

Serum zinc in psoriatic patients

Adnan Abd Oun Hashim Al-Jebory PhD

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Address for Correspondence:

Dr. Adnan Abd Oun Hashim Al-Jebory
E-mail: adnanaljebory@yahoo.com

Abstract

Background: Psoriasis is a common skin disorder affecting 1% to 3% of the population all over the world. Many etiological factors have been implicated but trace elements, especially zinc, may play an important role.

Aims: This study was done to evaluate the serum level of zinc in patients with psoriasis and its relation to clinical types, duration and surface area of the disease.

Patients and Methods: Fifty patients (25 males & 25 females) with different ages and different types of psoriasis were chosen for this study. Also 50 non-psoriatic volunteers, sex and age matched were served as controls, evaluated for serum zinc level.

Results: The result of this study has shown that 49 (98%) of psoriatic patients have low serum zinc compared with 2 (4 %) among controls ($P=0.0001$). The type of psoriasis may have an effect on serum zinc, the lowest mean serum zinc is found in palmo-planter (plaque) psoriasis (14% of patients) ($P=0.025$).

Conclusions: From this study we can conclude that zinc deficiency may play a role in psoriasis since most patients (98%) have low serum level.

Keywords: Psoriasis, Clinical types, Serum zinc

INTRODUCTION

Psoriasis is a common inflammatory & proliferative disease of the skin.^[1] It is characterized by well -defined, erythematous plaques bearing large, silvery adherent scales,^[2] The lesions have predilection for scalp, extensor surfaces of the limbs, elbows, knees, sacrum & nails.^[3] It is a genetically determined disease provoked & exacerbated by many factors as trauma, infections, drugs and psychogenic factors.^[4] However very little attention have been paid to the role of dietary factors, especially the trace elements regarding psoriasis.

There are many clinical types of psoriasis as psoriasis vulgaris, guttate psoriasis, erythrodermic psoriasis, pustular psoriasis and psoriatic arthropathy.^[5]

Zinc is a trace element involved in many cellular processes, including T-lymphocyte activity. Essentiality of zinc is related mainly to its function as metal moiety of important enzymes.^[6] Historically, for more than 3000 years, zinc salts such as zinc oxide or calamine were applied topically to facilitate wound healing. In the past fifty years progress has been made about association of zinc with numerous skin pathology.^[7] It has been shown to be a cofactor of over 300 metalloenzymes and over 2000 transcription factors.^[8] Zinc stabilizes the cell membrane, protect their integrity by reducing the formation of free radicals and prevention of lipid peroxidation, zinc is also required for immune system function, protein synthesis and wound healing.^[9]

The main sources of zinc are oysters, fish, meat and cheese. Our skin contains 1/5 of our bodies zinc supply.^[10] Normal plasma level of zinc is 12-17 μ mol/L.^[11] Endemic zinc deficiency is recognized to be a common and serious problem in developing countries.^[12] Nutritional supplement with zinc may have a role in psoriasis treatment but have received very little attention from medical researchers.^[14]

This study was conducted to evaluate the serum level of zinc in psoriatic patients and it's relation to clinical types, duration and surface area of the disease.

PATIENTS AND METHODS

The study was performed on 50 psoriatic patients & 50 (sex & age matched) non-psoriatic healthy individuals (controls) attended the Department of Dermatology and Venereology of Al-Yarmook Teaching Hospital in Baghdad City during the period from January 2010 to July 2011. A questionnaire form was designed to include name, age, sex, and duration of disease, occupation, residence, family history of psoriasis, alcohol intake, smoking habit and topical & systemic therapies in relation to psoriasis if any.

Patients were examined to assess the clinical type of the disease and its surface area. All subjects (cases & controls) were investigated for measurement of serum zinc level.

None of the patients nor the control subjects had history or clinical evidence of other associated disorders which might result in increase or decrease in the serum level of zinc (as malignant diseases).

Five milliliters of blood from each study subject was taken from venous blood, which then centrifuged and the serum was sent for determination of zinc by Shimadzu flame & flameless atomic absorption model, A.A.-670. Sera of the samples of selected specimens were inverted at room temperature for several times, and then diluted 10 folds by mixing one volume of serum with nine volumes of de-ionized water. The normal zinc level in this technique is 14.07 $\pm$ 0.81 μ mole/L.

Statistical analysis was done by using SPSS. Student t-test was used to test for the significance of difference of the means of the cases and the controls. ANOVA test is also used to test for differences in means among different types of psoriasis. P value <0.05 is considered significant.

RESULTS

The mean age of the patients was 33.64 years $\pm$ 15.2. The mean age of the controls was 34 years $\pm$ 12.5. Table 1 shows range & mean of zinc level in both psoriatic patients & controls. There was significant difference between the means of both groups (P=0.0001). Table 2 shows the distribution of the mean serum zinc according to the clinical types of psoriasis, which shows that the lowest mean serum zinc level, is found in palmo-planter (plaque) psoriasis (10.654 $\pm$ 0.81651 μ mol/L), and followed by plaque (non-scalp, non palmo-planter) type (11.215 $\pm$ 0.7818 μ mol/L), even though generalized pustular psoriasis is the lowest (10.220 $\pm$), but it could be neglected since it was one case only. ANOVA test proved that there is a significant differences in means of serum zinc among different types of psoriasis (P= 0.025).

Multiple comparison performed by Bonferroni test and it has proved there is only significant difference in means of plaque (non-scalp, non palmo-planter) and scalp psoriasis (P= 0.033). Table 3 shows the mean serum level of zinc in relation to percentage of body involvement by the disease. The serum zinc level in group 2 (more than 20% of body surface area) is slightly lower than that of group 1 (less than 20% of body surface area). (P value = 0.881). However both group's values are lower than normal values and the result is not significant.

Table 4 shows the mean serum level of zinc in relation to duration of the disease. The serum zinc level is slightly lower in patients who had the disease for 5 years and above than that of patients who had the disease for less than 5 years, but the result is not significant (P value > 0.05).

Table 1. The mean serum zinc level in both psoriatic patients & controls.

Study Subjects (Total n=100)	Serum zinc (μ mol/L)	
	Range μ mol/L	Mean $\pm$ SD
Psoriatics (n=50)	10.01-13.81	11.2512 $\pm$ 0.8434
Controls (n=50)	13.49-14.35	13.9198 $\pm$ 0.1955

Table 2. The mean serum zinc level according to the type of psoriasis.

Type of psoriasis	No. of cases	%	Serum zinc (μmol/L) Mean±SD
Plaque (non-scalp, non-palmo-planter)	29	58	11.215±0.7818
Scalp	4	8`	11.962±0.8759
Generalized pustular	1	2	10.220±0.8432
Erythrodermic	5	10	11.224±0.7879
Palmo-planter pustular	2	4	11.665±0.8325
Palmo-planter (plaque)	7	14	10.654±0.8165
Guttate	2	4	12.600±0.7948
Total	50	100%	11.2512±0.8434

ANOVA F test= 2.69, P= 0.032 (Post Hoc test of Bonferroni is only significant for scalp & guttate compared to palmo-planter (plaque) psoriasis comparison, mean difference=1.308; P=0.027 & 1.946; P= 0.012 respectively).

Table 3. Mean serum levels of zinc in relation to percentage of body involvement by the disease.

Percentage of body involvement		No. of cases	%	Serum zinc (μmol/L) Mean±SD
Group 1	<20%	29	58	11.2358±0.8434
Group 2	20%&more	21	42	11.2721±0.8357
Student's t-test= 0.1414; P=0.881 (Not significant)				

Table 4: Mean serum level of zinc in relation to duration of disease.

Duration of the disease	No. of cases	%	Serum zinc (μmol/L) Mean±SD
Below 5 years	36	72	11.2125±0.7784
5 years & above	14	28	11.3507±0.8481
Student's t-test= 0.5477; P=0.585 (Not significant)			

DISCUSSION

Although the cause of psoriasis is still unknown, there is increasing evidence of a complex interaction between altered keratinocytic proliferation and differentiation, inflammation and immune dysregulation.^[14] The mean serum zinc level in psoriatic patients in this study is 11.251 μmol/L which is below the normal level in comparison with matched controls whose mean serum zinc level is 13.919 μmol/L (table 1). This result is

significant and in agreement with many previous studies.^[14-16]

Crutchfield et al.^[17] used topical zinc pyrithione as ointment in the treatment of psoriasis and found significant improvement of psoriatic lesion which might explain our result of low serum level of zinc in psoriatic patients. Rowlands et al.^[18] using topical preparation contains zinc and found complete recovery of the classical histopathological features of psoriasis with

disappearance of neutrophils and prominent apoptosis at 24 hours which he explained as due to blockage of cytokine and growth factor at some level and induction of apoptosis. Ozturk et al.^[19] found no significant difference between patients with psoriasis vulgaris and healthy controls regarding serum zinc level. Derno B et al.^[20] found that plasma zinc decreased only in generalized pustular psoriasis while in this study all types of psoriasis showed low serum level of zinc although the postural type showed the lowest level. This study revealed no significant relation between duration of disease and serum zinc level.

Conclusion

This study revealed that there is a highly significant association between psoriasis and low serum zinc level, whether this is the cause or the result of the disease process, needs further studies to clarify this issue.

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