

HOSTED BY



Contents lists available at ScienceDirect

Egyptian Journal of Chest Diseases and Tuberculosis

journal homepage: www.sciencedirect.com

Serum zinc level in bronchial asthma

Aida M. Yousef^{a,*}, Ekramy Elmorsy^b^a Chest Department Faculty of Medicine, Mansoura University, Egypt^b Forensic Medicine, Faculty of Medicine, Mansoura University, Egypt

ARTICLE INFO

Article history:

Received 11 October 2016

Accepted 19 October 2016

Available online xxxxx

Keywords:

Bronchial asthma

Serum zinc level

ABSTRACT

Background: Free radicals has a harmful effects on the cells and tissues. It is responsible for the pathogenesis of many diseases. Antioxidants decrease the harmful effects of free radicals. Trace elements like selenium, zinc and copper are crucial for the activity of these antioxidants. The aim of this study is to determine serum zinc level in asthmatic patients during acute attacks, after inhaled corticosteroid therapy and during asymptomatic periods in order to evaluate the relation of serum zinc level to different clinical phases of asthma.

Methods: The study included 46 asthmatic patients (group 1 and group 2) and 30 healthy persons as a control group (group 3) and having no personal or family history of allergy.

The first group included patients presenting with acute asthmatic attacks (n = 26). This group was evaluated before the treatment and after three months of inhaled steroid therapy. The second study group included asthmatic patients who were asymptomatic (n = 20). Control group (group 3, n = 30). Serum zinc level was measured in all cases. In addition, pulmonary function tests were performed and forced vital capacity (FVC) and forced expiratory volume in one second (FEV1) were determined in all patients.

Results: During the acute attacks, serum zinc level was lower than after inhaled corticosteroid therapy in group 1 with a significant difference (p < 0.05). FVC and FEV1 were also statistically different in the pre and posttreatment periods (p < 0.05). Serum zinc level was significantly lower in group 1 (pretreatment) when compared with groups 2 and 3 (p < 0.05).

Conclusion: Measurement of zinc level could be recommended in asthmatic adults, proper supplementations of zinc can be useful in the management of asthmatic patients due to increase the effect of antioxidant defense system. However, further multi-centre studies with greater number of patients are needed to warrant the results of this study.

© 2016 Production and hosting by Elsevier B.V. on behalf of The Egyptian Society of Chest Diseases and Tuberculosis. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

Introduction

The increased incidence of bronchial asthma and allergic diseases is a matter of concern. injury and inflammation in such cases may be a result of oxidative stress. A potent antioxidant can act against inflammation and prevent the resulting tissue injury. The antioxidant defense need enzymes that act in presence of trace elements like zinc. observational studies have shown that diets low in antioxidants, such as zinc, selenium, magnesium, vitamin C are associated with an increased risk of asthma [1,2].

Zinc is essential for cellular function in the immune response and plays an important role in modulating the immune system [3].

Oxidative stress occur when an imbalance occurs between oxidants and antioxidants in favor of oxidants. Increased oxidative stress lead to secondary metabolic reactive oxygen species (ROS) that may cause direct lung injury [4].

Our hypothesis is that adult asthmatic patients may have a low serum zinc level that may be a risk factor in this group patients.

Our first aim is to evaluate serum level of zinc among asthmatic patients and the second aim is to compare level of zinc between asthmatic patients and healthy controls.

Materials and methods

This prospective case control study was performed in our institution. The study was conducted between February 2014 to the end of May 2015. The study included 46 asthmatic patients (20 males and 26 females) who were admitted to our department

Peer review under responsibility of The Egyptian Society of Chest Diseases and Tuberculosis.

* Corresponding author.

E-mail address: aymanhusen2002@yahoo.com (A.M. Yousef).

<http://dx.doi.org/10.1016/j.ejcdt.2016.10.009>

0422-7638/© 2016 Production and hosting by Elsevier B.V. on behalf of The Egyptian Society of Chest Diseases and Tuberculosis.

This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

Please cite this article in press as: A.M. Yousef, E. Elmorsy, Serum zinc level in bronchial asthma, Egypt. J. Chest Dis. Tuberc. (2016), <http://dx.doi.org/10.1016/j.ejcdt.2016.10.009>

and 30 healthy adult (12 males and 18 females) with no history of asthma.

Bronchial asthma was diagnosed based on the history, family history, and clinical examination such as episodic breathlessness, cough, wheezing and chest tightness and laboratory results. Measurements of pulmonary function tests provide an assessment of the severity of airflow limitation, its reversibility and provide a confirmation of the diagnosis of bronchial asthma.

Detailed history regarding bronchial asthma was taken, including age at the first presentation of asthma, duration of asthma, day-time and night symptoms, frequency of admission per year, types of drug used. Every patient was subjected to epidermal skin tests to detect the atopy with the allergens, PA chest X-ray, complete blood count. Anthropometric measurements which included weight (wt.), height (ht) and body mass index (BMI) was performed in all patients. pulmonary function tests were performed and forced vital capacity (FVC) and forced expiratory volume in one second (FEV1) were determined in all patients using spirometer.

A local Ethical Committee approved the study. The control group was healthy people of comparable age and sex to the patients, had no disease based on history and physical examination, no history of asthma and zinc deficiency.

Inclusion criteria included any patient with confirmed diagnosis of asthma with no zinc supplementation in drug history.

Exclusion criteria include every patient take any supplementation of trace elements in both group. Patients with renal or liver disease, diabetes mellitus, infection or thyroid dysfunction were excluded. patients received systemic, inhaled steroids, acetyl salicylic acid or nonsteroidal antiinflammatory drugs for the last 2 weeks.

Five cc Blood samples were taken to measure serum zinc level in the three different groups in the study.

First group: This group include patients who presented with acute asthma attacks ($n = 26$). five cc of blood was taken to measure the serum zinc level. After control of the acute asthma attack with the appropriate treatment, patients were discharged on inhaled corticosteroid treatment for three months with follow up. Provided that patient had no another acute attack during this period, another blood sample was taken to estimate the serum zinc level. Thus zinc level has been measured during the attack and after the steroid treatment.

Second group: Twenty patients with asymptomatic bronchial asthma who were followed by our department.

Third group: Thirty healthy persons based on medical history and clinical examination.

Blood samples were collected and prepared following Smith et al. [5]. Briefly, five ml of venous blood sample were obtained from each subject and centrifuged to collect sera. Samples were

kept in polyethylene containers and frozen immediately at -20°C until analysis. All samples were transferred to the laboratory in an ice box using ice chips to preserve them. Before assay, samples were allowed to come to room temperature and mixed gently. Then 0.5 ml of plasma of each sample was added to 2 ml of deionized water in a plastic test tube and mixed for 30 s. Analysis of serum zinc levels (SZnL) was done by Perkin Elmer 2380 Atomic Absorption Spectrophotometer. Assay optimization was carried out following the operating manual. The source of the flame was an air-acetylene mixture and wavelength was adjusted to 213.9 nm.

Statistical analysis

Statistical analysis was done using Graph PadPRISM 5 (Graph Pad Software Inc., San Diego, CA). As the data showed parametric distribution, student unpaired *t*-test was used for comparisons. For categorical variable comparisons, Fisher exact and Chi-square test was applied for gender and BMI comparisons, respectively. Pearson test was used for correlation studies. *p*-values ≤ 0.05 were considered as significant.

Results

Mean age of the acute asthmatic patients was 47 ± 3 y (range of 23–63 y) in comparison with 41 ± 3.1 y (range of 22–62 y) in the stable asthmatic patients, and 45 ± 2.3 y (range of 20–65 y) control subjects. There was no significant difference regarding the mean ages of the groups ($p > 0.05$).

There was no significant difference among the groups regarding body mass index ($p > 0.05$).

The parameters of FEV1 and FVC in pulmonary functional tests were significantly decreased during the attacks in comparison to that after the treatment of inhaled steroids with a statistically significant difference ($p = 0.0001$) (Fig. 1).

Hypo zincemia was defined when serum Zn level below $60.0 \mu\text{g/dL}$. 44% out of the case group had hypo zincemia. Mean serum zinc values of asthmatics was 56.8 ± 6.0 , while, it was 82.1 ± 5.9 in the controls. This difference was significant ($p < 0.01$) (Fig. 2) (Table 1).

In the first group, serum zinc levels measured during the attacks were lower than after the treatment with a significant difference ($p = 0.008$) (Table 1).

Discussion

Bronchial asthma is a chronic inflammatory lung disease. It is characterized by a production of mucous, airway smooth muscle (ASM) hypertrophy and hyperplasia [6].

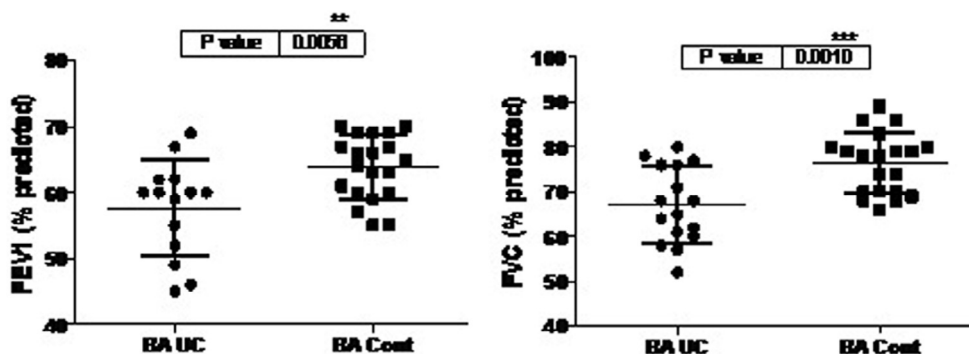


Figure 1. Scattered photographs showing differences in respiratory function parameters used in the study between the controlled and uncontrolled asthmatic groups.

Download English Version:

<https://daneshyari.com/en/article/8745320>

Download Persian Version:

<https://daneshyari.com/article/8745320>

[Daneshyari.com](https://daneshyari.com)