Concentration of Zinc in the Human Blood in Cases of Tuberculosis

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Abstract: The present study was aimed to investigate the serum level of zinc (Zn) in cases suffering from tuberculosis (TB) in Libya before and after treatment. The research was conducted on 60 cases. A total of 60 cases were divided into three groups: A, B in clinical form of TB. caused by *Mycobacterium tuberculosis*, and C healthy people, considered as control group. Zn concentration in Serum was measured using atomic absorption spectrophotometry method, before and after treatment and compared with control group. The level of Zn concentration expressed as µg/dl are shown in our results: the lowest Zn was before treatment (69.88 µg/dl), slightly Increased during treatment (73.60 µg/dl), and increased after treatment (79.88µg/dl) and the highest Zn concentration was in control group (81.10 µg/dl). From our study, we can measuring the serum level of Zn in TB patients in addition to the other examinations as direct microscopy and culture of *M. tuberculosis* would be more helpful to physicians in the diagnosis of TB.

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1.Introduction

Recently, many researchers have found that Zn plays an important and advantageous role in many diseases in animal and human. In many researches found that status of healthy human results from the balance between prooxidative and antioxidative processes in the body fluids and cells (1). In recent studies Zn has important role in immune system, glandular, reproductive and cell health. And an important in structure of some enzymes and also play role in improving diseases such as pneumonia and diarrhea(2). We need Zn for the normal growth, and is required for more than 200 metalloenzymes including the antioxidant enzyme (3,4). Generally Zn is present in most of food which daily consume. Normally in the body, concentration of Zn is highest in muscle tissue and bone. We don't need zinc supplementation by oral way if we eat healthy food (vegetables, fruits, and some protein sources) (5). In African countries, the number of deaths by TB. is higher than another countries. Every person has TB can infect an average of 10 to 15 persons per year. TB is usually associated with malnutrition and loss of weight. Several studies have been shown that decrease in the serum levels of many micronutrients and vitamins lead to malnutrition and many wasting diseases (6).

2.Material and Methods

The search was conducted on 60 cases, 18-60 years old. This study was conducted in Abosita hospital (last years). The cases were divided into 3 groups (A, B and C) 20 cases in each. Groups A and B were the experimental groups, whereas group C served as a control. In the experimental groups there were cases affected by clinical form of TB.. All group A were females, and group B were males. In control group there were healthy people whom their clinical and laboratory investigations did not demonstrated TB. or any other disease. Our data, including: age, sex, nationality, height and weight were recorded. Blood samples were collected from peripheral blood (5cc) and collected from each case before and after treatment and sent to the laboratory. Serum Zn level was measured by atomic absorption spectrophotometry method. The statistical analysis was performed using Tukey post-hoc and correlation coefficient. The data were expressed as mean and standard error of mean (Mean± SD), and P value < 0.05 was considered as significant.

3.Results

A total of 60 cases were evaluated in three groups. In each experimental group there were 11 Libyan (55%) and 9 another nationalities (45%). The youngest case was 18 years old and oldest was 60. The average Zn concentration in serum of cases is presented in table 1 and figures (1, 2). Figures (1, 2) shows that average Zn concentration in individual groups of cases was different. The lowest Zn level was stated in serum from the experimental group A (69.88 µg/dl). A slightly more than that was in serum

from the experimental group B (70.15 µg/dl). And the highest Zn level was in serum from the control group (81.10µg/dl). Analyzing the group A, the lowest average Zn level in serum of cases obtained before treatment, and then in group A there was observed a clear increase of Zn level in serum of cases after treatment until to be near to the level of Zn in control group (79.40 µg/dl), as a result of the applied drugs. Also when we analyzing the group B, the lowest average Zn level in serum of cases obtained before treatment, and then in group B there was observed a clear increase of Zn level in serum of cases after treatment until to be near to the level of Zn in control group (79.88 µg/dl), also as a result of the applied drugs.

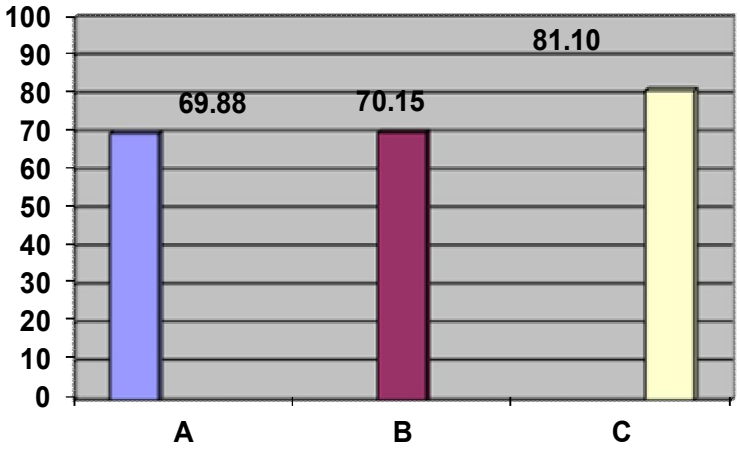

Fig. 1. Average concentration of zinc in the serum before treatment

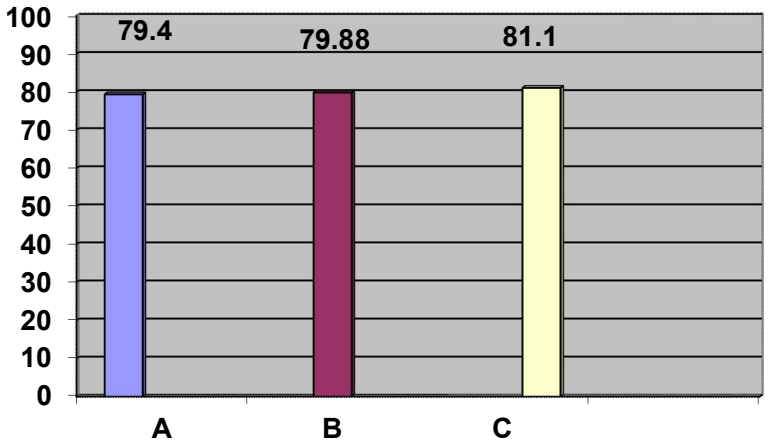

Fig. 2. Average concentration of zinc in the serum after treatment

Table 1: Zinc levels in each group before and after treatment

Serum Zinc (µg/dl)	Group A	Group B	Group C
Before treatment	69.88 ±6.9	70.15 ±5.4	81.10±3.6
After treatment	79.40 ±2.8	79.88 ±2.3	81.10±3.634

*Differences statistically significant ($P \leq 0.001$) before treatment.
*Differences statistically significant ($P \leq 0.05$) after treatment.

4.Discussion

Before years ago, many studies have been started studying the relation of various micronutrient to the body. Studies in(1998, 2009), they have been observed low level of Zn during active TB. (7,8). In our study, TB. cases had a lower serum Zn level as compared to the control group. Also another study in 2004, studied the serum levels of Zn in patients suffering from pulmonary TB, that study showed TB. patients had lower serum Zn level as compared to control group (9). In 2002, they have been observed TB. patients were improving by giving Zn supplements to their standard TB. medication (10). In some researches had changes in serum level of Zn during and after treatment (11,12). In our study, we observed clear increase in serum level of Zn after treatment. Many researches also prove this fact. Our research was conducted with the aim of evaluating serum level of Zn in TB. patients as well as determining the serum level of Zn after treatment. Therefore, measuring the serum level of Zn with other examinations as direct microscopy and culture of *M tubercolosis* would help the physicians in the diagnosis of TB.

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