ORIGINAL ARTICLE

To study correlation of serum uric acid levels with severity of psoriasis

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ABSTRACT

Background: Psoriasis is a common, chronic, inflammatory skin condition influenced by genetic, environmental and immunological factors. Increased epidermal cell turnover can lead to raised levels of serum uric acid in psoriasis. Thus, monitoring of serum uric acid levels can facilitate early diagnosis, treatment and prevention of comorbidities leading to improved quality of life.

Objective: To study the serum uric acid levels in patients of psoriasis. To correlate the severity of disease with serum uric acid levels in patients of psoriasis.

Methods: This was a case-control study conducted at the Department of Dermatology, Dayanand Medical College and Hospital, Ludhiana. Clinically diagnosed cases of psoriasis and BMI matched controls equivalent to 1/4th of the total cases were taken during the study period of one year i.e. from 1st March, 2021 to 28th February, 2022. Patient's history was taken and thorough examination was done. Serum uric acid of the patients was correlated to PASI score, type of psoriasis and was compared with serum uric acid levels of BMI matched controls.

Results: Mean serum uric acid of cases was 5.88±1.67 mg/dl, whereas the mean serum uric acid of controls was 5.27±1.19 mg/dl. Serum uric acid was raised in 15(25%) cases compared to 2(13.3%) controls (p=0.334). Hyperuricemia was seen in 60.0% of cases with PASI >20 compared to 33.3% of cases with PASI 10-20 & 6.7% of the cases with PASI <10. Serum uric acid levels showed a statistically significant association with PASI score (p=0.019).

Conclusions: Our study concludes that serum uric acid levels increase with the increase in the severity of psoriasis. Monitoring of serum uric acid levels during treatment and follow up of psoriasis patients can prevent its deleterious effects on psoriasis.

KEY WORDS: Psoriasis, Psoriasis area severity index (PASI) score, Serum uric acid(SUA)

INTRODUCTION

Psoriasis is a common, chronic, inflammatory and proliferative condition of the skin, associated with systemic manifestations in many organ systems. Genetic, immunological and environmental influences have a critical role in the etiology and pathogenesis. Environmental risk factors include streptococcal pharyngitis, obesity, trauma, low humidity, etc.[1]

According to various epidemiological studies, estimated worldwide prevalence of psoriasis is found to be 0.6% to 4.8% with higher prevalence in developed countries.[2] Psoriasis can occur at any age though the mean age of onset for the first occurrence is between 15-20 years, with a second peak at 55-60 years with males being more commonly affected.[3]

Psoriasis is a papulosquamous disorder with

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classical skin lesions consisting of well-circumscribed, circular, reddish papules or plaques covered with silvery white, grey or dry scales. Lesions are symmetrical in distribution and most commonly involve the scalp, elbows, knees and lumbosacral region. Koebner's phenomenon can be demonstrated in psoriasis.[4]

The most common symptoms associated with the disease include itching, irritation, pain, burning sensation and bleeding.[5]

According to the different clinical features, psoriasis is divided into five types: Plaque psoriasis, guttate psoriasis or eruptive psoriasis, inverse psoriasis, pustular psoriasis and erythrodermic psoriasis. Chronic plaque psoriasis is the most common type seen accounting for nearly 90% of all cases. Diagnosis of psoriasis is mainly clinical. Occasionally skin biopsy may be required in case of atypical presentation.[3,4]

The pathophysiology involves increased mitotic activity of the basal cell layer resulting in rapid epidermal cell turnover with the 28-day normal epidermal cell cycle reduced to 5 days. The mitotic activity of cells involves purine (adenine and guanine) metabolism, the end product of which is uric acid. Therefore, Serum uric acid(SUA) levels are expected to vary with the duration and severity of the disease.[6]

Normal SUA levels in males are 3.4-7mg/dl whereas in females it is 2.4-5.7mg/dl.[7] Hyperuricemia is defined as serum uric acid levels greater than 6mg/dl in females and greater than 7mg/dl in males.[8]

Since SUA levels may vary with the extent of skin involvement in psoriasis, so Psoriasis Area Severity Index (PASI) score is used to calculate the severity of the disease.[4]

Psoriasis is not exclusively a dermatological disease. It can affect various organ systems as well. Elevated SUA levels also act as a risk factor for a large number of life-threatening diseases such as premature cardiovascular diseases, chronic kidney disease and metabolic syndrome.[9] Being aware of the above comorbidities and complications associated with psoriasis and hyperuricemia, early diagnosis of psoriasis, and estimation of SUA levels may facilitate early and appropriate treatment initiation and prevention of comorbid conditions.

MATERIALS AND METHODS

Clinically diagnosed cases of psoriasis attending outpatient and inpatient in Department of Dermatology of Dayanand Medical College and Hospital, Ludhiana during the study period of one year i.e. from 1st March, 2021 to 28th February, 2022 were included in the study. Detailed history was taken and thorough examination was done. BMI and PASI score were calculated. BMI matched controls equivalent to 1/4th of the total cases were taken.

Inclusion criteria:

1. Clinically diagnosed cases of Psoriasis vulgaris
2. Patients of any age group and either sex
3. Patients willing to participate

Exclusion criteria:

1. Patients not willing to participate
2. Pregnant and lactating woman
3. Patients with history of leukemia, polycythemia vera, gout, chronic liver disease or renal disorder
4. Patients who were taking drugs known to affect serum uric acid levels such as alcohol, allopurinol, salicylates, ethambutol etc.
5. Patients who were taking or had taken meth-

otrexate in last 3 months

Serum uric acid was calculated by enzymatic colorimetric method using uricase enzyme on autoanalyzer. Serum uric acid of the patients was correlated to PASI score, type of psoriasis and was compared with SUA levels of BMI matched controls.

Method to calculate PASI score: To calculate PASI score affected body surface area (BSA) is estimated for the head and neck, trunk, upper extremities and lower extremities separately and graded (0-6) with a correction factor of 10%, 20%, 30%, 40% respectively to allow for the differing surface area of these four regions. Erythema, desquamation and induration are then graded (0-4) in each region. The severity rating for the three main target symptoms is multiplied with the numerical value of the areas involved and with the various percentages of the four body areas. The index varies in steps of 0.1 units from 0.0 to 72.0.[10]

RESULTS

A total of 60 cases and 15 BMI matched controls were evaluated during the study period of one year. In our study, mean age of cases and controls was 43.05±11.17 years and 46.93±11.23 years respectively. The maximum number of cases were in the age group of 31-50 years (56.67%) and the minimum number of cases were <20 years (1.67%) of age. Whereas, the maximum and minimum number of controls were in the age group of 41-50 years (46.67%) and <30 years (6.67%) respectively.(Table1) Male preponderance was observed in cases in contrast to female preponderance in controls. Amongst cases, 47 (78.3%) were males and 13(21.7%) were females whereas amongst controls, 8(53.3%) were females and 7(46.7%) were males. Out of 60 cases, 43 cases had chronic plaque psoriasis (71.7%) followed by palmoplantar psoriasis which was present in 9 patients (15%). (Table 2)

Table 1 Age distribution of cases and controls

Age (years)	No. of cases (n)	Percentage (%)	No.of controls (n)	Percentage (%)
<30	10	16.67%	1	6.67%
31-40	17	28.33%	3	20.00%
41-50	17	28.33%	7	46.67%
51-60	11	18.33%	2	13.33%
>60	5	8.33%	2	13.33%

Table 2 Types of psoriasis

Type of psoriasis	No. of cases (n)	Percentage (%)
Chronic plaque psoriasis	43	71.7%
Palmoplantar psoriasis	9	15.0%
Scalp psoriasis	3	5.0%
Generalized pustular psoriasis	2	3.3%
Flexural psoriasis	1	1.7%
Erythrodermic psoriasis	1	1.7%
Guttatte psoriasis	1	1.7%

Extremities including the lower limbs and the upper limbs were most commonly affected sites involved in 42(70%) and 41(68.35%) cases respectively; followed by scalp (63.30%) and trunk (60%). (Table 3)

Table 3 Sites of involvement

Sites	No. of cases (n)	Percentage (%)
Scalp	38	63.30%
Upper limbs	41	68.35%
Trunk	36	60.00%
Lower limbs	42	70.00%
Palms & soles	15	25.00%

Psoriasis was classified on the basis of severity using the PASI score as mild (<10), moderate (10-20) & severe (>20) psoriasis. Maximum number i.e. 22 cases (36.7%) had moderate psoriasis followed by severe psoriasis seen in 20 cases (33.3%) and 18 cases (30.0%) had mild psoriasis. Also, the lowest PASI score was 1.5 while the highest PASI score was 56.3. Nail changes were present in 43.3% of the cases as compared to 13.3% of the controls. Therefore, nail changes showed a statistically significant association with the psoriasis (p-0.039). Nail pitting was the most common finding (36.67%). Joint involvement seen in 18.3% of cases showed no significant association (p-0.107). Hyperuricemia was seen in 25% of cases compared to 13.3% of controls. Thus, SUA levels were not significantly associated with psoriasis (p-0.334). (Table 4)

Table 4 Serum uric acid levels and psoriasis

		Cases		Controls		Total
		No. of cases (n)	%age	No. of cases (n)	%age	
SUA levels	Normal	45	75.0%	13	86.7%	58
	Hyperuricemia	15	25.0%	2	13.3%	17
Total		**60**	**100.0%**	**15**	**100.0%**	**75**

Mean SUA of cases was 5.88±1.67 mg/dl, whereas the mean SUA of controls was 5.27±1.19 mg/dl. (p-0.187). Hyperuricemia was predominantly seen in male cases (93.3%). Majority of the cases with hyperuricemia had chronic plaque psoriasis (30.23%). Out of 15 cases with hyperuricemia, the largest fraction i.e. 9 (60.0%) cases had severe psoriasis (PASI > 20). (Table 5) Therefore, the SUA levels showed a statistically significant association with the PASI score in our study (p-0.019).

Table 5 Serum uric acid levels and PASI score

		SUA levels				Total
		Normal		Hyperuricemia		
PASI Score	< 10	17	37.8%	1	6.7%	18
	10-20.0	17	37.8%	5	33.3%	22
	> 20	11	24.4%	9	60.0%	20

DISCUSSION

Psoriasis is a common, chronic skin disease with multifactorial etiology and genetic susceptibility. Due to the exaggerated proliferation of keratinocytes, levels of SUA are frequently raised in patients with psoriasis. In this study, 60 cases of psoriasis and 15 BMI matched controls were taken over a period of one year. Levels of SUA were estimated and was correlated to the severity of psoriasis.

In our study, the mean age of cases and controls was 43.05±11.17 years and 46.93±11.23 years respectively, which was comparable to the study conducted by Solak et al[11] in which the mean age of cases and controls was 44.1±14.4 years and 44.1 ± 14.4 years respectively. Similarly, Das et al[12] showed a mean age of 39.7 ± 7.3 years among the psoriasis group and 41.5±18.5 years among controls. However, the mean age by Agravatt et al[3] was 40.6±11.8 years among cases and 39±6.48 years among controls.

In the present study, the male patients were predominant comprising 78.3% of study patients (n=47) and female patients were 21.7% (n=13). The male preponderance was also noted in studies conducted by Sayami et al[13] and Takahashi et al.[14] However, female predominance was noted in studies done by Kundakci et al[15] and Agravatt et al.[3]

The mean SUA in cases and controls was

5.88±1.67 mg/dl and 5.27±1.19 mg/dl respectively. Also, the mean SUA levels in cases were 4.59±0.91 mg/dl in females, 6.24±1.66 mg/dl in males. Whereas, 4.71±1.22 mg/dl in females and 5.90± 0.83 mg/dl in males respectively in the control group. In a similar study done by Gisondi et al[16] the mean SUA in psoriasis cases was 5.61±1.6 mg/dl and in controls was 4.87±1.4 mg/dl.

The prevalence of hyperuricemia among cases was found to be 25% compared to 13.3% among cases with a p-value of 0.334 which was statistically insignificant. Similar results were shown by Cassano et al[17] where the prevalence of hyperuricemia in cases and controls was 10% and 6% respectively. However, the prevalence of hyperuricemia was 40.7% in a study by Ukonu et al[18] with a p-value of 0.001. Studies by Sayami et al[13] and Gisondi et al[16] also showed a significant association between psoriasis and serum uric acid with p-value of 0.012 and < 0.001 respectively. The mean SUA of the cases based on PASI Score with <10, 10-20 and >20 were found to be 5.11±1.49 mg/dl, 5.96±1.58 mg/dl and 6.49±1.71 mg/dl respectively. Thus, the mean SUA was in increasing order as the severity of psoriasis increased. Similarly, in a study done by Sayami et al[13] mean SUA based on PASI score was 4.77±0.85 mg/dl, 5.33±1.36 mg/dl and 5.82±1.97 mg/dl respectively.

In our study, 60% (n=9) of the cases with elevated SUA levels had PASI score >20. Out of the remaining 40% of cases, 33.3% (n=5) had PASI score between 10-20, and 6.7%(n=1) had a PASI <10. Also, our study showed a statistically significant increase in SUA levels with the PASI score with a p-value of 0.019. Likewise, Sayami et al[13] observed a statistically significant increase in SUA level with PASI Score (p-value= 0.021). Gisondi et al[16] also noticed higher SUA levels in psoriatic patients with PASI score ≥10 (p-value < 0.01). Our findings were in accordance with the study by Kwon HH et al[19] where he reported no significant difference between SUA levels of psoriatic patients and healthy controls but found a positive correlation between SUA levels and PASI score. However, studies by Agravatt et al[3] and Cassano et al[17] revealed no significant correlation between serum uric acid level and PASI score with value of ≥ 0.05 and 0.34 respectively.

CONCLUSION

Psoriasis is a chronic inflammatory disorder extending involvement beyond the skin. Our study concludes that serum uric acid levels increase with the increase in severity of psoriasis which suggests an association between SUA levels and PASI score. Although, SUA levels did not show significant relation with psoriasis when compared with healthy controls. The main limitations of our study were a limited time frame, relatively small sample size, and lack of follow-up.

As hyperuricemia showed a close relationship with PASI scores, SUA levels of the psoriatic patients should be monitored during treatment as well as on follow-up visits. Our study lacked sufficient evidence to prove psoriasis as an independent risk factor for hyperuricemia as metabolic syndrome associated with psoriasis can also lead to elevated SUA levels. Therefore, SUA screening should be done with increased frequency in obese patients as elevated levels of SUA play a crucial role in the progression of metabolic syndrome, cardiovascular disorders, and gout in these patients.

Since psoriasis has a great psychosocial impact

on the lives of these patients. The presence of co-morbidities can further have a deleterious impact on quality of life. Thus, appropriate screening of SUA levels and management of hyperuricemia can prevent this. A multi-disciplinary approach involving physicians and dermatologists might be helpful in the global treatment of patients.

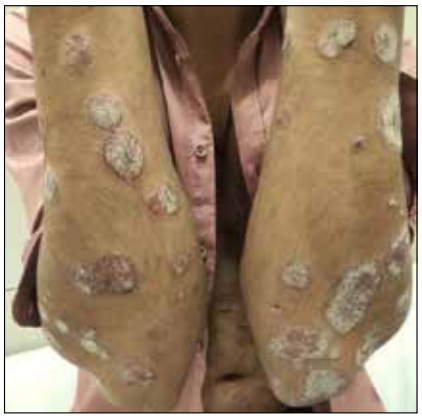

Fig. 1 Chronic plaque psoriasis

Fig. 2 Scalp psoriasis

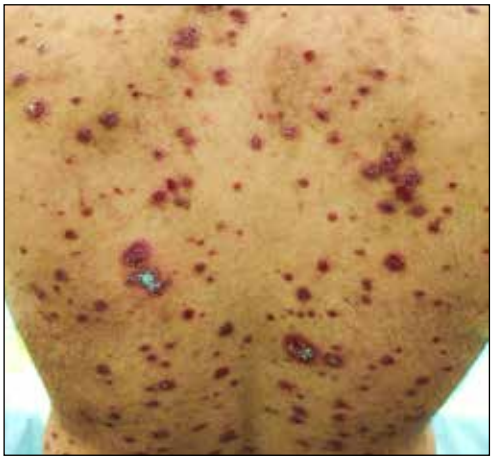

Fig. 3 Guttate psoriasis

Fig. 4 Palmoplantar psoriasis

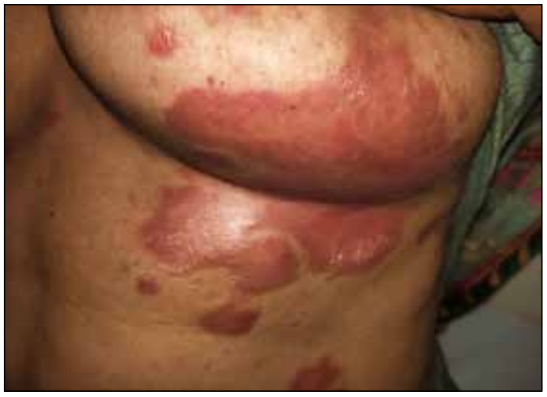

Fig. 5 Inframammary flexural psoriasis

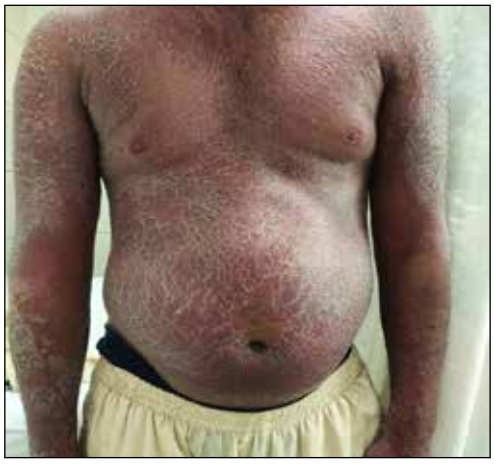

Fig. 6 Erythrodermic psoriasis

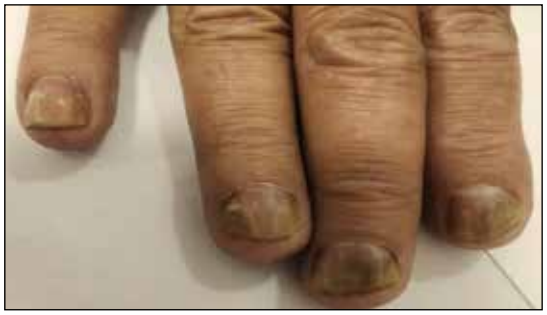

Fig. 7 Nail psoriasis

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