Case Report

TRACE METALS IN TREATMENT OF PSORIASIS*

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SUMMARY: Psoriasis in an ancient disease etiology and treatment of which is still not sufficiently known. We therefore tried oral zinc in a series of patients, a demonstrative example of which is presented here: A 14 year old girl complaining of recurring lesions of psoriasis since four years was treated with oral zinc. Complete cure followed. The clinical and laboratory data are presented. It appears that oral zinc administration has a place in treatment of psoriasis.

Key words: Psoriasis, serum zinc, serum copper, metalloenzymes.

INTRODUCTION

Psoriasis is an ancient disease described by Celsus (6) nearly two thousand years ago (6). Despite this long history it is still affecting nearly 3% of the population in the United States (5). Its cause and treatment still remains unknown and its prognosis unfavorable with recurrence rates being over 90% (6).

On reviewing the literature of the last two decades concerning psoriasis, one is impressed with the possibility that the trace elements may play an important role in its etiopathogenesis and treatment (7-10, 23,24). In fact a debate (7-9, 23,24) started in 1967 resulted in no clarification of the subject despite the fact that many research groups contributed with their observations (10,18,20,23, 28-30). During the last several years these problems were re-investigated in a series of psoriatic patients especially from the point of serum zinc and copper levels and related enzymes in our laboratory. A demonstrative case will be presented here.

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CASE HISTORY

Z.K., a 14 year old girl (Prot. No 27842), came to Hacettepe Univ. Hospital complaining on nonhealing wounds on the scalp and legs with itching on Feb. 3, 1989.

Her complaints started six years ago when she first noticed development of richly scaling and itching wounds covered with crusts on varying areas of her body. Each individual lesion remained active for an unpredictable duration ranging from 2 months to 6 months and disappeared leaving no scar behind. For the first five years the lesions appeared during winter and spontaneously healed during the summer. During the last year this marked periodicity disappeared and her complaints became permenant.

During the last 10 months similar lesions appeared at the scalp and especially above and behind the left ear, and to a lesser extent on the other regions of the scalp.

The patient also complains of thinning and loss of hair and scaling all over the head.

Physical examination revealed a well developed well nourished adolescent girl in moderate emotional stress for which she offered no explanation. There were no abnormal findings concerning the systems.

The skin however revealed important pathological findings: in the left temporal region there were itching and yellow coloured lesions approximately 15 x 30 mm cov-

ered with yellow crusts and scales. They were surrounded by many punctate lesions (3 x 5 mm). Behind the left elbow and on the left forearm there were three lesions measuring approximately 5 x 8 mm also covered by crusts and surrounded by smaller punctate lesions (3 x 5 mm). Similar small lesions covered with silvery crusts were scattered over her back and to a lesser extent over her abdomen. On the outer aspect of the left tibia the largest lesion (8 x 15 cm) with irregular boundaries was observed. It was covered by yellow crusts. On it there were also shining silvery scales, which left punctate hemorrhages when removed (Figure 1).

Figure 1.

Laboratory findings: Hemoglobin 13 g/100ml, Hematocrit: 40%, WBC: 13200/cmm, RBC: 4 100 000/cmm, sedimentation rate 12 mm/hr, fasting blood sugar 100 mg/dl, lipids 665 mg/dl, and cholesterol 156 mg/dl. Serum zinc level was 74 μg/dl and serum copper level 100 μg/dl. Zinc content of 10^{10} erythrocytes was 9.5 μg. 24 hour, urine contained 200 μg zinc and 16 μg copper (Table 1).

A biopsy was performed which confirmed the clinical diagnosis of psoriasis. Zinc treatment was started (3,4). A month later there was 80% healing. The lesions in the scalp and the punctate lesions on the lateral tibia, abdomen and back had completely disappeared and the ulcer on the left lat. tibia was greatly reduced in size.

Table 1: Laboratory Findings.

Date of sampling	3.3.1989	19.4.1989	29.8.1989
SGOT	15	-	14
SGPT	6	-	5
Alk. phosphatase	9.8	5.6	8.3
Catalase	1.340	0.960	2.240
Ceruloplasmine	220	230	270
SOD	3571	4000	-
G6PD	-	81	96
Serum Zinc	74	86	76
Zinc of 10^{10} erythrocytes	9.5	10.8	12.7
Erythrocyte Zn	1008	888	1224
Serum Cu	100	104	110
Sedimantation rate	12	27	10

The lesions completely disappeared at the 2nd month of treatment.

DISCUSSION

Psoriasis, afflicting present nearly 3% of the population in the United States is not a rare disease (5). It is amenable to treatment but recurrences occur frequently (6,22), perhaps because of chronic or recurrent streptococcal infections (1,5,12), or due to a defect in cyclo-oxygenase pathway and PGE_2 production (6), or to local production of interferon (26) or to other causes. Nevertheless, among those who respond favorably to treatment more than 90% succumb to recurrences with time (6). Approaches to treatment of the disease vary from coal tar baths (22) to local application of anthralin (14), cortisone (2,15,16,20,21,27), ACTH (13), Grenz rays (16), methotrexate (2,25), PUVA (22) and UVB (22), interferon (21) and finally cyclosporin (27). It is interesting that many objections have been raised to these remedies (2,13,16,21,25). Further more their multiplicity stress their inadequacies. We therefore initiated research in order to illuminate the possible role of trace metals in the pathogenesis and treatment of psoriasis. This approach appears reasonable because copper and zinc are known to be among the constituents of the skin and to play essential roles in maintenance of its function in association with the enzyme systems activated by trace metals (18, 19).

Greaves and Boyde found significantly reduced plasma zinc levels in patients with psoriasis (7-9). They reported 39 patients with psoriasis and 13 cases with

other skin diseases whose serum zinc levels were reduced (7). According to these authors Panomerava took a year before reporting the same observation. Voorhees *et al.* reported 10 psoriatic patient, 4 of whom revealed significantly reduced serum zinc levels (28). Zinc administration to these patients produced no increase in zinc content of the involved skin, the authors therefore concluded that "zinc is no better than placebo in the treatment of psoriasis". They observed however that zinc content had increased in psoriatic scales, in serum, uninvolved skin and in urine. They therefore believed that systemic zinc deficiency is unlikely to be the basic error in psoriasis.

Portnoy and Molokhia, determining the zinc concentration of skin obtained from psoriatic patients and from normal controls and found no significant differences (18, 19). The range of variation of serum zinc values in psoriasis was very wide. However, they observed a significant increase in serum copper levels in psoriatic patients (18). They later reported 40 patients in whom no reduction was found in serum zinc levels even in the severely affected group (over 10% of the body surface) of psoriatics (23). They further studied plazma zinc, serum albumin and alkaline phosphatase in thirty five psoriatics and their age and sex matched controls (17) between which no significant difference was seen. The patients with extensive involvement in this series however revealed lower levels of zinc compared to those with minimal involvement (17).

Molokhia and Portnoy observed that nearly 10 times as much copper existed in the epidermis as the dermis which would suggest that copper concentration alterations in the dermis would greatly be overlooked if the concentration of these elements is not determined in the two layers of cutis separately. This is an important technical point which deserves further attention (19).

Hinks *et al.* (10) found the zinc concentration of plasma and leucocytes of patients with psoriasis and eczema to be within normal limits. Copper levels, however, were significantly elevated. In contrast, selenium concentrations were reduced.

Kekki *et al.* (14) studied ceruloplasmin bound copper and noncerulopasmin bound copper in patients with psoriasis and in normal controls. No difference was seen in the ceruloplasmin bound copper between the two series.

The rather detailed review of the literature above indicates that any part played by zinc, copper and selenium, in the pathogenesis of psoriasis still remains questionable. We therefore collected a series of cases where serum copper and zinc and a series of related enzymes were measured before and during zinc and copper administration (3,4). As is seen in the record of the presented case we believe that most of our patients obtained benefit from oral zinc treatment.

The difference perhaps originates from the fact that we reevaluate every patient by measuring the zinc and copper levels in serum and in the red cells as well as a series of related enzymes monthly. We therefore have the opportunity to correlate the clinical progress of the patients with these parameters and to manage treatment accordingly.

We believe, as others did in the past (19, 23) that the discrepancy in the literature concerning zinc levels of serum of psoriatics may at least in part originate from methodological differences, and that trace metal metabolism and therapy deserves a re-evaluation.

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