Society; PDGF, platelet-derived growth factor

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significant improvement in FVC, FEV1 and 6 MWD after 10 days of medical treatment when compared with baseline data. By comparing both groups, there was more significant improvement in FEV1 and 6 MWD after 10 days of laser when compared to the control group.

Conclusion: A ten-day course of LLL may be a useful adjunct to standard medical care for chronic respiratory diseases, though this requires corroboration with larger studies.

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Introduction

Acupuncture is an integral part of a 4000-year-old philosophy of medicine that is known as traditional Chinese medicine (TCM). Acupuncture is a therapy that involves the stimulation of defined points on the body with the use of needles for therapeutic and preventive purposes. Other methods of stimulation of acupuncture points include pressure (acupressure), electric and more recently the use of laser [1].

The basic idea underlying acupuncture therapy is that disorders related to the flow of 'Qi', thought to be the energetic life force moving through the body along a network of channels or pathways called meridians in the concept of TCM, can be prevented or treated by stimulating the relevant points on the body surface. By and large, these channels or pathways are modulated in such a way as to stimulate, when there is a deficiency or lack of energy, or reduce, when excess energy is present [1].

Laser therapy has biostimulative and tissue regenerative properties as well as antimicrobial, anti-inflammatory and analgesic effects [2]. Studies on its effects in respiratory disease have shown improvement in both gas exchange and pulmonary function, as well as enhanced immunity and other health benefits [2].

There are several extraordinary effects that have been observed with therapeutic lasers, and phototherapy makes laser therapy unique among the various healing modalities available today. Photobiomodulation produces changes in oxidation/reduction status of the mitochondria which leads to dramatic increases in ATP synthesis. Activation of the sodium/potassium pump alters the cell membrane permeability to calcium [3,4].

Phototherapy has been shown to effect cellular activity in the following ways: stimulates cell growth, increases cell metabolism, improves cell regeneration, invokes an anti-inflammatory response, promotes edema reduction, reduces fibrous tissue formation, stimulates nerve function, reduces the production of substance P, stimulates long term production of nitric oxide, decreases the formation of bradykinin, histamine, and acetylcholine and stimulates the production of endorphins [4].

One of the basic properties of low level laser (LLL) seems to be the ability to inhibit inflammation at the level of innate immune activation. Representative studies showed that LLL was capable of suppressing inflammatory genes and/or pathology after the administration of lipopolysaccharide (LPS) as a stimulator of monocytes and bronchial cells, in vitro, and leukocyte infiltration in vivo. Inflammation induced by other stimulators such as zymosan, carrageenan, and TNF-alpha was also inhibited by LLL. Growth factor stimulating activity of LLL was demonstrated in both in vitro and in vivo

experiments in which augmentation of FGF-2, PDGF and IGF-1 was observed. Endogenous production of these growth factors may be useful in regeneration based on activation of endogenous pulmonary stem cells [5].

Bronchial asthma is a major health problem characterized by a chronic inflammatory disorder of the airways, in which many cells and cellular elements play a role [1]. COPD is a major global health problem predicted to rank as the third greatest cause of mortality by the end of the next decade, it is a slowly progressive and poorly reversible inflammatory disease characterized by the functional abnormality of airway obstruction, which includes emphysema, chronic bronchitis, and small airways disease [6]. Inhibition of the inflammatory response may represent an important therapeutic strategy for COPD [6].

As a consequence, therapeutic intervention in chronic respiratory diseases would require addressing the issues of inflammation and regeneration. The present study aimed to develop a possible rationale for how LLL may be useful as a non-pharmacological intervention that may provide a valuable adjunctive or alternative treatment for chronic respiratory diseases.

Subjects and materials

Thirty-one patients suffer from chronic respiratory illness, of both sexes (12 females and 19 males), their age ranged between 19 and 70 years. All subjects were recruited from the outpatient chest clinic of the Kasr Alainy hospital. Patients with other chronic diseases that may contribute to exercise limitation; such as: cardiac, renal and liver diseases were excluded. Malignancies and those with Lack of motivation and Non-adherence were also excluded. No symptoms of respiratory infection were seen for 4 weeks before the study.

They were sub-divided into the control group ($n = 15$) and the study group ($n = 16$) The control group included patients that received conservative treatment with medication only while the study group included patients that received a ten-day course of low level laser therapy, in addition to conservative treatment with medication.

All patients were subjected to: Full history taking including medical history and clinical examination, Plain Chest X-ray (P-A view) and HRCT chest.

In the study group, patients were subjected to low level laser therapy using (Phyaction CL) with output of 5–20 mW, wavelength of 905 nm and frequency of 5000 Hz. Laser probe placed in intercostal space corresponding to the site of lesion both anteriorly and posteriorly on chest wall and arm as: Standardized laser acupuncture application with 7 points (LU-1, LU-2, CU-17, BL-13, BL-17, LU-5, LU-7). Each acupuncture point was stimulated for 1 min with total number of applications: daily for 10 days [7].

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