

ANTIOXIDANT VITAMINS, CALCIUM AND PHOSPHORUS LEVELS IN PSORIASIS**SREEKANTHA¹, MANJUNATHA GOUD B K^{3*} AVINASH S S²,
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ABSTRACT

Psoriasis is regarded as a multifactorial disease in which interaction between genetic and environmental factors seem to play a causative role. Evidence is now accumulating that there is an association between Vitamin C, Vitamin E, Calcium, Phosphorus and psoriasis but the detailed mechanisms are not yet known.

In the present study we estimated vitamin E, Vitamin C, Calcium and Phosphorus in 25 psoriatic patients and 25 age matched controls. We observed a very highly significant decrease in Vitamin E, Vitamin C and Calcium ($p < 0.001$). It could be concluded from our study that decrease in above parameters are the probable causative agents for the pathogenesis of psoriasis.

KEYWORDS

Psoriasis, Vitamin E, Vitamin C, Calcium, Phosphorus.

INTRODUCTION

Psoriasis is a chronic inflammatory immune mediated disease that predominantly affects the skin and joints¹. Global prevalence of psoriasis is about 2–4.8%². Psoriatic lesions are erythematous papules which form plaques characterized by sharp borders and increased scaling. Genetic and environmental factors have been suggested to play an etiological role in the disease. According to various research groups, there is still no single concept that explains the etiology of psoriatic features³. Among the environmental factors, systemic infections,

metabolic disturbances, medications, stress, Vitamin C, Vitamin E, calcium and phosphorus are important.

Skin possesses endogenous and exogenous antioxidant protectors to prevent oxidative damage. Among these skin antioxidants, ascorbic acid (Vitamin C) has demonstrated a protective role against UV injury which is a major exacerbating factor for psoriasis⁴.

Though Lipid peroxidation is increased, some studies have revealed conflicting role of vitamin E in pathogenesis of psoriasis⁵. Hypocalcemia is a triggering factor for the development of psoriasis. Decreased intracellular calcium

triggers the alteration in differentiation and proliferation of keratinocytes⁶.

The main aim of our study is to estimate Vitamin C (Ascorbic acid), Vitamin E (Tocopherols), Calcium and Phosphorous levels in psoriatic patients.

MATERIALS AND METHODS

Study was conducted in Wenlock and KMC group of hospitals Mangalore and Manipal. 25 freshly diagnosed psoriatic patients were studied in the age group of 30 to 60 years before initiation of any treatment. 25 healthy age and sex matched volunteers were used as controls.

Patients and controls were excluded from study if there was evidence of renal, hepatic or thyroid dysfunction and any history of bone lesions, collagen vascular disorders and scurvy. All the patients and controls under treatment with drug that may contribute to change in calcium and phosphorus homeostasis were excluded.

All the parameters were estimated in serum. Vitamin E (Tocopherol) was measured by their reduction of ferric to ferrous ions which then formed a red colored complex with alpha-alpha' dipyridine. Tocopherols being lipid soluble was

first extracted into xylene and the absorbance was read at 460 nm⁷. Vitamin C (Ascorbic acid) was oxidised by cuprous to form dehydro ascorbic acids, which reacted with 2, 4 DNPH, to form a red bis hydrazone which was measured at 520 nm⁸. Calcium reacts with o – cresophthalein in alkaline solution to form purple colored calcium – o – cresophthalein complex which was read at 600 nm⁹. Phosphorus – inorganic phosphate forms blue colored ammonium phosphomolybdate complex with ammonium molybdate in presence of sulphuric acid which is read at 340 nm¹⁰.

STATISTICAL ANALYSIS

Statistical analysis was conducted using Mann-Whitney U test.

RESULTS

In psoriatic patients Vitamin E ($p < 0.001$), Vitamin C ($p < 0.001$) and Calcium ($p < 0.001$) levels were decreased significantly and inorganic phosphorus ($p < 0.001$) was increased significantly as compared to controls shown in table 1.

Table no 1

	Psoriasis patients	Normal controls	P Value
No of cases	25	25	
Phosphorus (Mean \pm SD)	5 \pm 1.26	3.55 \pm 0.47	<0.001
Calcium (Mean \pm SD)	7.25 \pm 0.73	9.84 \pm 0.91	<0.001
Vitamin E (Mean \pm SD)	3.96 \pm 0.928	8.93 \pm 3.51	<0.001
Vitamin C (Mean \pm SD)	0.296 \pm 0.063	0.858 \pm 0.45	<0.001

$p < 0.001$ = very highly significant

DISCUSSION

Numerous biochemical, immunological, genetic and recently free radical generation abnormalities are responsible for the pathogenesis of psoriasis, the exact pathogenesis of psoriasis has remained unclear, but some factors are known to trigger, participate or aggravate the disease process. One of these factors is increased free radical production and decreased antioxidant resistance¹¹. Oxidative stress and increased generation of free radicals are linked to pathogenesis of psoriasis. Elevated levels of superoxide anions plays a central role in pathogenesis of psoriasis. Increased levels of markers of lipid peroxidation are observed in psoriasis, indicating advanced phospholipids peroxidation of lipid membrane caused by a decrease of antioxidant resistance¹².

Vitamin E (Alpha tocopherol) is a major chain breaking antioxidant that prevents the propagation of lipid peroxidation. Significantly decreased Vitamin E levels in our study demonstrates the decreased antioxidant resistance in psoriatic patients¹³.

Among the endogenous and exogenous antioxidant protectors of the skin Vitamin C has demonstrated a protective role against UV injury

to prevent oxidative damage¹⁴. Therefore, ascorbic acid (ROS scavenger) levels are of interest in psoriasis. Our study demonstrates the significantly decreased Vitamin C levels in psoriatic patients.

In our study the calcium levels were significantly decreased along with increase in the phosphate levels in patients suffering from psoriasis

Hypocalcemia is responsible for triggering and aggravation of psoriasis¹⁴. Calcium within the cell plays an important role in the regulation of proliferation and differentiation of keratinocytes. Calcium homeostasis may be involved in the development or exacerbation of psoriasis because hypocalcemia may damage cell adhesion molecules, such as cadherins which dependent on calcium¹⁴.

Thus, decreased antioxidant resistance in psoriatic patients shown by the decreased levels of antioxidant vitamins, Vitamin E and C is responsible for development of psoriasis. Further study has to be done in larger population to show the effect of antioxidant vitamins and calcium supplementation on the development and progression of psoriasis.

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