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A study of serum calcium and uric acid levels in Psoriasis

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Abstract

Introduction: Psoriasis is one of the most common dermatological conditions seen in daily practice. There has been a lot of research on its consideration as a systemic disease with researchers being of the view that the dermatological manifestations represent only a part of spectrum. This study was undertaken to analyze one such debatable association of serum calcium and uric acid levels with severity and clinical subtypes of psoriasis.

Objectives:

1. To estimate the serum levels of calcium and uric acid in patients of psoriasis.
2. To correlate the severity of disease with serum levels of calcium and uric acid in patients of psoriasis.

Materials and Methods: 100 patients of psoriasis who consented for the study were enrolled for this randomized, hospital based observational study. A detailed history, general physical examination and cutaneous examination was done to determine the clinical subtype and to calculate the PASI. Serum calcium and serum uric acid levels were estimated in all the patients.

Results: Among the 100 patients studied, majority of patients were male (74 %), while female patients accounted for 26%. Chronic plaque psoriasis was the most common type, being present in 66%. Hypocalcemia was observed in 38% of study subjects. High serum uric acid levels were seen in 26.6%. There was a significant correlation observed between hypocalcemia and PASI score in psoriasis patients.

Conclusion: There was a positive correlation between hypocalcemia and PASI score with no such correlation observed between serum uric acid level and PASI.

Keywords: Psoriasis, Body Surface Area, PASI, Hypocalcemia, Hyperuricemia.

Introduction

Psoriasis is a common, chronic, disfiguring, inflammatory and proliferative condition of the skin, in which both genetic and environmental influences have a critical role.[1] Elevated uric acid serum levels are a frequent finding in psoriasis. It seems a convincing idea that the rapid epidermal turnover in psoriasis might lead to an increased purine breakdown and may thus influence the uric acid serum levels.[2] Consequently, a relationship might well be expected between hyperuricemia and the extent of psoriatic skin involvement. Many studies in the past have especially identified a direct association between the serum uric acid levels and psoriatic arthropathy. Such elevations has correlated positively with Psoriasis Area and Severity index (PASI), extent of skin involvement and Body Mass Index (BMI).[3]

Association of mild hypocalcemia with pustular psoriasis of Von Zumbusch, a rather severe form of psoriasis has been observed.[4] It has been demonstrated that decreased serum calcium levels aggravates psoriasis in most patients.[5] This study was undertaken to appraise the correlation of serum calcium and uric acid levels with severity and clinical type of psoriasis.

Materials and Methods

In this prospective, observational, hospital based study conducted in tertiary care hospital, a total of 100 consecutive cases of psoriasis consenting for the study were randomly selected and enrolled after obtaining approval from institutional ethical committee. The objective was to estimate the serum levels of calcium and uric acid in patients of psoriasis and to correlate the same with the severity of disease in patients of psoriasis. All patients of psoriasis were included in the study and subjects with coexisting rheumatoid arthritis, chronic renal disease, gout and postmenopausal women were excluded from the study. The study was conducted between November 2015 and June 2017.

The data regarding age, sex, symptoms, duration of disease, treatment history, smoking and alcohol, family history, history of chronic renal failure and gout were recorded in a proforma. A detailed general physical examination was conducted. Type and distribution of lesions were noted. Severity of psoriasis was assessed according to Psoriasis Area Severity Index {PASI} and Body Surface Area (BSA).Serum calcium and serum uric acid was estimated in all the patients and recorded. The reference level for hypocalcemia was set at less than 8.5mg/dl and 10.5mg/dl for hypercalcemia and for hyperuricemia it was more than 6mg/dl in females and more than 7.2mg/dl in males.[6,7]

All the results were recorded, tabulated and analysed according to statistical proportions and the correlation was analysed using Pearson Chi-square test.

Results

The age of the patients ranged from 10 years to 60 years. The majority of patients (28%) belonged to the age

group of 31years to 40 years age group. Mean age of the patients included in study was 36.8 years. Males comprised 74% and females were 26%. Majority of males (29.7%) were in the age group 41 to 50 years. Females were more in the age group of 31 years to 40 years (38.4%).

Chronic plaque psoriasis was the most commonly observed clinical type in this study which was seen in 66% of cases. This was followed by palmoplantar psoriasis which was observed in 14% of the study subjects. A meagre 2% of cases had pustular psoriasis. Hypocalcemia was noted in 38% and hyperuricemia in 16% of the study subjects. Hypocalcemia was observed in 68% of males whereas hyperuricemia was seen exclusively only in males.

There was no correlation observed between the duration of the disease and occurrence of hypocalcemia. 36.8% of patients with hypocalcemia had the disease for less than a year and only 10.5% patients were hypocalcemic though they had the disease for more than 6 years (Table 1)

Table 1: Association of duration of disease and Hypocalcemia

Duration (months)	No. of psoriasis patients	No. of patients with hypocalcemia	Percentage (%)
0-12	36	14	36.8
13-36	38	8	21.1
37-48	12	10	26.3
49-60	2	2	5.3
61-72	0	0	0
>73	12	4	10.5
Total	100	38	100

The duration of the disease did not correlate positively with uric acid levels, among the cases with hyperuricemia 50% had the disease for a period of 1-2 years and no cases had hyperuricemia with disease duration of more than 6 years. (Table 2)

Table 2: **Correlation of duration of disease and Hyperuricemia**

Duration (months)	No. of psoriasis patients	No. of patients with hyperuricemia	Percentage (%)
0-12	36	4	25
13-36	38	8	50
37-48	12	4	25
49-60	2	0	0
61-72	0	0	0
>73	12	0	0
Total	100	16	100

In our study, the cases were divided into three groups with a PASI score ranging from 0-15, 16-30 and 31-45 based on the severity of the disease. In the present study majority of the cases (58%) had a PASI score of 0-15 and 4 patients had a score between 31- 45. (Fig. 1)

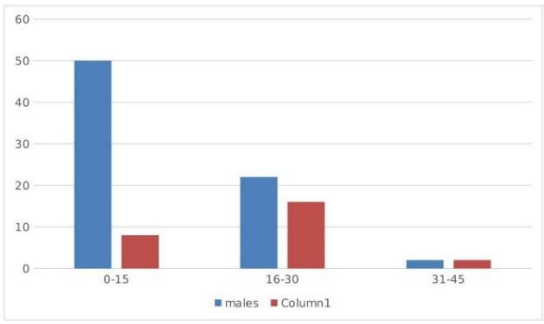

Fig. 1: Showing PASI score

Out of 58 patients with a PASI score ranging from 0-15, 16 patients had hypocalcemia (27.6%) and 18 patients with PASI 16-30 had hypocalcemia (47.4%). Four patients had PASI score of 31 to 45 and all these four patients had hypocalcemia (100%). Using Chi square test, P value was found to be 0.002 which was statistically significant.

Pearson correlation coefficient was calculated to be -0.63659 with negative correlation and statistically significant. (Table 3)

Table 3: Correlation of PASI score and Hypocalcemia

PASI	With hypocalcemia	With normocalcemia	Total number of patients
0-15	16	42	58
16-30	18	20	38
31-45	4	0	4
Total	38	62	100

P value was calculated using Chi square test and was found to be 0.3 which was not statistically significant. Pearson correlation coefficient value was calculated to be 0.08608 which showed positive correlation but was not statistically significant. (Table 4)

Table 4: Correlation of PASI score and Hyperuricemia

PASI	With hyperuricemia	With normal serum uric acid	Total number of patients
0-15	0	42	58
16-30	16	22	38
31-45	0	4	4
Total	16	68	100

Hypocalcemia was observed in 39.3% of patients with chronic plaque psoriasis although 60% had normal calcium levels in the same group. It was noteworthy that all patients with pustular psoriasis and erythrodermic psoriasis had hypocalcemia (100%). P value calculated using Chi square test was found to be 0.0009 which was statistically significant. (Table 5)

Table 5: Type of Psoriasis and Hypocalcemia

Type of psoriasis	Hypocalcemia	With normal serum calcium	Total cases
Chronic plaque	26	40	66
Palmo plantar	4	10	14
Scalp	0	8	8
Guttate	2	4	6
Pustular	2	0	2
Erythrodermic	4	0	4
Total	38	62	100

Twelve cases out of 66 chronic plaque psoriasis had hyperuricemia (18.2%), while four cases out of fourteen palmoplantar psoriasis had hyperuricemia (28.6%). Patients with other types of psoriasis didn't have hyperuricemia. P value was found to be 0.377 using Chi square test which was not statistically significant.

Table 6: Type of Psoriasis and Hyperuricemia

Type of psoriasis	Hyperuricemia	Normal	Total No of cases
Chronic plaque	12	54	66
Palmo plantar	4	10	14
Scalp	0	8	8
Guttate	0	6	6
Pustular	0	2	2
Erythrodermic	0	4	4
Total	16	84	84

Discussion

Psoriasis is categorized as hyper proliferative disease, as epidermal basal cells exhibit increased frequency of mitosis in the disease. Several studies have demonstrated close relation between psoriasis and serum calcium level.[8] Out of 100 patients in our study, 38 patients (38%) had hypocalcemia which correlated closely with a study done by HH Qadim et al,[9] remaining

62 patients had either normal calcium level or hypercalcemia. Fourteen patients had hypocalcemia with disease duration of less than one year. Eight patients had hypocalcemia with disease duration of one to three years. Ten patients out of thirty eight patients with hypocalcemia had the disease for a varying span of thirty seven to forty eight months.

Sixteen patients out of thirty eight patients with hypocalcemia had PASI score ranging from 0-15, eighteen patients had PASI score ranging from 16-30 and four patients had PASI score ranging from 31-45.

Out of the 38 patients with hypocalcemia, 26 patients had chronic plaque type of psoriasis and four patients each suffered from palmoplantar and erythrodermic psoriasis. Hypocalcemia was also observed in two cases each of guttate and pustular psoriasis.

P value of hypocalcemia in our study was 0.001 which was significant. High levels of serum calcium were observed in 10% cases, low in 15% cases and and normal levels in remaining 75% cases in a study by K C Verma et al.[10] The total serum calcium levels was found to be within normal limits, ranging from 8.8 to 10.4mg% in a study by Ramesh Chand et al.[11] A study by another group of workers showed total serum calcium levels to be decreased in 4.9% of study subjects and this was attributed to severe episodes of disease and associated steatorrhea.[12]

The alterations in serum calcium in patients of psoriasis have been varyingly reported, showing a decreased or normal level.[13] Calcium depletion from horny layer of epidermis may play a role in the formation of psoriatic skin lesions.

An increased level of uric acid was recorded only in 16% of patients. Out of the 16 patients, 8 patients had the disease duration for 1 to 3 years. Among patients of hyperuricemia, 8 had a PASI of 0-15 and 8 had PASI 16-30. Out of these 16 patients 12 patients had chronic plaque psoriasis and 4 had palmoplantar psoriasis. Mean value of uric acid in our study was 8.03mg/dl. High serum uric acid levels were seen in 26.6%, while normal levels were present in remaining patients.[14] Mehta[15] et al observed high serum uric acid levels in 20% of patients while it was low in 1% cases. P value of serum uric acid and severity of psoriasis in our study was 0.479 which was not statistically significant, a study done by Lambert[16] showed similar findings. Increased purine metabolism occurs in psoriasis because of increased epidermal cell turnover.[17]

Conclusion

The study findings suggest that patients with psoriasis often exhibit deranged serum calcium and uric acid levels. A negative correlation was observed with regards to PASI score and hypocalcemia. However serum uric acid levels did not show any statistical significance.

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