

Measurement of serum zinc level in patients with warts, cardiovascular diseases, and leukemia

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ABSTRACT

Objectives: To evaluate serum zinc (Zn) level in patients with warts, cardiovascular problems, and leukemia.

Patients and methods: One hundred eighty six patients with warts, cardiovascular problems, and leukemia; plus ٣٠ apparently healthy volunteers were included in this study. The patients were classified according to their clinical conditions to three groups. Seventy three patients with skin warts, ٧٨ patients with cardiovascular diseases (CVD), and ٣٥ patients with leukemia. Blood samples were taken from patients and controls. The blood was placed in zinc free plastic tube left for ٤٥ minutes, then separated by centrifuge to obtain the serum. To one ml of the serum, ٩ ml of ٢٥% trichloroacetic acid were added and shaken for ١٠ seconds. Then the samples were put in a water bath at ٣٧ °C for ١٠ minutes, centrifuged and the supernatant was transferred into a clean plastic tube, each sample was aspirated into atomic absorption spectrophotometer and the element was measured.

Results: This study revealed a significant decrease ($p < ٠.٠٥$) of serum Zn level in patients having warts compared with the control group. Also, a significant decrease ($p < ٠.٠١$) was noticed in the level of Zn in each group of patients with CVD and leukemia compared with the control group.

Conclusion: Serum Zn level decreased in skin warts, cardiovascular diseases, and in leukemic patients, which may require special attention to this point.

الخلاصة

الهدف: ان هدف الدراسة هو تقييم مستوى الخارصين (Zn) في مصل دم المرضى الذين لديهم ثآليل في الجلد، والمرضى الذين يعانون من مشاكل في الجهاز القلبي الوعائي، وكذلك مرضى ابيضاض الدم. **المشاركون وطرائق العمل:** ان مجموع الاشخاص الذين جرت عليهم الدراسة هو ١٨٦ مريضاً لديهم ثآليل في الجلد، مشاكل في الجهاز القلبي الوعائي، وابيضاض الدم. اضافة الى ٣٠ شخص يبدون اصحاء كعينات ضبط. قسم المرضى الى ثلاث مجموعات: ٧٣ مريضاً عندهم ثآليل، 87 مريضاً لديهم مشاكل في الجهاز القلبي الوعائي، ٣٥ مريضاً مصابين بابيضاض الدم. اخذت عينات الدم من المرضى ومن مجموعة الضبط ثم وضعت في انابيب بلاستيكية خالية من عنصر الخارصين. تركت العينات لمدة ٤٥ دقيقة ثم فصل المصل بواسطة الدوران بجهاز المفتل، بعد ذلك اضيف ٩ مليلتر (مل) من محلول ثلاثي كلور الخل الثلجي بتركيز ٢٥ % الى ١ مل من مصل الدم لكل عينة من المرضى ومجموعة الضبط بعدها رج الانبوب لمدة ١٠ ثوان ثم وضعت الانابيب في حمام مائي عند درجة ٣٧ درجة مئوية لمدة ١٠ دقائق ثم ادخلت جهاز المفتل مرة اخرى وسحب الجزء العلوي الصافي من النموذج ووضع في انبوب بلاستيكي نظيف بعد ذلك ادخل النموذج الى جهاز الامتصاص الذري لقياس مستوى الخارصين في كل نموذج.

النتائج: اظهرت نتائج الدراسة وجود انخفاضاً معنوياً ($p < 0.05$) في مستوى الخارصين في امصال المصابين بالثآليل مقارنة لمجموعة الضبط. وانخفاضاً معنوياً ($p < 0.01$) في مستوى الخارصين في امصال دم المرضى الذين يعانون من امراض الجهاز القلبي الوعائي وكذلك مرضى ابيضاض الدم بالمقارنة مع مجموعة الضبط.

الاستنتاج: كان هناك انخفاضاً معنوياً ملحوظاً لمستوى الخارصين في امصال المرضى الذين لديهم ثآليل في الجلد، مشاكل في الجهاز القلبي الوعائي و ابيضاض الدم بالمقارنة مع مجموعة الضبط مما يستدعي الانتباه الطبي لهذه المعلومة.

Zinc (Zn) is an essential trace element, necessary for the proper functioning of several enzymes in the body^١. Subnormal Zn levels have been reported in patients with dietary deficiencies, atherosclerosis, malignant tumors, myocardial infarction, acute and chronic infections^{٢,٣}. Zinc deficiency produces slow wound healing, and symptoms of vitamin A deficiency^٤. Also low sperm count, hair loss, sleep problems, mental lethargy, and pustular dermatitis^{٥,٦}.

People absorbed too little Zn from their diet experienced loss of appetite, decrease sense of taste and smell^٧. However, Zn has become a common dietary supplement^٨, and as far as Zn was an essential trace element for body growth and diseases resistance^٩, a measurement of serum Zn level is an important requirement for all age groups, and special need for those having different diseases.

In this work, serum Zn level was measured by atomic absorption spectrometry and the study was oriented to measure the level of Zn in patients having skin warts, patients with angina pectoris and myocardial infarction, and patients with leukemia.

Subjects and Methods

Subjects

This study was conducted in the Departments of Dermatology and Intensive Care Unit at Rezgari, Al-Jammhori, and Nanakali Hospitals, Erbil. The total numbers of samples were ٢١٦; divided into ١٨٦ patients with Warts, cardiovascular problems, Leukemia. The control group included ٣٠ apparently healthy volunteers, ١٥ females their ages ranged between ٢٠-٦٠ years (mean±SD: ٣٠±١٥.٠٨), and ١٥ males their ages ranged between ٢٠-٦٥ years (mean +SD: ٣٠±١٣.٧٥). The patients were classified according to their clinical conditions to three groups.

The first group included ٧٣ patients, with skin warts, ٤٣ females, their ages ranged between ٢-٤٢ years (mean±SD: ٣٣±٨.٥٨), and thirty males, their ages ranged between ٣-٣٦ years (mean ±SD: ٣٣±١٣.٧٥).

The second group included ٧٨ patients with cardiovascular problems, ٣٣ females, their ages ranged between ٥٥-٧٣ years (mean +SD: ٦٣±٥.٢٢), and ٤٥ males, their ages ranged between ٥١-٧٦ years (mean±SD: ٦٤±٥.٥٥). Those patients were selected from Intensive Care Unit.

The third group included 30 patients with leukemia. Sixteen females, their ages ranged between 7-56 years (mean±SD: 34±16.08), and 14 males their ages ranged between 5-63 years (mean±SD: 30±19.42). Those patients were seen in Nanakali Hospital.

Methods and Instruments

Venous blood samples (5 ml) were taken from participants by venipuncture. The blood was placed in Zn free plastic tube, left for 30 minutes, then separated by centrifuge (3000 rpm) to obtain the serum. Frozen samples were thawed at room temperature. To 1 ml of the serum, 9 ml of 2% trichloroacetic acid were added and shaken for 10 sec. Then the samples were put in a water bath at 37 °C for 10 min centrifuged and the supernatant was transferred into a clean plastic tube, each sample was aspirated into air acetylene flame and the element was measured^{9,10}.

The instrument used was atomic absorption flame emission spectrophotometer, PYE-Unicom with

hollow cathode lamp, sort of flame air, acetylene gas, absorption at 213.86 nm. The instrument used at the Department of Chemistry, College of Science, University of Salahadden, Erbil.

Data are presented by mean±S.D. and were analysed using unpaired t-test to compare data between patient and control parameters.

Results

Serum Zn level was decreased significantly ($p < 0.05$) in patients with warts. Also significant decrease ($p < 0.01$) of serum Zn was noticed in patients with cardiovascular problems and in leukemic patients compared with the control group (Table 1).

Data also showed that the mean serum Zn level for female groups were significantly decreased compared with controls, but the mean serum Zn levels for female patients with warts and cardiovascular problems were higher than the mean serum Zn level of leukemic patients (Table 2).

Table 1: Serum zinc levels in the control and patient groups.

Variables groups	Control group N=30	Patients with Warts N=23	Patients with cardiovascular problems N=28	Leukemic patients N=30
Zinc (μ/dl)	97.37±10.81	79.32±17.1*	71.21±10.90**	56.04±11.28**

* $p < 0.05$ patients vs controls, ** $P < 0.01$ patients vs controls

Table 2: Serum zinc levels in female control group, skin warts, cardiovascular problems and leukemic patients.

Variables groups	Control group N=10	Patients with warts N=13	Patients with cardiovascular problems N=33	Leukemic patients N=16
Zinc (μ /dL)	90.09 \pm 11.12	67.16 \pm 10.07*	61.92 \pm 9.27*	59.82 \pm 10.01*

* $p < 0.01$ patients vs controls

Table 3: Serum zinc levels in male control group, skin warts, cardiovascular problems and leukemic patients.

Variables groups	Control group N=10	Patients with warts N=30	Patients with cardiovascular problems N=40	Leukemic patients N=19
Zinc (μ /dL)	99.09 \pm 10.62	60.00 \pm 11.74*	60.64 \pm 12.13*	53.09 \pm 11.81*

* $p < 0.01$ patients vs controls.

Serum zinc levels for male patient group were significantly decreased as compared with the controls. However, serum zinc levels for male patients with warts were higher than the mean zinc levels of patients with cardiovascular problems and leukemia (Table 3).

Discussion

In this study, serum zinc level in patients with warts was significantly lower than controls. This finding is consistent with the finding of Al-Gurairi et al.¹¹, who found that zinc was considered as immunomodulator, and its deficiency caused lymphopenia and reduced immune capacity among patients with viral warts. also zinc deficiency in those

patients was due to inadequate amount of zinc carrier protein which lead to decrease zinc absorption. Shear¹² suggested that zinc therapy is very helpful for warts in patients with low serum level of zinc, while no beneficial effect of zinc treatment could be demonstrated on either clinical or inflammation indexes¹³.

The results of this study demonstrated that cardiovascular problems have reduced level of serum zinc, this finding is consistent with that of other studies^{7,14}, who found that zinc deficiency was associated with atherosclerosis and coronary artery disease due to decrease in high density lipoprotein and apoA-lipoprotein.

Eby¹⁰ noticed that, the elderly tend to avoid meat and other high zinc content foods, due to fears of cholesterol, and they increase consumption of refined wheat products which is zinc depleted diet, and this lead to increase adverse cardiovascular events. Zinc acts as a hypolipidemic and antiatherogenic agent¹¹.

This study also found a significant decrease in serum zinc level in patients with leukemia. This result is in agreement with the study of Shin et.al.¹¹, who found that a low level of zinc were often noticed in acute and chronic lymphatic leukemia and malignant lymphoma. Eby¹⁰ noticed that leukemic cells contained much less zinc than normal lymphocytes, suggesting an error in zinc metabolism, which appears correctable with zinc treatment. Eby¹⁰ also found that pre-acute lymphatic leukemia in child is often marked by sever atopic-like allergic reaction, major and/or frequent upper respiratory viral infections and fevers, taste and appetite suppression, growth suppression, lethargy, depression, diarrhea, and offensive body odor. Each of these conditions can be a symptom of zinc deficiency.

This study also showed that there is no significant difference in serum zinc level according to gender. These results are consistent with other workers¹², who found that the difference in serum zinc level among sex were not significant. However, Nsonwe et al.¹³ found that females have significantly higher serum zinc level than males,

In conclusion, serum zinc level was significantly decreased in patients with skin wart, cardiovascular diseases and leukemia this in turn may require medical intervention by a specialist.

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