Letters to Editor

Serum zinc and copper levels and Cu:Zn ratio in psoriasis

Sir,

Both zinc and copper are known to be involved in a number of cellular metabolic activities. It has been established by a number of analytical and experimental observations that both zinc and copper play an essential role in the normal keratinization process of animal skin.

Sixty patients of psoriasis, comprising of 34 males and 26 females, were studied. Patients with diseases known to alter the serum zinc and copper levels, pregnant women, and females taking oral contraceptives were excluded. Five ml of venous blood was collected and serum was separated. The serum zinc and copper level estimation was done by atomic absorption spectrophotometry. The results were compared with 20 age and sex matched normal healthy controls, mostly relatives of patients. The results were compared by applying unpaired 't' test.

The mean age of the patients was 31.6 ± 13.18 years. The duration of psoriasis ranged from one month to 18 years (mean 4.26 ± 2.44 years). The serum zinc levels in the normal healthy controls were in the range of 98-118 µg/dl (mean 106.6 ± 5.89 µg/dl), while the serum zinc levels in patients of psoriasis were in the range of 58-96 µg/dl (mean 74.28 ± 7.84 µg/dl). The serum copper levels in controls ranged from 102-126 µg/dl (mean 115.14 ± 6.87 µg/dl) while in psoriasis patients it ranged from 122-160 µg/dl (mean 142.78 ± 8.22 µg/dl) [Table 1]. The difference in both the serum zinc and copper values was statistically significant (P<0.01) as compared to controls.

No significant change in the serum zinc and copper levels was observed among psoriatics on the basis of their age, sex, duration of disease, and involvement of joints and nails. However, patients with more than 20% body surface involvement (mean 69.66 ± 8.29) and patients with a positive family history of psoriasis (mean 70.08 ± 4.23 µg/dl) had significantly lower serum zinc levels than those with less than 20% body surface involvement (mean 77.81 ± 8.03) [Table 2] and a negative family history of the disease (74.83 ± 7.61 µg/dl) [Table 3]. There was no significant difference between the serum levels of copper of psoriatics between these two groups. The mean serum copper:zinc ratio was 1.92 in psoriasis patients as compared to 1.08 in controls.

Psoriasis is a multifactorial disease with a genetic predisposition characterized by a defect in keratinization. Many workers have observed significantly low serum levels of zinc and copper in psoriatic patients, while others have found normal levels. A significant lowering of the serum zinc concentration in psoriasis without an improvement in serum zinc levels after oral zinc therapy is also observed. McMillan and Row also observed that psoriatics with more than 10% body surface area had a significantly lower serum zinc concentration than those with less than 10% body surface area involvement. In our study too patients with more than 20% body surface area involvement showed a significantly decreased (P<0.01) serum zinc concentration than those with less than 20% body surface area involvement. An reduction in serum zinc concentration with increasing surface area involvement in psoriatics may be due to zinc depletion secondary to loss of zinc through exfoliation. An alternative possibility is that disturbance in the serum zinc status might actually be resulting in greater surface area involvement.

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Serum zinc level in vitiligo: A case control study

Sir,

Vitiligo is a common dermatological disorder characterized by acquired, idiopathic, progressive, circumscribed hypomelanosis of the skin and hair, with total absence of melanocytes microscopically.

Various physiological, biochemical, histochemical and enzymatic studies have been done to find out the cause of the disease.

Zinc impairs growth and development, decreases the resistance to local infection, delays wound healing, may produce hyperkeratotic skin lesions, apathy, depression, behavioral changes, and taste disturbances. Conditioned zinc deficiency occurs with the formation of insoluble complexes with calcium, fiber and phytate thus markedly decreasing the intestinal absorption of zinc. Decrease in plasma levels of zinc may occur in a woman on oral contraceptives, in pregnancy, cirrhosis of liver, viral hepatitis, parasitic infestations, acute infections, neoplastic conditions and myocardial infarction. Zinc deficient states were reported with steatorrhea, renal failure, severe burns and mongolism. Alcohol consumption may increase the urinary zinc levels.

Research at the molecular level has demonstrated deficiency of antioxidant substances in vitiliginous skin. This leads to cytotoxic action of reactive oxygen species such as superoxide anion and hydroxyl radical which are generated by the ultraviolet damaged epidermis. The free radicals are also cytotoxic to melanocytes and inhibit tyrosinase.

Essentiality of zinc is related mainly to its function as the metal moiety of important enzymes. Zinc is considered as an antioxidant because the extracellular enzyme superoxide dismutase is zinc-dependent. It plays a vital role in the protection against free radical damage.

Zinc as a trace element, plays an important role in the process of melanogenesis. Trace elements including zinc catalyze the rearrangement of dopachrome to form 5,6 - dihydroxy indole - 2 carboxylic acid (DICA) in the process of melanogenesis.

The present study was conducted to measure the serum zinc level across clinical spectrum of vitiligo and to compare it with age and sex-matched controls.

This study was conducted for a period of one and half years from January 2002. Sixty newly diagnosed patients of vitiligo who attended the dermatology OPD were included in the study. Patients who were not on any treatment with zinc in the four weeks prior to diagnosis were included in the study group. A detailed cutaneous and systemic examination was done in all patients and patients with other skin disorders or systemic diseases were excluded from the study group.

The control group included normal volunteers who were not on zinc medication in any form. Three ml of fasting blood was collected in special sterile tubes (RIA vial) and was centrifuged for 10 minutes at 1500-2000 rpm. The supernatant serum was transferred to a separate sterile vial and kept at -20°C in the deep freezer till the analysis. All other routine investigations were done including hemogram, blood sugar, serum calcium and liver function tests. The serum zinc level was measured by 'atomic absorption spectrophotometer' (AAS). Normal range of serum zinc level is 11-19 mmol/l.

Of the 60 patients, 49 were males and 11 were females. Male to female ratio was 4.5:1. The mean age of presentation was 33.8 years and the mean age of onset was 29.2 years. The mean duration of the disease was 2 years. Only 33% of the patients had a positive family history. The most common site of involvement was found to be the lower extremity. Vitiligo vulgaris was the commonest morphological pattern (85%) followed by mucosal vitiligo (10%), segmental vitiligo (3.3%) and acrofacial vitiligo (1.6%).

Analysis of the zinc level revealed a reduced level in 13 (21.6%) out of the 60 patients. Eleven (22%) out of 49