Serum Selenium in Psoriatic Patients

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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 selenium, may play an important role.

Objective: This study was done to evaluate the serum level of selenium in patients with psoriasis and it's relation to clinical types, duration and surface area of the disease.

Patients & 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 selenium level.

Results: The result of this study has shown that 94% of psoriatic patients have low serum selenium compared with 4% among controls (P=0.0006). The type of psoriasis may have an effect on serum Selenium (P=0.025), the lowest mean serum selenium is found in plaque (non-scalp, non-palmo-planter) psoriasis (58% of patients). The higher extent of body involvements is associated significantly with reduced serum selenium (P=0.0004).

Conclusion: From this study we can conclude that selenium deficiency may play a role in psoriasis since most patients (94%) have low serum level.

Key words: psoriasis, clinical types, serum selenium.

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, pustural psoriasis and psoriatic arthropathy. [5]

Selenium (Se) is an essential trace element for human & many other forms of life. The current, recommended daily allowance is 55µg for a healthy adult .Selenium has been shown to regulate the functions of many intracellular proteins by being a chemical component of selenoproteins as either selenocysteine or selenomethionine.[6,7] It has anti-carcinogenic properties.[7] Anticancer effects may be mediated through changes in the proliferation of certain cells (such as promotion of immune cells), cell apoptosis &/or toxic effect on cancer cells.[8] The preventive factor is an organic compound containing selenium as the active ingredient. Selenium is part of the enzyme glutathione peroxidase which helps in prevention of accumulation of hydroperoxides in lipids of cell membranes and it plays an important role in the body's antioxidants defense against the deleterious effect of free radicals. Some of the functions of selenium & vitamin E overlap. [9]

Selenium is known to affect the immune system. A slight but statistically significant increase in the number of CD4+ T cells was observed after selenium supplementation in the reticular dermis of the psoriatic lesions whereas the number of CD8+, CD11c+ & CD1+ cells were not significantly altered (suggest that selenium may be able to modulate immunological mechanism of psoriatic lesions by increasing the number of CD4+ T cells.[10] Selenium dietary intake could be one of the contributing factors in the pathogenesis & course of psoriasis.(11) Vitamin E reduces loss of Se requirements by preventing loss of Se from the body or maintaining it in an active form.[12] Significantly lower Se intake could be expected in people eating little meat especially fish meat & obtaining their food supply from low Se. areas .The human blood Se level, seems to be regulated in the vicinity of 20µg /100ml.[13,14] This study was conducted to evaluate the serum level of selenium in psoriatic patients and it's relation to clinical types, duration and surface area of the disease.

Patients & Methods

The study was performed on 50 psoriatic patients & on 50 (sex & age matched) non–psoriatic healthy individuals (controls) attended the Dermatological & Venereological Department of Al-Yarmulke Teaching Hospital in Baghdad City in the period from January 2002 to July 2002. 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 selenium 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 selenium (as malignant diseases).

Five milliliters of blood from each study subject was taken from venous blood, put in a test tube which then centrifuged and the serum was sent for determination of selenium 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 selenium level in this technique is 1.62± 0.08µmole/L.

Results:

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.

The mean age of the patients was 33.64 years ±15.2. The mean age of the controls was 34 years ±12.5.

Table 1 shows range & mean of selenium level in both psoriatic patients & controls. There was significant difference between the means of both groups (P=0.0006).

Table 2 shows the distribution of the mean serum selenium according to the clinical types of psoriasis, which shows that the lowest mean serum selenium level, is found in plaque type (non–scalp, non-palmoplanter) psoriasis (0.907µmol/L), and followed by erythrodermic type (0.930µmol/L). ANOVA test proved that there is a significant differences in means of serum selenium 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).

The result showed that 47 (94%) of 50 psoriatic patients have serum level of selenium below normal value while only 3 patients (6%) have serum selenium level within normal limit and the highest frequency was found in plaque type (58%), while only 2 (4%) of controls showed low serum selenium.

Table 1: Range, mean and SD of serum selenium level in both psoriatic Patients & controls.

Study Subjects (Total n=100)	Serum Selenium	
	Range µmol/L	Mean µmol/L ± SD
Psoriatics (n=50)	0.61-1.65	0.97144 ± 0.269224
Controls (n=50)	1.59-1.67	1.6322 ± 0.0116

Student's t-test= 17.564, P=0.0006 (highly significant)

Table 2: The mean and SD of serum selenium level according to the type of psoriasis.

Type of psoriasis	No. of cases	%	Mean ±SD serum level of selenium µmol/L
Plaque (non-scalp, non-palmo-planter)	29	58	0.907±0.281772
Scalp	4	8`	1.332±0.275943
Generalized pustular	1	2	1.520
Erythrodermic	5	10	0.930±0.087846
Palmo-planter pustular	2	4	1.065±0.032527
Palmo-planter (plaque)	7	14	0.943±0.116455
Guttate	2	4	1.020±0.094752
Total	50	100%	0.97144±0.269224

ANOVA F test= 2.723, P= 0.025 (Post Hoc test of Bonferroni is only significant for scalp and plaque (non-scalp, non-palmo-planter) psoriasis comparison, mean difference=0.425, P= 0.033)

Table 3 shows the mean serum level of selenium in relation to percentage of body involvement by the disease. The serum selenium level in group 2 (more than 20% of body surface area) is lower than that of group 1 (less than 20% of body surface area), however both group's values are lower than normal values and the result is highly significant (P value = 0.0004).

Table 4 shows the mean serum level of selenium in relation to duration of the disease. The result is not significant (P value > 0.05).

Table 3: Mean and SD of serum levels of selenium in relation to percentage of body involvement by the disease.

Percentage of body involvement		No. of cases	%	Mean ± SD serum selenium µmol/L
Group 1	**<20%**	29	58	1.11897±0.24335
Group 2	**20%&more**	21	42	0.77624±0.14568
Student's t-test= –5.742 **P=0.0004 (highly significant)**				

Table 4: Mean and SD of serum level of selenium in relation to duration of disease.

Duration of the disease	No. of cases	%	Mean ±SD serum selenium µmol/L
Below 5 years	36	72	0.97372±0.27842
5 years & above	14	28	0.97836±0.24805
Student's t-test= 0.05414 P=0.957 (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]. Since selenium plays a role in cell proliferation and cell cycle [15] so selenium may modulate psoriatic pathology.

The mean serum selenium level in psoriatic patients in our study is 0.97144 µmol/L ±0.269224 which is below normal limit (normal value is 1.62±0.08); this result is in agreement with other two previous studies by Corrocher et al [16] and Fairris. [17] In contrast to Donadini[18] who found no significant reduction in serum selenium level in psoriatic patients, our study has showed decreased serum selenium level in 94% of psoriatic patients.

Michaelsson et al [19] found low plasma selenium level in moderate & severe psoriasis and most of their patients (85%) had had their psoriasis for at least 10 years. Our study also has shown lower level of serum selenium in group 2 (20 % and more of body surface area) in comparison to group 1 (less than 20% of body surface area) and the result is significant (P= 0.0004), keeping in mind that both groups have lower serum selenium than normal controls. This indicates that the higher surface area of involvement, the lower serum selenium level is.

Our study proved that there is no significant association between duration of disease and serum selenium level, although Michaelsson et al [19] have proved such association.

Conclusion:

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

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